Promoting Inclusive Growth

CHALLENGES AND POLICIES

Edited by Luiz de Mello and Mark A. Dutz

OECD

THE WORLD BANK

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Foreword

The world economy is going through difficult times. The global crisis has bequeathed several countries a legacy of high unemployment, unsustainable public finances and lower potential output. It is therefore time to look ahead and ponder the challenges we will be facing in the years to come. This is what this volume is about. It puts together the proceedings of a conference co-hosted by the OECD and the World Bank that took place in Paris on 24-25 March 2011. The conference provided an opportunity for policymakers, academics, practitioners and members of civil society to discuss complex policy issues and look for creative, forward-looking ways of addressing them.

The policy issues highlighted in this volume - financial development, social policies, innovation, regulation and political economy issues - are relevant to all countries, albeit at varying degrees, depending of their level of development and specific conditions. The key question is: how to design appropriate policies to strengthen growth and make it inclusive and sustainable over time?

This volume puts structural reform at the core of the debate. Structural reforms include a variety of policy initiatives - in product, labour and financial markets, and in tax and benefit systems, among others - to enhance the productive capacity of our economies. Structural reforms can do much to unleash opportunities for investment and to allow countries to tap new sources of growth. They can also address issues of inclusiveness and social cohesion, ensuring that the benefits of sustained growth are shared equitably.

Exploiting synergies among policy domains is also essential in this context. For example, innovation goes beyond R&D and calls for investment in human resources and appropriate competition policies to encourage entrepreneurship, among others. Innovation is also a key pillar of green growth, which is about greening old activities by harnessing knowledge and new technologies that can also create jobs and promote welfare in an environmentally sustainable manner. Pro-growth policies that remove impediments to job creation would contribute at the same time to fiscal consolidation by creating revenue for the budget. A strengthening of social

protection could positively affect people's consumption-saving decisions and the balance of growth between domestic and external sources, depending on the initial position of the country and assumptions about the sustainability of the policy.

We are very pleased to present this volume, because 2011 marked the 50th anniversary of the OECD and another milestone year for the World Bank in terms of promoting growth and opportunity for those in need. The policy challenges that are discussed here offer a window of opportunity to define how the OECD and the World Bank may continue to provide the best policy advice for our respective members and partner countries.

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Executive summary

This volume discusses several policy challenges facing countries to achieve and sustain inclusive growth. The volume is based on the proceedings of a conference co-organised by the OECD Economics Department and the World Bank on 24-25 March 2011, which brought together academics and practitioners from advanced and emerging-market economies, as well as developing countries. While discussions on strong growth typically focus on the pace of economic expansion and the associated improvements in the population's living standards, those on inclusiveness also delve into the patterns of growth and on how its benefits are shared among the different social groups.

An important policy message that underpins the various contributions to this volume is that strong growth is not necessarily inclusive. As a result, there is much room for policy action in different domains to ensure that pro growth initiatives also foster inclusiveness.

What is inclusive growth and how is it dealt with in this volume?

Inclusiveness is a multidimensional concept. Societies strive to achieve and maintain strong growth as a means of raising living standards and improving people's wellbeing. But strong growth is not necessarily inclusive in that the benefits of increased material prosperity are not always shared evenly among the various social groups. Neither is strong growth, even if sustained over a number of years, a guarantee that disenfranchised social groups would have stronger voice in the political process and in society at large. In particular:

- Discussions on inclusiveness usually focus on the incidence of poverty and the distribution of income among individuals and households. Measures of material deprivation and relative income shares are the conventional metrics for gauging the distributive impact of policies. But inclusiveness goes beyond poverty and income distribution and encompasses other dimensions, such as well-being, voice in the political

process and participation in social life, which are highlighted in the different chapters.

- Policymakers often focus on regional development as a way of ensuring that the benefits of growth are distributed evenly across the national territory. Central to the policy debate in this area is the role of policy in eliminating bottlenecks, such as deficiencies in infrastructure, which could prevent laggard regions from catching up with their more prosperous counterparts. Options for sharing budgetary revenues from the exploitation of natural resources among sub-national jurisdictions is another case in point, given that such endowments are rarely distributed evenly within a country's territory.

- Efforts to make growth more balanced across sectors, including between private-sector stakeholders and the government, and between tradable and non tradable activities, have implications for inclusiveness. For example, greater reliance on domestic sources in countries where growth is driven predominantly by the external sector would likely create job opportunities in sectors producing non-tradable goods.

Reflecting its multidimensionality, inclusiveness is dealt with from different angles in this volume. Poverty and income distribution feature prominently in Ross Levine's chapter on financial regulation and in Charles Sabel's chapter on individualised service delivery. The authors discuss policies that have the potential for ensuring a more equitable distribution of income among individuals by equipping them with the needed tools to pull themselves out of poverty and to withstand adverse shocks that could reduce their earnings capabilities. The political economy of inclusive growth is dealt with by Mushtaq Khan and Gene Steuerle. Khan discusses how the sharing of political power that arises from interactions among social groups in the political process affects the distribution of income and opportunities in society and determines the degree of inclusiveness of the growth process. Steuerle discusses how policies aimed at controlling the direction of future resources, no matter how well intentioned, can limit the fiscal space in which to make investments in and find new opportunities for inclusive growth.

The sectoral dimension of inclusiveness is discussed in Morris Teubal and Yevgeny Kuznetsov's chapter in relation to the design of government support for innovation and entrepreneurship. The authors discuss the options that are available to policymakers for avoiding a bias in government intervention, which could create a dual economy combining fast growing targeted sectors with slower growth elsewhere. Sjak Smulders's chapter on

green growth emphasises the cross country dimension of inclusiveness. The author discusses the different incentives and policy options facing mature and developing countries to pursue greener forms of growth and to factor in the costs of environment degradation and resource use in their growth strategies. The cross-country dimension is also highlighted in the chapter by Mark Dutz and colleagues, which assesses empirically the effects of pro-competition regulations in product markets on employment and firms' propensity to innovate in a sample of mature, emerging-market and developing economies.

How can pro-growth policies foster inclusiveness?

Growth-friendly policies are known to have a concomitant bearing on inclusiveness. Of particular interest in this volume are the synergies that exist between pro competition reform in product and financial markets, support for innovation and green growth, and initiatives to promote social development. Actions in these different policy domains hold promise for creating an enabling economic environment in which social groups share the benefits of improved economic performance and stronger growth. The main messages of the chapters are as follows:

- ***The political economy of growth matters for inclusiveness***

Making growth inclusive is about enabling stakeholders to share the benefits of increased affluence and promoting wellbeing. At the policy level, creating the enabling conditions for inclusive growth calls for institutional change and adaptability to evolving economic conditions, a process where the coexistence of old and new institutions often creates tensions that need to be resolved through the political process. Mushtaq Khan develops this line of argument in a chapter that deals with governance in developing countries. Using the experience of Thailand as an illustration and focusing on the protection of property rights, the author argues that the removal of structural obstacles to pro market governance would contribute to making growth more inclusive. Policy action is needed to address the market failures that hold back growth in a process which the author describes as building "growth enhancing governance capabilities". The impetus for, and outcomes of, reform nevertheless differ across countries because of their different "political settlements", or the interaction between institutions and the distribution of power.

Political economy considerations also permeate the analysis in other chapters. This is the case, for example, of the design and implementation of regulatory reform in the financial sector. As noted by Ross Levine, powerful segments of society may influence the design of financial regulation, as in the

example of mandated credit provisions, and render the growth process exclusive, rather than inclusive, by capturing the benefits of government intervention. The design of fiscal consolidation, which is currently needed in several advanced economies, also underscores the political underpinnings of inclusive growth, as noted by Gene Steuerle. By affecting the level and composition of revenue and expenditure, fiscal choices made in the past can have a bearing on how the benefits and costs of government provision are shared among individuals and social groups. For example if almost all resources are committed to rapidly rising health costs, then little may be left over for education. In turn, such commitments can exclude some social groups from the political process, with the young increasingly feeling left out to the extent that their future budgets are pre-ordained.

- ***There is much scope for making support for innovation and entrepreneurship more inclusive***

To become more inclusive, government action in support of innovation in the business sector should not be biased towards the development of high tech activities and to the detriment of other sectors in the economy. Using the Israeli experience as an example, Morris Teubal and Yevgeny Kuznetsov argue that support for high tech Research and Development (R&D) should not neglect low/mid tech activities, which tend to employ more workers than high-tech sectors. The risk of biased support is that the benefits from the development of high tech activities could be circumscribed to that sector and give rise to a dual economy characterised by high growth in the targeted sector and slow growth elsewhere, which undermines inclusiveness. Lower tech industries have strong growth potential in many countries, and appropriate policies could be put in place to encourage those industries to become users of sophisticated technologies through learning, training and technology transfers. An important challenge for policymakers is to design and implement an effective system of support for innovation that is consistent with the country's comparative advantages and creates synergies across the different sectors of the economy.

Innovation-led growth fosters inclusiveness to the extent that it also creates jobs for less skilled individuals. It is often argued that technological change brought about by innovation opens up employment opportunities for better-paid, high-skilled individuals and destroys jobs for the unskilled, a process that undermines inclusiveness and accentuates income disparities. However, the empirical evidence reported by Mark Dutz and colleagues for a sample of enterprises in countries at different levels of development shows that innovative firms grow faster and as a result hire a larger share of unskilled workers relative to firms that do not innovate. These findings

suggest that innovation fosters growth and does not necessarily imply a rising employment gap between highly skilled individuals and their less skilled counterparts.

Technological innovations may also facilitate the implementation of pro-inclusiveness policies, contributing to their success. A case in point is the delivery of conditional cash transfers, which are often disbursed through bank debit cards and automated telling machines in many countries. Increased availability of such payment technologies throughout the developing world is reducing the scope for fraud and leakages in the provision of social services.

- ***Pro-competition regulatory reform is good for growth and inclusiveness***

The growth benefits of structural reform to foster competition in product markets are well known. By unleashing opportunity for investment in sheltered sectors and facilitating the adoption and diffusion of new technologies, reforms to render product market regulations more conducive to competition can generate productivity gains and remove obstacles to effective labour utilisation, which contributes to making growth more inclusive at the same time. This hypothesis is borne out by the empirical evidence reported by Mark Dutz and colleagues that employment grows faster in countries that have a better business environment, while taking into account the role of other important drivers of job creation. The findings highlight the importance of business, legal and physical infrastructure as drivers of entrepreneurship, which can in turn spur economic growth and alleviate poverty because of the linkages that exist between entrepreneurial activity and the creation of productive jobs. The authors also find that access to finance, export markets, Internet communication and other essential business services are powerful determinants of enterprise employment growth, especially for small and young firms in emerging-market and developing countries.

Financial deepening is an important element of the growth process and also has a role to play in making it inclusive. Ross Levine argues that regulatory settings that foster competition, promote transparency and provide appropriate incentives for financial institutions encourage inclusive growth at the same time. However, policy actions often undermine, rather than promote, inclusiveness. For example, competition may be stymied in the name of stability, because a volatile economic environment is detrimental to growth and may hurt the poor disproportionately. Policy activism, such as the allocation of credit by non price mechanisms, is usually motivated by pro poor considerations but often ends up favouring politically connected groups, rather than the underserved population, as noted above in relation to the political economy of inclusive growth. The main challenge for policymakers

is therefore to create an environment where regulation removes obstacles to the provision of financial services and facilitates access to those services by the population, which promotes inclusiveness, in a manner that does not undermine stability.

- ***Greater customisation in the provision of social services contributes to inclusiveness***

Because the benefits of growth are not necessarily spread evenly, there is room for government intervention to equip individuals and households with the tools that would allow them to make the most of good times and cope with adverse conditions. Charles Sabel argues that one option for doing so is to better tailor service provision to individual needs. Greater service customisation would require a shift from a traditional welfare state in mature economies towards a more enabling one that delivers capacitating services to overcome idiosyncratic obstacles to performance, to address heterogeneity in the population and to deal with disability. Demand for such services is increasing because of changes in migration patterns, family structure and labour market behaviour.

Using the example of education in the Nordic countries, the author discusses how increased emphasis on individualised service delivery yields the double dividend of greater efficiency and equity. In doing so, the chapter sheds light on a specific dimension of inclusiveness, which is related to social justice and equity. The concept of equality is shifting away from the one based on equal treatment towards due regard to the needs of each individual. The issue is relevant for developing and emerging market economies as well, even where social protection programmes are incipient.

The customisation of enabling services poses challenges for policymakers. The identification of individual needs and the delivery of individualised services are more complex than in the case of uniform provision. Accountability is also more complex in the case of flexible service delivery. A change in culture is also called for, given that in most countries policies are designed and implemented for the delivery of uniform, rather than customised, services.

Chapter 1

The political economy of inclusive growth

Mushtaq H. Khan*

Growth is inclusive if it supports high levels of employment and rising wages. For developing countries, this means acquiring competitiveness in new sectors and technologies. Policies to support inclusive growth have to address significant market failures and have a mixed record across countries. Part of the difficulty lies in the "political settlement" or social order in which policies and institutions are embedded. The political settlement is structurally different in developing countries compared to advanced ones, and across developing countries. Ambitious good governance strategies that aim to achieve strong enforcement of property rights across the board are unlikely to succeed in developing countries. The thrust of reform strategies has to shift towards building pragmatic "developmental" governance capabilities that can enable the implementation of policies that target specific market failures in specific political settlements. The general argument is illustrated with reference to the recent experiences of Thailand.

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Introduction

Inclusive growth is defined here as growth that is both sustainable and broad-based in terms of employment opportunities. Sustaining growth, particularly in developing countries, requires institutional solutions to address market failures. If the relevant market failures are primarily the result of weak property rights, the solution would be to focus on governance reforms that strengthen property rights. This is essentially the approach of "good governance" reforms, with their emphasis on property right enforcement, rule of law, anti-corruption and political accountability. While many of these reforms are desirable in their own right, they are inadequate for addressing important market failures and in any case are difficult to implement. This is because the nature of the "political settlement" in developing countries makes them structurally different from most advanced countries (though aspects of these problems can affect advanced countries too). Sustaining growth therefore requires specific institutional solutions to important market failures that can be implemented *in particular political settlements*.

This brings us back to the problem of governance, but in a different way. Implementing solutions to market failures requires governance capabilities that are different from and more specific compared with the capabilities required to enforce general good governance requirements. We highlight these differences by referring to "governance for growth" or developmental governance as a strategy for developing the governance capabilities that are necessary to address market failures in specific political contexts. The question then is to identify policy and institutional instruments for addressing market failures that can be adequately enforced in a particular settlement, given existing enforcement capabilities or feasible improvements in enforcement capabilities through targeted "developmental governance" reforms.

The significant differences in the performance of institutions across countries have been explained by differences in the social orders in which the institution is located (North et al., 2007; North *et al.*, 2009). We analyse social orders using the analytical frame of "political settlements" (Khan, 2010). A political settlement is a combination of institutions and organisations that can reproduce itself over time. Once a reproducible social order emerges, the relative power of different organisations is relatively stable and evolves along stable paths. This macro-level political economy can help to explain a fundamentally important observation: particular formal institutions appear to perform very differently across countries and over time. Our explanation focuses on the observation that if a particular institution implies a distribution of benefits that is out of line with the relative power of

organisations sustained by the macro-political settlement, its implementation is likely to be resisted or altered by informal arrangements. Informal adjustments to formal institutions or their partial enforcement can therefore help to explain differences in the effectiveness of institutions and their success in achieving inclusive growth.

The paper is structured as follows: firstly, we provide definitions and identify the challenges of sustaining inclusive growth; subsequently we summarise the limitations of the "good governance" agenda and the importance of focusing on a more limited range of "developmental governance" capabilities; and finally we describe our framework of political settlements as a tool for understanding the efficacy of different policy responses. We use the example of Thailand since the 1980s to illustrate how changes in the political settlement affected the choice and viability of growth strategies.

Markets, institutions and inclusive growth

The most important policies sustaining growth in the post-war period were identified in the Growth Report of the Commission on Growth and Development (2008). A first group of policies was important for supporting high levels of accumulation. A second group promoted innovation and technical imitation. A third group of policies achieved macroeconomic stabilisation. A fourth ensured the effective allocation of land, labour and capital. And finally there were policies that ensured social inclusion both for achieving developmental goals and for maintaining political stability (Commission on Growth and Development, 2008). Countries used different policies and instruments to achieve these goals, and all countries did not perform equally strongly on all these fronts all the time. Nevertheless, sustained growth required policies that achieved a level of success on all these fronts. Macroeconomic management has a separate literature and will not be examined further here. However, aspects of investment, technology acquisition, factor allocation and political stabilisation are strongly interconnected with each other and with institutional and political governance capabilities. The governance capabilities that support policies in these areas are critical for sustaining inclusive growth.

The ability to compete in global markets has rightly been identified as an essential condition for sustaining growth. However, significant market failures can prevent developing countries from achieving or sustaining competitiveness. Market access is therefore necessary but not sufficient for sustaining inclusive growth. Low wages too are not sufficient to ensure inward capital flows or domestic investments. Indeed, in the presence of market failures, free markets can lead to divergence rather than convergence,

as happened in many developing countries under colonial rule. For instance, from 1873 to 1947 Indian per capita income declined from around 25% of US per capita income to under 10% of the US level (Clark and Wolcott, 2002) during a period of close to zero tariffs, strong protection of the rights of British investors and virtually no restrictions on the repatriation of capital and profit. The proximate cause of this decline was simply that it was not profitable to invest in modern manufacturing or agriculture. The productivity of Indian workers was so low that even the low wages compared to those in the home country did not give India a competitive advantage for prospective British investors in most industries. This problem remains today for most sectors in most developing countries.

This appears to be a puzzle. Low productivity in poor countries should have been countered by private investments in up-skilling and training. Given the large wage differentials, small improvements in productivity would be sufficient to achieve competitiveness with more advanced countries. Private investments should have financed the acquisition of the requisite capabilities, particularly since what is missing is often not formal skills and education appropriate for the production process but the absence of know-how. Surely private investors should have been able to finance learning-by-doing in the workplace. The puzzle of low investments disappears when we look for significant market failures that may prevent investments, particularly in financing learning-by-doing. Without strategies to overcome these market failures, the only areas that are likely to grow in a poor economy are sectors that have already achieved international competitiveness. These are typically low technology and low value adding sectors with simple organisations where the productivity gap with more advanced competitors is likely to be low and the wage differential can compensate, giving the country a competitive advantage.

The challenge of sustaining inclusive growth in developing countries is that there are relatively few sectors that have already achieved international competitiveness or have prospects of achieving competitiveness rapidly. The rapid growth and employment generation that some developing countries have experienced in recent years can be traced to their achievement of global competitiveness in a few sectors, such as garments and textiles, cut flowers, toy and shoe manufacturing or food processing and packaging. A few developing countries like India have achieved global competitiveness in a small number of higher technology sectors, for example in software, pharmaceuticals, iron and steel, and automobiles. Middle-income countries face more serious problems particularly if, as is the case in Thailand, they rely on multinationals in sectors like automobiles and electronics. Moving into higher points on these value chains can require the development of domestic technological and entrepreneurial capabilities. In all these cases, success can

be traced to specific processes of financing learning-by-doing and overcoming critical market failures (Khan, 2009b). The challenge of extending these successes to other sectors remains even in the most successful developing countries.

Achieving competitiveness involves much more than putting together machines and workers with the appropriate formal skills. Owners, managers and workers somehow have to acquire the know-how to operate new types of organisations and technologies. Without this know-how, investments in machines can fail and workers with formal education are likely to remain unemployed. Indeed, poor countries typically suffer from capital flight and the out-migration of skilled workers. The know-how involved in setting up factories, organising production lines, managing quality control and order flows, maintaining work flows and so on is mostly "tacit knowledge" that cannot be learnt in books and manuals. It can only be acquired through learning-by-doing with high levels of effort over time (Nelson and Winter, 1982; Stiglitz, 1987; Lall, 1992; Lall and Teubal, 1998; Lall, 2000a and 2000b).

Sustaining inclusive growth can therefore be interpreted as a process of opening up new sectors and moving existing sectors up the quality and value chain. Investment in productive capacity and formal education are necessary but not sufficient for this, particularly in developing countries. At least as important are the investments in financing loss-making periods of learning during which organisational and technological capabilities are acquired. However, financiers will only be interested in this if they can be sure that they will not lose out because of poor levels of effort by those being financed. Outside financiers may not be able to satisfactorily contract for or enforce these conditions, particularly in developing countries, and as a result they avoid these areas. Policy can address these market failures by reducing the cost or risk of financing loss-making learning periods, provided the governance capabilities are in place to ensure that the opportunities created are not wasted in their turn (Khan, 2000b, 2009b). In the literature on technology acquisition, it is recognised that responding to these market failures involves the creation and management of new opportunities in some sectors. These opportunities can be described as rents and have variously been referred to as learning rents (Khan, 2000b), contingent rents (Aoki *et al.*, 1997) or performance-indexed rewards (World Bank, 1993). To achieve the learning objective, rents have to be conditional, and agencies managing these rents have to have the critical capability to withdraw or re-allocate rents if performance is poor.

A further set of significant market failures affect land markets and can set important constraints, particularly in developing countries. Investors often find it impossible to buy land for expanding or setting up a plant. This is

because of structurally high transaction costs in land markets, which can be traced to poorly defined land rights, multiple claims on land, poor contracting institutions and often very fragmented land ownership. These are general problems that can become a serious constraint in densely populated countries like India. The net effect is that the cost of acquiring land becomes so high that potential investors are put off from investing, particularly in regions that are most in need of employment generation. Establishing well-defined property rights to reduce these transaction costs is unrealistic in the medium term for reasons that we will discuss. As a result, investors in developing countries regularly invoke non-market processes to acquire land. This can range from state purchase orders to acquire land for industrial development, the allocation of public land to industrial zones, and the involvement of political actors or even mafias in land acquisition. The allocation of land using non-market or part-market processes can imply significant rents for the beneficiaries. The conditions of allocating these rents once again describe the difference between rewarding unproductive clients, speculation, and accelerated industrialisation. Here too, the governance capabilities of specific agencies can explain significant differences in performance across countries.

Governance capabilities for enforcing institutions, rents and market failures refer to closely connected concepts. Institutions are rules that describe how social actors act (North, 1990). Property rights that define who can do what with an asset are institutions, and so are rules of taxation, subsidisation or conditional financing. The economic effect of an institution depends not only on what the rules specify but also on the degree to which they are followed or enforced. Institutions are formal if they are enforced by the state, and informal if they are self-enforced or enforced partly or entirely by non-state actors or agencies. Organisations are the agencies that operate under these institutional rules. Political organisations organise their members and broader constituencies to achieve political goals. Typically they seek to change institutional rules in ways that favour particular constituencies. Economic organisations are engaged in organising production. The governance capabilities to which we are referring are state capabilities for enforcing formal institutions. If all necessary property rights could be enforced by the state at reasonably low cost, we would have an ideal market economy based on voluntary contracting between organisations. Under these conditions, organisations should be able to achieve all or almost all socially beneficial arrangements through voluntary contracting: in other words, there would be few market failures. Enforcing formal institutions like property rights and rule of law is therefore a critical requirement of market-enhancing governance. However, enforcing formal institutions is expensive. It is difficult to sustain spending on protecting property rights that is out of line with what asset owners can collectively afford, given the average productivity of assets. It is not surprising that poorer countries tend to score systematically

lower on property rights, rule of law and other "good governance" scores compared with more advanced countries.

Rents are incremental incomes that are typically associated with specific institutions. If markets were ideal and property rights were perfectly enforced, the emergence of rents would very likely signal value-reducing institutional changes, such as barriers to entry creating monopoly rents. However, in a world with significant market failures, rents may be associated with institutional changes that enhance welfare. Examples include efficiency wages or subsidies to firms to reduce their carbon emissions. Rents can also be redistributive for the purposes of achieving political stability. Sometimes rents can bring about political stability in ways that allow other rents to be managed to solve market failures. But at other times, redistributive coalitions can affect the management of all rents, including those potentially necessary for growth, with very damaging consequences. The presence of rents in an economy therefore does not tell us much about the implications for efficiency and growth - that requires an analysis of the specific types of rents that are present and the conditions of their creation and allocation (Khan, 2000a and 2000b). The challenge is clearly that states require a minimal set of "developmental" governance capabilities to ensure that important growth strategies and their associated rents can be effectively managed.

Most examples of market failures illustrate that when societies respond to these market failures, rents are inevitably created. However, if policy results in the emergence of policy-induced rents, then this is likely to induce rent seeking. Rent seeking is the expenditure of resources by organisations that seek to change the structure, types and allocations of rents. Not only does rent seeking imply a resource cost since resources are used up in these activities, but it can also subvert the formulation and implementation of policies in ways that prevent the resolution of the market failure (Khan, 2000b, 2007a). Thus, another way of thinking about developmental governance is that it is about strengthening the governance capabilities that support specific policies so that the latter is not subverted by rent seeking. Rent seeking can be damaging either because it distorts policy *ex ante* so that in the name of correcting market failures rents are created for unproductive rent seekers, or because it can subvert policy *ex post* by allowing rents to be captured by firms or individuals without solving the market failure. In a world full of rents, however, rent seeking cannot be reduced to zero. Rather, in the context of particular policies, the aim should be to ensure that the resource cost of rent seeking and any distortion in policy is not so great that the net effect of the policy becomes negative. The lower the cost of the rent seeking and the lower the policy distortion for useful rents, the better - but aiming for zero rent seeking is equivalent to aiming for zero carbon emissions to save the

environment (Khan, 2000a). The social optimum here too is to maximise the net benefit.

Governance and growth

There have been two broad types of policy responses to the market failures that constrain growth in poor countries. Before the 1980s, it was common to use broad-based interventions like tariffs and subsidies (that created extensive rents) to accelerate learning and technology acquisition. Very often these strategies had disappointing results because the range of market failures, which policy-makers tried to address, were too broadly defined and, in most cases, the governance capabilities of the state were not remotely sufficient to enforce the requirements for success. Rents associated with potentially beneficial interventions failed because powerful groups could focus on capturing the rents without delivering the desired results. In the worst cases, infant industries refused to grow up, subsidies proliferated and became a way of life, and public sector enterprises made persistent losses.

In contrast, the dramatic success of a small number of East Asian countries in the 1960s and beyond was based on their ability to manage policy-induced rents so that they served as incentives and opportunities for achieving new capabilities, rather than as unconditional gifts that could be captured by the powerful (World Bank, 1993). A comparison of the performance of the East Asian countries with the others should have led to the reasonable conclusion that the others did not have the same capability to manage the rents their policies had created. An appropriate response would have been to scale down the range of interventions in less successful countries in order to target the most critical market failures and improve developmental governance capabilities in vital policy areas. Instead, the response from the late 1970s onwards was towards liberalisation and "good governance" strategies that were actually even more ambitious. These sought to address market failures by making markets more efficient across the board. The strategy was to enhance a number of market-enhancing governance capabilities for enforcing property rights and rule of law, and reducing corruption, which could in theory reduce market transaction costs and allow private contracting to proceed more efficiently (Khan, 2007b, 2008a).

The limitations of an exclusive focus on market-enhancing strategies like "good governance" are well known (Khan, 2008a). If significant reductions in transaction costs could be achieved in this way, the market failures that prevent investment in new sectors may disappear. However, while many of the good governance reforms are desirable in themselves, they are unlikely to be implemented to a significant degree in the near future for structural reasons that are primarily to do with the political settlements of developing countries,

rather than a weakness of "political will" (Khan, 2007a). It is not surprising that an empirical relationship between a policy commitment to market-enhancing governance and accelerated economic growth has not been established. A weak positive relationship has been identified in many regression exercises between actual improvements in "good governance" indicators and economic growth, but the strength of the relationship is weak and the regression analysis shows that the additional growth, which achievable improvements in good governance can offer, is limited (Kurtz and Schrank, 2007). Deriving important policy conclusions from the results of weak multi-country regression results is problematic. For one thing, given the two-way causality that everyone accepts between good governance scores and economic growth, it is difficult to identify the true strength of the relationship in one direction using available econometric techniques.

Another problem is that the data to test these theories are weak and available only from the 1990s (Arndt and Oman, 2006). Given the limited support from cross-section data, supporters of good governance policies (for instance, Kaufmann *et al.*, 2007) have sought support in long-run econometric exercises using instrumental variables, such as in the work of Acemoglu, Johnson and Robinson (2001, 2002). Here instrumental variables that explain where settler colonialism was established are found to correlate with high per capita incomes today. The authors claim that this is because settler colonialism established stable property rights. However, the econometrics only establishes that settler colonies did better; it does not establish that they did better because they first established stable property rights. Other factors were also correlated with the onset of settler colonialism, for instance, the entry of settlers with higher human capital (Glaeser *et al.*, 2004). More significantly for the claims of good governance theory, the period of economic transformation in settler colonies was historically one of violent property right disruptions (Khan, 2009a). These transformations involved significant transfers of assets from indigenous populations to settlers. But settler colonialism did not first establish property rights that then allowed efficient markets to transfer assets from indigenous populations to more efficient users; rather, settler colonies used "institutions" of violence to destroy pre-existing rights by force. Paradoxically, these forced transfers allowed them to carry out rapid transformations in the organisation of production, which achieved the growth in productivity that subsequently allowed property rights to be adequately protected, but the process of transformation that is primarily of interest to developing countries was neither based on stable property rights nor did it attempt to minimise social costs.

Nobody can dispute the long-run relationship between social productivity and stable property rights. As assets become more productive, they can begin to pay for their effective protection and property rights are likely to be better

protected. Nor can it be disputed that everything else being the same, if property rights are better defined, there will be positive effects on time horizons, transaction costs and investments. The question is really about feasible governance priorities during the period of transformation when asset use and social organisation are rapidly changing from traditional to formal productive structures. Far from establishing that good governance is a pre-condition for these transformations, settler colonialism, with its extreme disregard for the rights of indigenous populations, provides an entirely inappropriate model of how to achieve developmental transformations. Thus, neither the cross-section nor the instrumental variable regressions provide convincing evidence that countries can make a significant transition from poverty to prosperity by first achieving good governance capabilities. We can accept that improvements in good governance capabilities could result in some improvements in development performance, but we have no evidence that achievable improvements along these dimensions are sufficient for developmental transformations.

The role of policy and of rents in accelerating these transitions has to be understood in this context. Since forced transitions are neither feasible nor desirable, the role of policy must be to create incentives and compulsions to move society in productive directions within the limits set by their inherited political settlements. Unfortunately, the discussion about developmental governance was for a time dominated by the experiences of the East Asian tigers in the 1960s and 1970s (for instance, Amsden, 1989; Wade, 1990). This was unfortunate because these countries had exceptional political and institutional capabilities to manage an extensive range of developmental rents while most countries do not. So if addressing market failures required East Asian capabilities, then aiming for developmental governance would be inappropriate for most countries. East Asian capabilities were, however, not based on an ability to "pick winners". The latter implies a degree of prescience that neither private investors nor bureaucrats can be expected to have. Rather their success was based on supporting investment in areas where new productive capabilities could be developed and withdrawing conditional rents if competitiveness failed to emerge in time.

Other countries with ambitious rent strategies performed less well because they lacked the governance capability to discipline and manage their developmental rents. In less dynamic countries, firms and sectors that did not engage in learning or technology acquisition could retain their rents by using political influence. In this way, potentially productive rents effectively became redistributive rents. As political stability is important for all countries, an important policy message is that the redistributive rents required for stability have to be separated from developmental rents, which need to be managed and allocated differently. Clearly, most countries could not hope to

manage developmental rents on the East Asian scale, but it was equally futile for them to hope that they could achieve significant good governance capabilities in economies that were still largely pre-capitalist. Achievable improvements in good governance could enable some improvements in market efficiency but this was unlikely to be sufficient for enabling the huge structural changes required for economic transformation solely on the basis of voluntary market contracts. The realistic if difficult strategy must be to develop a limited range of developmental governance capabilities in each country, taking into account both the significant market failures that they face and the specific constraints on policy implementation and institutional enforcement determined by their political settlements.

Political settlements and the enforcement of institutions

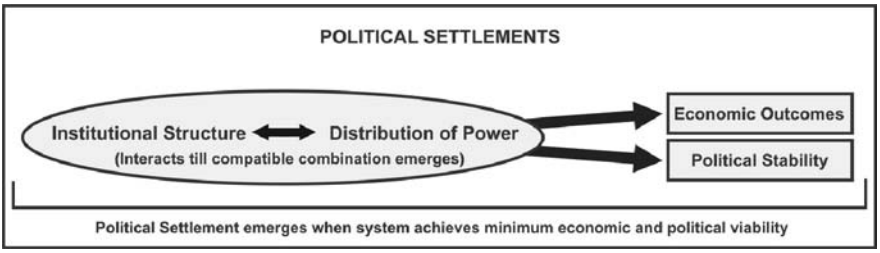
There is a growing recognition that the macro-political economy defined by the "social order" of a country matters for the operation of its institutions (North *et al.*, 2007; North *et al.*, 2009). In our model of a social order (based on the analysis of political settlements), the relative power of organisations plays an important role in explaining the enforcement of particular institutions (Khan, 2010). The relative power of organisations of different types matters because the ability of different groups to contest, obstruct or oppose rules that they perceive to be against their interests clearly affects their enforceability. Thus, formal property rights or strategies of financing learning-by-doing may fail either because they were inappropriately designed or because they could not be effectively enforced. Relative power can be ranked in terms of many dimensions. The dimension that is most useful for us is holding power. This refers to how long a particular organisation can hold out in actual or potential conflicts against other organisations or the state. Holding power is a function of a number of different characteristics of an organisation, including its economic ability to spend money to protect its interests, its ability to inflict costs on competing organisations, its ability to mobilise supporters to absorb costs during conflicts, and its ability to mobilise ideologies to consolidate and keep its members committed. As the outcomes of conflicts depend on relative rather than absolute power, our use of the word power refers to a distribution of power. Holding power is correlated to some extent with economic power, but it is also based on organisational capabilities. This is why holding power cannot be reduced to economic power, and richer individuals and organisations do not always win in conflicts.

The "political settlement" describes the macro political economy of a social order. We define a political settlement as a reproducible combination of organisations (with a defined distribution of power) and an institutional

structure (Khan, 2010). To be sustainable, the distribution of power across organisations has to allow the enforcement of a combination of formal and informal rules that is sufficient for the political and economic viability of the society. Economic viability or reproduction is a level of economic activity that avoids a crisis. The minimum level of economic performance depends on the expectations of its organisation and can vary across societies. Political viability requires that the core institutional and political arrangements that define the political settlement do not begin to unravel because of conflict and violence. A political settlement's degree of robustness depends on how the economy and polity are operating with respect to these minimum viability limits. However, the minimum levels of economic and political viability are not defined in absolute terms but are themselves endogenous to the society.

There are two levels at which the interactions of institutions and the distribution of power are analytically significant. The first is a macro level of interaction, which operates at the level of a society as a whole to define the political settlement. Figure 1.1 describes this interaction between institutions (both formal and informal) that collectively constitute the institutional structure and the distribution of power across organisations in that society. A system of institutions and a distribution of power across organisations is a political settlement if the resultant economic outcomes and levels of political stability are sustainable. Institutions and the distribution of power are necessarily an interdependent system. First, institutions affect the distribution of power because they sustain a distribution of economic benefits across organisations that contribute to their relative holding power. Secondly, the distribution of power across organisations affects institutions because powerful organisations are likely to determine the evolution and enforcement of formal and informal institutions to achieve the distributions of benefits that they desire. Both are likely to interact until a sustainable combination of institutions and a distribution of power emerges. Once this happens, both the institutions and the distribution of power are mutually supportive. A political settlement therefore sustains a distribution of power. This brings us to the second or micro-level of interaction, which is particularly relevant for policy assessments of the feasibility of different directions of incremental institutional change. The distribution of power, which is supported by the current political settlement, is relevant for understanding the resistance to the introduction and proper management of particular institutions since every incremental institutional change also changes the distribution of benefits in society and this will be supported or resisted by different organisations.

Figure 1.1. Political settlements



Source: Khan (2010).

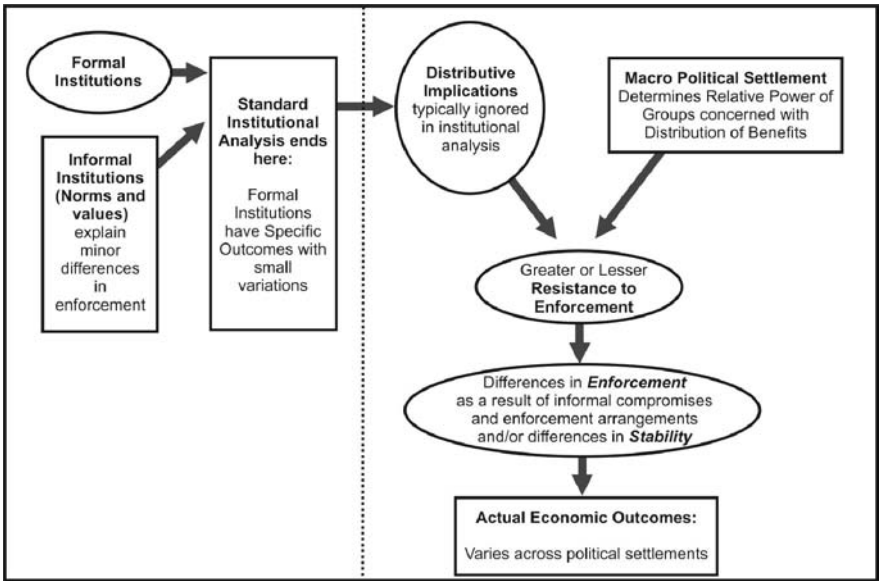
The political settlement in developing countries is of particular interest because these countries are by definition going through transition and transformation. This transformation (along very different trajectories and rates across countries) involves production shifting from traditional, pre-capitalist organisations to modern organisations, using more sophisticated technologies and requiring complex organisational structures and new social hierarchies. While this transformation is taking place, the pre-existing distribution of power between individuals and organisations does not disappear immediately, but rather new formal institutions and new types of organisations emerge and coexist. The result is that formal institutions are set up during this period in a manner that is appropriate for the needs of modern organisations and typically based on institutions and organisations in more advanced societies. In theory, these formal rules support a distribution of benefits at the micro-level that is consistent with the property rights and hierarchies of modern organisations, but this distribution may be difficult to enforce given that the actual distribution of holding power between organisations is likely to be significantly different at the macro-level. The lack of "alignment" between prior distributions of power and the distribution of benefits that would emerge if the formal rights supporting the future productive economy could be fully enforced lies at the heart of the social order problem in developing countries.

This is why informal institutions play a much more important role in developing countries than they do in advanced ones. Informal institutions are rules that are not enforced by formal agencies. They include behaviour that is supported by habits, customs, cultures and values; however, they also include rules that may appear to be formal but are actually enforced by informal agencies like mafias and patron-client organisations. Various reasons have been offered to explain the dominance of informal institutions in developing countries, including the weakness of state capabilities in enforcing formal institutions. If the weakness of enforcement capacities were the primary

reason for poor enforcement, the "good governance" reform agenda implemented with some external assistance would have helped, but developing countries have remained decidedly "non-Weberian" regardless of attempts at strengthening formal enforcement. This can be understood if we recognise that the full enforcement of formal institutions in these contexts is very strongly resisted given the actual distribution of power at the macro-level of the political settlement. Only when the vast majority of organisations have become formal productive ones is the distribution of organisational power likely to support the full enforcement of formal rules. Developing countries can therefore be described as having variants of clientelist political settlements. Here informal institutions and arrangements, in particular operating through clientelism, play an important role in adjusting the distribution of benefits to sustain the interests and power of powerful organisations that operate outside the formal sector. The variations within the broadly defined clientelist political settlement across developing countries are, however, even more important because they define the limits of different strategies for sustaining growth.

These variations are important for our second level of analysis, shown in Figure 1.2. This looks at the economic implications of attempting to introduce new "incremental" institutions within a specific political settlement. Standard institutional analysis typically looks at particular institutions in isolation. This theoretical analysis of incentives and outcomes is shown in the left-hand half of Figure 1.2. At best, it is recognised that the norms and values of the host population may affect the costs of enforcement. Unless values and cultural norms are exogenous and not amenable to change in response to economic opportunities, they can at best explain small and relatively transient differences in institutional outcomes. In contrast, by locating the analysis of institutions (and economic policies more generally) within a macro-analysis of political settlements, we can explain differences in the enforceability of particular institutions in different contexts.

Figure 1.2. Political settlements, partial enforcement and institutional performance



Source: Author.

Any particular (incremental) formal institution that is the subject of policy implies specific distributive outcomes that may or may not be consistent with the macro-distribution of organisational power that is described by the political settlement. An analysis of the links in the right-hand half of Figure 1.2 has a number of important implications. First, if the enforcement of formal institutions is constrained by the distribution of organisational power, which is sustained by the "social order", we can begin to explain why the performance of institutions and policies has varied so greatly across countries. In particular, institutions and policies that are the most developmental can vary significantly across countries. What may be theoretically a "second-best" institution may actually be "first-best" once we account for differences in resistance and enforcement costs that may result in a worse outcome with the theoretically best institutional strategy.

Secondly, the political settlement in most developing countries also explains why ambitious developmental strategies of the East Asian type have generally failed. The East Asian states had very specific political settlements with weak political organisations (whether formal or informal), which was a product of Japanese strategies of colonial rule. In contrast, in the more typical British and French colonial strategies, indigenous elites were used in the colonial administration, together with strategies of divide and rule. Political

organisations therefore evolved to be much stronger (Khan, 1999, 2000a). Thirdly, the characteristics of the political settlement in developing countries can explain why, in general, good governance strategies have fared so poorly. If the social order in developing countries has to be systematically responsive to organisations with power outside the formal economy, the enforcement of formal institutions is unlikely to be very good. In particular, the distribution of benefits to politically important, informal organisations is likely to involve informal institutions and informally managed rents. Finally, in some countries, the political settlement may be so adverse that the space for feasible reforms may be very limited. There may be no feasible improvements in governance capabilities that would allow even a few important market failures to be adequately addressed. Here an understanding of political settlements and the experiences of other countries may suggest strategies of political reorganisation to change the political settlement itself - but the difficulty and hazards of such strategies need not be stressed.

There are many dimensions of the distribution of power between organisations in a macro-political settlement that could potentially affect the performance of particular institutions and policies. To make the analysis tractable, we focus on a few dimensions that are likely to have more significant effects on institutional enforcement and performance. Two dimensions appear to be particularly important (Khan, 2010). The first is the distribution of power between political organisations, which can be analysed by looking at the construction of the ruling coalition. This has important implications for the enforceability of different types of interventions and institutions. A second dimension is the distribution of power between economic and political organisations. The productive capabilities of capitalist organisations and the strength of their linkages with political organisations define this dimension of the political settlement, which also affects the enforceability of different types of institutions (Khan, 2010). In this paper I focus on the first dimension - the relative power of political organisations - to illustrate the implications for institutions and governance.

Political organisations in developing countries are typically based on patron-client relationships. Bigger political organisations are coalitions of smaller ones. Smaller organisations join bigger coalitions at different levels of the pyramid, depending on the organisational power that they bring to the coalition and the strategies of inclusion of the coalition leadership. The pyramid that constitutes the ruling coalition is distinguished both by the number and strength of the coalitions it includes and excludes, and the power of higher-level organisations (ultimately the coalition leadership) vis-à-vis lower-level organisations within the ruling coalition. These organisational differences in the construction of the ruling coalition can often have significant implications for the enforcement and operation of institutions.

Figure 1.3 shows these two dimensions of interest in the construction of the ruling coalition. The first is the "horizontal distribution of power". This describes the power of excluded political organisations relative to the ruling coalition. If excluded coalitions are weak, the ruling coalition is likely to feel secure and act with a longer time horizon. Excluded political organisations can range from very weak to almost as powerful as the ruling coalition. At its limit, if excluded coalitions become more powerful than the ruling coalition, the latter is unlikely to survive. The relative strength of excluded organisations can be assessed by looking at their organisation and strategies, the success with which they engage in conflicts, and the informal and formal distributions of benefits that they are able to achieve. Excluded coalitions can be weak for different reasons. The most benign possibility is that all, or almost all, powerful political organisations have been incorporated within the ruling coalition. It could also be that the distribution of power across factions was skewed to begin with, and factions within the ruling coalition happen to be significantly more powerful than excluded factions, even if the latter are numerous. However, if there are administrative, legal or military restrictions on excluded groups, it can be difficult to assess whether they are actually weak or simply quiescent in the face of obstacles. The more extensive the obstacles to the organisation of excluded groups, the more likely it is that they are actually strong and have to be repressed to be excluded. However, exclusion based on repression is not likely to be sustainable over long periods of time.

Figure 1.3. The ruling coalition in clientelist political settlements

VERTICAL DISTRIBUTION OF POWER WITHIN RULING COALITION	HORIZONTAL DISTRIBUTION OF POWER: RULING COALITION RELATIVE TO OTHER POLITICAL ORGANIZATIONS	
	EXCLUDED ORGANIZATIONS WEAK (RULING COALITION CAN HAVE LONG TIME HORIZON) →	EXCLUDED ORGANIZATIONS STRONG (RULING COALITION LIKELY TO HAVE SHORT TIME HORIZON)
LOWER LEVEL ORGANIZATIONS WEAK (RULING COALITION HAS STRONG IMPLEMENTATION CAPABILITIES) ↓	**POTENTIAL DEVELOPMENTAL-STATE COALITION** Low opposition from excluded factions gives ruling coalition stability and long time horizon. Limited power of lower level factional supporters ensures high enforcement capability. Construction of developmental state possible: South Korea 1960s	**AUTHORITARIAN COALITION** Initial enforcement capabilities likely to be strong but repression may be required against excluded and coalition is vulnerable to overthrow. Strong opposition also increases bargaining power of lower levels. Military governments in Pakistan 1960s, Bangladesh 1980s and 1990s
(RULING COALITION HAS WEAK IMPLEMENTATION CAPABILITIES) LOWER-LEVEL ORGANIZATIONS STRONG	**DOMINANT PARTY** Inclusion of most organizations allows long time horizon but strength of lower-level organizations weakens implementation. Excluded factions become stronger if dissatisfied supporters start leaving. India under Congress 1950s and 1960s, Thailand under Thaksin 2000s, Tanzania under CCM 1992-, West Bengal under CPM 1977-	**COMPETITIVE CLIENTELISM** Ruling coalition has short time horizon and weak implementation capabilities. Many powerful organizations excluded. Stability requires formal and informal arrangements to enable credible cycling of coalitions in and out of power. India and Bangladesh after the 1980s, Thailand in the 1980s and 1990s

Source: Khan, 2010.

The second dimension describing the ruling coalition is the "vertical distribution of power". This refers to the relative power of higher compared to lower-level organisations within the ruling coalition. By definition, lower levels in a patron-client hierarchy are always weaker and to some extent dependent on higher levels. However, this too can vary from a situation where lower-level organisations have little bargaining power to one where they can effectively block or limit the implementation of policies that are supported by higher levels if their demands are not met. When lower-level organisations have little holding power, higher levels can select or abandon lower-level client organisations without facing great resistance. This makes it easier to ensure that lower levels implement the policies that are adopted by higher levels. In contrast, when lower-level organisations have significant holding power, they can impose serious costs on their patrons if they are not satisfied. This in turn can mean that the enforcement of particular rules becomes more difficult for two reasons. First, collective action within the ruling coalition to agree about the rules to be enforced is now more difficult, as lower-level organisations that do not agree with particular rules can veto the agreement more easily. Second, organisations outside the ruling coalition may find it easier to block the enforcement of rules that are against their interests because it becomes easier to find powerful lower-level organisations within the ruling coalition that will go against their leadership for a price and block the implementation of particular rules.

These two dimensions range along a continuous scale defining four limiting types of ruling coalition in Figure 1.3. At the top left-hand corner is a ruling coalition, which we describe as a potential developmental coalition. Here the ruling coalition faces little contestation from horizontally excluded groups. This gives it the confidence to have a long time horizon and aligns its interests with long-term development. In addition, the superior power of higher-level organisations means that the ruling coalition has effective implementation capabilities. These features imply that this is potentially the most developmental coalition, provided that there are pressures on the leadership to be developmental, as well as minimal technological capabilities within the economic organisations to benefit from growth-supporting policies. Solutions to market failures are more likely to be selected and enforced under such a ruling coalition. The ruling coalition in South Korea or Chinese Taipei from the 1960s to the 1980s approximated these developmental characteristics. Ambitious and broad-based developmental rents could be effectively managed to drive sustained and inclusive growth. Other conditions of course are also important, such as the internal and external pressures to adopt inclusive growth strategies, which depend on the organisation of interests within society and its relationship with external forces; however, without a political settlement that provides adequate time horizons and implementation capabilities on the part of the ruling coalition, the demand for

generating growth is likely to remain unrealised. The important point is that this aspect of the distribution of power across political organisations in East Asia was not at all typical and this is why it did not provide a replicable model for other countries. Most other countries inherited a more "adverse" distribution of power across political organisations from their colonial histories, giving their ruling coalition poorer time horizons or implementation capabilities.

A second type of ruling coalition is shown in the top right-hand corner, which we describe as an authoritarian coalition. In this configuration, excluded organisations are strong and the ruling coalition has to survive by limiting the capabilities of the excluded in some way. Thus formal or informal arrangements are likely to be used to restrict political activity outside the ruling coalition. Authoritarianism is difficult to sustain for long unless there are special factors, such as natural resource rents or military support that bolsters the exclusion capabilities of the ruling coalition. Nevertheless, the fact that excluded coalitions are actually strong is likely to result in periodic demonstrations of strength by the excluded. Developmental coalitions can also impose administrative restrictions on excluded organisations, like the martial law restrictions in Chinese Taipei from the 1950s, but in such cases excluded coalitions are actually weak so, for instance, there was no significant resistance in Chinese Taipei over several decades. Thus, if excluded organisations are powerful, it is likely that there are restrictions on their organisational freedom, but the presence of restrictions does not necessarily mean that they are powerful. The second characteristic of the authoritarian coalition is that lower-level organisations are relatively weak, which gives higher levels relatively high implementation capabilities. If lower-level organisations were strong, the authoritarian coalition would become unsustainable because in that configuration it would be difficult to satisfy lower-level organisations and there would be powerful tendencies for lower-level organisations to defect to one of the excluded coalitions for a better deal. As already strong excluded coalitions get stronger, the ruling coalition becomes more vulnerable and is eventually likely to become unviable.

Conversely, the presence of strong external organisations in this configuration is likely to increase the bargaining power of lower-level organisations as they can threaten to leave and join an excluded organisation. If the leadership is unwilling or unable to pay more, some do leave, further strengthening excluded coalitions and increasing the bargaining power of remaining lower-level organisations. This type of cumulative breakdown can rapidly undermine authoritarian coalitions. As defections increase the power of the excluded, violence is more likely to become the ultimate exclusion strategy of the authoritarian coalition. However, if violence has to be actually

implemented on a sustained basis, the ruling coalition is unlikely to remain viable and can suddenly collapse, as happened in several North African and Middle Eastern countries in 2011. Authoritarian coalitions facing weaker excluded coalitions (those towards the centre of the horizontal range of variation in Figure 1.3) are less likely to have to use violence. For instance, Tanzania's one-party state under TANU in the 1960s faced very little resistance from excluded factions, even though organisational rights were limited in a pre-emptive way to prevent resistance developing. In contrast, the military-controlled ruling coalition in Pakistan/Bangladesh in the 1960s initially faced weak excluded coalitions, but had to resort to violence as excluded coalitions became stronger. It was eventually overthrown by a mass uprising in 1969. As with a developmental coalition, the enforcement capabilities of authoritarian coalitions are relatively good, but time horizons are likely to be poorer given the vulnerability of the leadership. Nonetheless, given the tendencies for lower-level factions to become stronger over time, the capacity to implement is likely to get progressively poorer. Authoritarianism is therefore likely to suffer progressively weaker implementation capabilities even if it began with stronger capabilities. Its time horizon is also likely to collapse further as excluded groups become stronger (Khan, 2010).

The third type of ruling coalition is the dominant party, which is "dominant" to varying extents. In this case, excluded political organisations are weak. This is because either all or most of the powerful factions have been included within the dominant party, or else excluded factions are too fragmented to pose an effective threat. The characteristic feature that distinguishes the dominant party from authoritarian arrangements is that it does not have to use administrative or military power to the same extent to exclude others and indeed could win formal, contested elections. The dominant party therefore enjoys a longer time horizon. However, the inclusion of many political organisations within the ruling coalition creates numerous potential points at which implementation can be vetoed. Lower-level organisations tend to be relatively powerful as a result of greater inclusion and many internal coalitions have to be satisfied to achieve implementation. The implementation capabilities of this ruling coalition are therefore weaker when compared with developmental coalitions but often also relative to authoritarian coalitions, particularly those at an early stage of their life when their implementation capabilities can be quite strong. Like authoritarianism, the dominant party also faces a structural dilemma. If it includes all the powerful organisations within it, it can remove threats from outside - but at a price. Rents will be spread more thinly and dissatisfaction is likely to result in blocked implementation. Sooner or later, dissatisfied internal organisations are likely to start joining excluded groups, and once this begins, the process of cumulative decline is difficult to stop. Dominant

parties are likely to begin with long time horizons but constrained implementation capabilities; however, both are likely to decline over time, perhaps precipitously due to cumulative causation. India under the Congress Party in the 1950s and 1960s, Tanzania under the CCM, West Bengal under the CPM from 1977 to 2011, Thaksin's Thai Rak Thai in Thailand from 2001-06 were variants of dominant party coalitions that enjoyed different levels of vulnerability and weakness.

This brings us to the fourth and final variant, which describes the default structure of clientelist political settlements when authoritarian and dominant party arrangements break down. This is competitive clientelism, where the number of clientelist political organisations is so great, or so fragmented, that the inclusion of all of them in a ruling coalition would not work, but neither would a strategy of keeping excluded groups out by legal or military mechanisms. The only sustainable (if vulnerable) arrangement is for alternative coalitions to cycle in and out of power in a reasonably orderly way. Democracy in developing countries is typically based on variants of competitive clientelism rather than a rule-following competition for power between parties with different manifestos for taxing and spending. In competitive clientelism, the ruling coalition is formed by political entrepreneurs, who seek to bring together enough political organisations within their coalition to be able to rule at the lowest price for themselves. The excluded are technically free to organise, restructure and entice factions that are currently included in the ruling coalition to leave and join them in an attempt to form a new coalition. Given the relative power of the excluded, the expectation is that coalitions will cycle in and out of power. Elections in this system provide a mechanism for testing the organisational power of competing coalitions, and elections are successful if they reflect the balance of organisational power on the ground. However, competitive clientelism is only sustainable if there is an "implicit rule of law" amongst the competing coalitions that ensures that losers accept the outcomes of these contests without descending into open warfare. Competitive clientelism can provide comparative stability when the underlying factional structure is very fragmented because attempts to sustain authoritarian or dominant party coalitions in these contexts are likely to result in instability and violence. Thus, the equilibrium modes of developmental, authoritarian and dominant party coalitions are likely to have longer time horizons and better implementation capabilities than competitive clientelism, but if the underlying distribution of power between political organisations does not support these institutional arrangements, then the imposition of these forms can produce worse outcomes than the equilibrium mode of competitive clientelism. This is why attempts to sustain authoritarianism when the underlying distribution of power has changed can result in very poor

economic outcomes, and a transition to competitive clientelism can (after a sustainable equilibrium has been achieved) provide relatively better results.

Understanding competitive clientelism is important because it is the political settlement that underpins democracies in developing countries. For instance, as authoritarian arrangements collapse in the Middle East, the likely outcome is the eventual emergence of competitive clientelism rather than Weberian social democracies. It is important for policy-makers to understand the challenges for governance and institution-building in these contexts. The political configuration here faces challenges from a number of directions. First, political stability in this power arrangement requires that the ruling coalition understands the relative power of excluded groups and internalises the futility of using administrative power as a long-term strategy of exclusion. Secondly, the design of governance institutions in this context has to take into account the specific problems of short-termism and generally weak implementation capacities. The imperative of focusing on developing targeted governance capabilities is most important in this context precisely because of the general characteristics of competitive clientelism. Attempts to develop broad-based "good governance" capabilities are likely to fail in any variant of a clientelist political settlement, but it is particularly difficult in competitive clientelism with its short time horizons and weak implementation capabilities. This may appear paradoxical because this variant has features of political accountability that authoritarian or dominant party systems appear to lack. However, sustaining growth in any of these contexts requires the identification of critical areas of market failures that constrain growth and the development of targeted governance capabilities for addressing some of these problems to the greatest extent possible.

The conditions for sustaining stability are frequently violated in competitive clientelism because the ruling coalition has a temptation to believe that it can leverage administrative powers to keep the opposition permanently excluded. In other words, the ruling coalition can suffer from the misapprehension that it can be an authoritarian coalition. The real distribution of power between political organisations, however, precludes authoritarian solutions, and attempts in that direction only result in repeated crises of violence. Paradoxically this can create strong pressures for organisations, like the military, to attempt to re-create an authoritarian coalition that is based on stronger exclusion capabilities, or for the ruling coalition to attempt to construct a dominant party. But given the underlying distribution of power, these attempts are also likely to be short-lived unless there is a significant political project of social engineering to reconstruct political organisations - otherwise, the cycle of democratic interludes that end in electoral crises, followed by military takeovers and attempts at authoritarianism, is likely to continue. A sustainable competitive clientelism requires credible mechanisms

that allow the ruling coalition to be replaced in elections by an alternative coalition if the latter acquires greater holding power. This cannot be guaranteed simply through formal electoral rules in societies where so much happens informally. What is required is that elite expectations have to adapt to recognise that the use of administrative power to exclude powerful coalitions cannot cross socially acceptable limits. This is difficult to achieve. As a result, democracy is not always a stabilising force in developing countries, nor does it necessarily generate developmental outcomes if appropriate governance capabilities cannot be developed.

Today all of South Asia is governed by competitive clientelist coalitions as is much of Africa, though there are exceptions, such as Tanzania, which remains under a dominant party. Thailand in the 1980s and 1990s was also characterised by competitive clientelist coalitions until the emergence of a dominant party resulted in the military coup of 2006. Indeed only India has achieved an internal equilibrium that makes its competitive clientelism operate relatively smoothly. One reason for India's exception is, paradoxically, its size and diversity, which helps to prevent a ruling coalition from imagining that it can get away with significant administrative interventions in elections. Intervention to benefit a complex ruling coalition of diverse factions is in itself complex and this complexity can help to ensure an informal rule of law emerging for the conduct of elections. A further factor that helps the credibility of elections in India is that it is a large federal country with elections that are organised at the state level. If excessive violations happen within a particular state, the federal government has strong incentives to intervene to prevent a particular state descending into crisis. The federal government can impose the president's rule and re-run the election. Therefore, while irregularities, violence and the use of "black" money from the informal economy does happen in India, the parties know that an outcome that is significantly out of line with their organisational strength on the ground cannot be sustained. Third-party "institutional" oversight of electoral outcomes is far less credible in smaller states with competitive clientelism. In such states, electoral crises are more frequent and occasionally lead to military takeovers. An understanding of this political settlement suggests that the problem is unlikely to be solved simply by attempting a stronger enforcement of formal electoral laws. Considerable attention has to be given to strategies that assist the evolution of an informal rule of law for political coalitions, and a shared understanding amongst elites about how this political settlement actually works. For reasons of space we have not discussed another important dimension of the distribution of power between economic and political organisations (Khan, 2010). However, the discussion so far is sufficient to show the importance of focusing on pragmatic governance strategies that aim to overcome particular market failures constraining growth in the context of specific political settlements.

Governance for growth: issues and challenges and the case of Thailand

Our discussion of Thailand draws on a series of studies of growth-enhancing governance in a number of countries (Khan, 2008b, 2009a, 2009b and 2010). Figure 1.4 summarises the phases in the evolution of the political settlement in Thailand from the perspective of the dimensions referred to earlier (the distribution of power between political organisations and the productive capabilities and political connections of economic organisations). Here, we will focus on the important transition from the second to the third phase, when Thailand moved from a period of competitive clientelism in the 1980s and 1990s - a period that is known for its political corruption and "money politics" - to the phase that the 1997 pro-democracy constitution and the financial crisis ushered in, which paradoxically created the conditions for sustaining a dominant party coalition. Both the constitution and the crisis combined to weaken the political power of capitalist organisations, as well as the political organisations that were linked to them. The result was not the emergence of a rule-following social democracy as the framers of the constitution expected (and we would argue that this is not possible in any developing country) but rather allowed a reconfiguration of existing political organisations into a dominant party (the Thai Rak Thai of Thaksin and its successors). The implications for inclusive growth identify some of the challenges for institution-building and reform in developing countries. On the one hand, Thaksin's politics were more "inclusive" because he succeeded in building a dominant party system that was based on a promise of populist redistributive strategies operating through the formal government budget, which were indeed partially implemented. For instance, the 30-baht healthcare system significantly increased access to virtually free healthcare for the poor. On the other hand, other formal implementation capabilities were weak and contributed to the abandonment of strategies for industrial restructuring after the 1997 crisis. Moreover, Thaksin, unlike his predecessors, did not require the political and economic support of capitalist organisations to survive because his dominant party had an assured electoral constituency based on the promise to tax the middle class and distribute to the poor. This autonomy from the capitalist sector allowed Thaksin to capture unproductive rents in his own business dealings, which had further consequences for investor confidence and capacity building.

Figure 1.4. Evolution of the political settlement in Thailand

THAILAND	
CHARACTERISTICS OF POLITICAL SETTLEMENT	**BROAD FEATURES OF INSTITUTIONS AND GROWTH**
Vulnerable Authoritarianism with Weak/Moderate Capability / Politically Weak Capitalists 1960s-1970s	Capitalist rights supporting rapid accumulation but with weak industrial policy institutions
Competitive Clientelism with moderate-to-high capability / powerful capitalists: Mid 1970s-2001	Rapid growth supported by factional capitalist rent-seeking and limited industrial policy
'Unproductive' Dominant Party with high capability / politically delinked capitalists: 2001-2008	Adverse formal institutions supporting growth in formal sector but populist redistribution to the poor. Reliance on foreign investments grows
Backlash: Authoritarianism with a Democratic Face 2008	Political and policy uncertainty

Source: Khan, 2010.

The pro-democracy constitution in Thailand that was implemented at the turn of the century coincided with a rapid recovery from the 1997 financial crisis. Investments and the growth rate recovered but to a lower level compared with the preceding period (Table 1.1). However, an abrupt termination of the arrangements that had allowed gradual capability-building within domestic productive organisations also meant that manufacturing growth was now driven by multinational takeovers and investments. The implications were complex, with significant short-term benefits but more serious longer-term constraints on the capacity building required in a middle-income country to progress up the value chain towards a greater emphasis on design and innovation. Thailand appeared to abandon previous strategies of building domestic organisational and entrepreneurial capabilities precisely when more significant domestic capabilities were required to drive growth up the value chain. These paradoxical results were interconnected. Thaksin's power base in the countryside and his strategy of weakening competing political organisations meant that domestic capitalist firms could no longer use formal and informal institutions to support capability development. At the same time, the implementation capabilities of his dominant party coalition were too limited to carry out industrial restructuring from above.

Table 1.1. Thailand: output and productivity growth 1981-2005

Growth rates	Pre-boom	Boom	Crisis	Recovery	Transition to Thaksin
	1981-86	1987-96	1997-98	1999-2002	2000-2005
All sectors					
Output	5.5	9.5	-5.9	4.1	5.3
Factor contributions					
Capital stock	3.2	4.8	1.8	1.0	
Labour	1.4	2.7	1.3	1.9	
Land	0.03	0.01	0.01	0.01	
TFP	0.9	2.0	-9.0	1.2	
Labour productivity	2.6	7.6	-5.8	3.4	
Manufacturing					
Output	5.8	13.2	-4.8	7.1	6.9
Factor contributions					
Capital stock	4.1	7.4	3.2	1.6	
Labour	1.5	5.1	2.7	2.3	
TFP	0.15	0.7	-10.7	3.2	
Labour productivity	3.1	6.0	-7.7	2.4	
Investment share (% of GDP)	28.3	38.4	27.1	22.8	31.8

Source: Calculated from Warr (2005), Tables 1.3 and 1.4, and World Bank (2008).

The political and economic crisis of 1997 was partly due to excessively strong links between businesses and political organisations and this needed to be reformed. These links had allowed politically connected businesses to access rents, but sometimes these informal arrangements also indirectly solved important market failures and contributed to the dramatic growth over the previous three decades. Rents allowed learning-by-doing to be financed while the competition between the factions supporting different groups of capitalists ensured that these rents were effectively temporary and created strong incentives for high levels of effort (Khan, 2000b, 2000a). However, as the economy became more sophisticated these arrangements had to change and more effective methods of assisting capability development were necessary. The late 1990s were therefore a period of missed opportunities for growth-enhancing governance reforms. Instead, the constitutional changes brought about a change in the political settlement, which allowed the emergence of Thaksin's dominant party. However, this too was unstable because while excluded organisations of capitalists and the middle classes were initially weak, they retained potential support within the army and the monarchy. The backlash that happened in 2006 in the form of a military coup against Thaksin, followed by political uncertainty, will not be discussed further in this paper (see Khan, 2010). Our focus here is to look at a few

critical, informal arrangements that worked during the competitive clientelist period, the reasons for their failure and the emergence of a dominant party system and finally the missed opportunities of growth-enhancing governance prior to the constitutional crisis that began with the military coup.

When both formal and informal arrangements are involved in allocating resources and creating incentives, rents provide a useful lens through which to examine the role of informal institutions. Both formal and informal institutions can create rents (defined as resource flows that would not exist in the absence of particular institutions). Rents are more visible than informal arrangements, so examining rents can help to identify the implicit informal arrangements that are responsible for the allocation of particular rents and the terms on which they are available. The ways in which formal and informal institutions affect economic incentives and therefore market failures can then be analysed by looking at significant rents and the implicit and explicit rules of their allocation. Figure 1.5 summarises some of the most important rents in different periods in Thailand. The first two rows cover the period of competitive clientelism, while the third row refers to the dominant party period after 1997.

Putting these institutional arrangements in the context of the political settlement in Thailand over this period helps to explain the successes and failures of implementation and why the effectiveness of the underlying institutional ensemble was changing over time. Competitive clientelism during the 1980s and 1990s was relatively successful in Thailand because of some specific features of the Thai competitive clientelist political settlement (Doner and Ramsay, 2000; Khan, 2000a). Growth accelerated, as Table 1.1 shows, over the 1980s and 1990s, particularly compared with the virtual zero growth that the country experienced under the free trade imposed by the Bowring Treaty from 1855 to 1950 (Manarungsan, 1989). The competition for rents between competing political organisations was different from the competitive clientelism in many other developing countries because, in Thailand, productive capitalists were politically powerful and more likely to be in leadership positions in political organisations. This was partly due to the fact that Thailand was not colonised and its political organisations grew gradually and in line with the financing capabilities of emerging capitalists, rather than being creations of colonial administrations or anti-colonial movements. Moreover, as Thailand had many such political organisations, no single organisation could monopolise power for too long. Political power provided access to temporary rents, but the incentives were to convert these into productive assets or to finance periods of learning by doing, so that economic organisations remained economically viable out of power. Indeed building productive capabilities was a pre-condition for being able to finance

political activity when out of power and therefore to have a chance of returning to power (Khan, 2000; Phongpaichit and Baker, 2008).

A second, more formal, set of institutional arrangements were also important in Thailand, and failures of adaptation in this area are significant if we want to identify missed opportunities and challenges. Key macro-economic agencies of the state, in particular the central bank, the Bank of Thailand (BOT), were relatively insulated from factional politics. Initially at least, these agencies were able to resist patron-client politics from affecting monetary or exchange rate policy. However by the 1980s, the growing power of political organisations began to undermine the capacity of technocratic agencies to manage macro-economic aggregates. Competitive clientelism had initially been characterised by an implicit deal between technocrats and politicians whereby the technocrats managed the macro-economy and the politicians allocated sectoral and firm-level rents that were by necessity temporary (Christensen and Siamwalla, 1993; Doner and Ramsay, 2000).

Figure 1.5. Phases of governance and growth in Thailand

Policies/Rents	Governance	Outcomes/Vulnerabilities
Rent allocation for growth and to create capabilities in economic organizations 1980-97 Formal rents based on fiscal incentives, import and export controls and licensing. Informal rents based on ability to negotiate terms on formal rents, preferential access to privatized assets, loans, licenses, natural resources, land and insider information.	**Competitive Clientelism** ensured access to rents was relatively competitive because of competition between political organizations controlled by competing economic organizations. Competing organizations could not be permanently blocked and together with formal hard budget constraints, this ensured competitiveness. A permanent flow of rents to particular factions was not feasible.	**Rapid growth of large economic organizations with moderate technology** Dramatic growth (particularly 1980s) in low and medium-tech sectors where learning periods were short. But competitive clientelism also damaged autonomy of critical agencies: by the late 1980s and 1990s the Bank of Thailand, the NESDB and other agencies became targets of ruling factions.
(Limited) Rent allocation by technocratic agencies like Board of Investment (BOI) to accelerate technology acquisition, particularly 1980s Examples are targeted BOI incentives for specific technology acquisition strategies including duty concessions, time bound entry barriers, local content conditions supported by specific incentives.	**Technocratic and political (growth-enhancing) governance capabilities** Effective technocratic capabilities existed in some agencies and there were moments of political support for such strategies even in overall context of competitive clientelism.	**Upgrading and diversification through conditional support particularly over 1980-97** Examples include diesel engines 1980-85, cathode ray tubes 1985 onwards. But growing politicization of agencies and cheap capital imports created adverse incentives. BOI responded by supporting firms independent of nationality by mid-1980s.
Non-discriminatory rent allocation to all technology providers including FDI, particularly 1997- Local content rules, local ownership rules and setting of national technology priorities abandoned Rents for FDI were initially provided by cutting tariffs and taxes relative to competitors. Incentives now require massive investments in education and skills.	**Thaksin's Dominant Party wanted to unravel the competitive clientelist political settlement. In addition, regulated by international agreements such as WTO and FTAs** Limited attempt at developing technology policy framework rapidly abandoned. FTAs and WTO limit capability of governments to create temporary rents. Governance focus shifts to ensuring quality of skills.	**Rapid growth of FDI in assembly operations with agglomeration economies** Automotive sector success story but ownership of technology and bulk of profits is foreign. Challenge of increasing domestic value added. Country vulnerable to relocations of FDI. Political crisis as dominant party overthrown and FDI less confident.

Source: Khan, 2008b.

By the end of the Prem Tinsulanond government in 1988, these Chinese walls began to be undermined as new, more robust politicians hired and fired

technocrats to assert control over the economy in ways that they thought were required (Rock, 2000). The outcome was not only that serious macro-economic damage could be inadvertently inflicted, but also that ruling factions could attempt to capture much more significant and long-lived rents by using macro-economic management, thereby upsetting both the dynamic incentives for profit-seeking by business clients and also raising the stakes in political competition. An important set of missed opportunities in developing growth-enhancing governance capabilities in Thailand emerged at this stage. In particular in the 1980s during Prem Tinsulanond's quasi-civilian government, economic agencies exercised considerable effort to promote technology acquisition. The country had by then already acquired a diversified base of basic technology industries and needed to upgrade into more value-generating industries where entry was constrained by significant productivity disadvantages. Technocratic agencies, such as the National Economic and Social Development Board (NESDB), the Bank of Thailand and the Finance Ministry, had capabilities that had not yet been undermined by political appointments. Prem's military-backed government had aspects of an authoritarian ruling coalition and was therefore somewhere between the classifications of competitive clientelism and authoritarianism in Figure 1.3, although still broadly within a competitive clientelist settlement. It had a longer time horizon than competitive clientelism and better implementation capabilities.

As technology upgrading and investments in learning are subject to serious market failures, the institutions that addressed these problems were particularly important. In the 1980s the Board of Investment (BOI) was implementing ambitious technology upgrading strategies. An example was a project with three joint venture firms to introduce the production of diesel engines for agricultural machinery. The policy instruments included targeted import duties to protect domestic markets, reductions of duties for imported raw materials, entry barriers into the sector to protect initial investors, and a four-year target for achieving 80% local content. The project was monitored throughout and protection was reduced for those firms that failed to meet the local content requirement at the end of the period (Rock, 2000). Strategies like these were paying dividends, not only in Thailand but also in India in the 1980s and 1990s, before these countries signed on to WTO restrictions on these strategies (Khan, 2009b). As long as the economic organisations were not so politically connected that they could subvert the conditions attached to this assistance, the economic outcomes were good in a number of projects.

However, by the mid-1980s the conditions for supporting domestic capital in technology acquisition were being weakened. Instead of looking for new instruments for delivering support that could be better enforced within that political settlement, or shifting support to different groups or sectors that

lacked the power to subvert technology acquisition policies, key technocrats in Thailand began to look for foreign companies to drive technology upgrading. At the same time, exogenous changes in the global financial system following the Plaza Agreement of 1985 made Japanese investors interested in countries like Thailand. Net inflows of FDI almost quintupled from the 1980-85 annual average of 6.1 billion baht to 28 billion in 1988 and 45.7 billion in 1989, mostly driven by a huge increase in Japanese FDI (Phongpaichit and Baker, 1997). These levels were roughly sustained right through to the crisis of 1997 and beyond, but from the perspective of national capability development and with the great benefit of hindsight, we can say that some vital decisions made by technocrats at this critical juncture had damaging consequences.

The 1997 crisis and the new constitution led to a dramatic change in both the political settlement and in economic policies. The outcome was the victory of the populist Thai Rak Thai Party led by the charismatic businessman Thaksin Shinawatra. The new constitution sought to create a modern political system where strong parties would compete on manifestos. It tried to reduce the weight of clientelist provincial interests by introducing a number of seats to be allocated by party lists. It tried to reduce competitive clientelist lobbying by increasing the power of the Prime Minister over the party - for instance, by stipulating that when ministers resigned, they would lose their parliamentary seat, making them more likely to stay with the party. The Prime Minister could call an election with 45 days notice, but a candidate had to be a member of a party for 90 days to stand for election. This was to reduce the threat of defections. A number of independent bodies were also created to check and balance political representatives. However, the framers of the constitution did not understand that constitutional rules cannot create a Weberian state if the material conditions for such a state do not yet exist. Ironically, the rules weakened lower-level political organisations relative to the party leadership by enough to make a dominant party more viable. The weaker the bargaining power of lower-level organisations, the more likely that the dominant party would be able to satisfy their expectations. The lower the threat of their defections, the more likely that the dominant party could continue to win electoral contests. The result of the constitution was, therefore, in many respects worse for the middle-class framers of the constitution and for many capitalists who initially supported Thaksin's party.

When Thaksin set up the Thai Rak Thai Party in 1998, his agenda was strongly influenced by the crisis. He spoke of the need to protect Thailand's competitiveness, respond to the aggressive behaviour of global competitors and have business attitudes replace bureaucratic ones in the running of the country. This struck a chord with both the middle classes who saw the old bureaucratic polity as a cause of the economic mismanagement for which the

whole society was paying a price, as well as the stricken Thai businesses that were looking for support and salvation on a scale that the IMF would not recommend. Unfortunately for Thailand, Thaksin turned out to be less strongly committed to industrial development and technological progress than his initial industrial backers had hoped. Part of the problem was that the internal power structure of the dominant party did not provide enough implementation capacity to overcome the resistance to industrial disciplining. As an intuitive populist politician, Thaksin also recognised that a focus on big business was more difficult to sell in the short term and so his rhetoric turned rapidly to support the small entrepreneur and the farmer, even though the employment-generation possibilities in these sectors were limited. A rural uplift programme that was based on debt relief, spending programmes and the 30-baht health plan emerged, without any proper costing of their long-term viability.

On top of the constitutional changes that were assisting the maintenance of a dominant party, Thaksin began to spend unprecedented amounts buying in lower-level political organisations and his party promised benefits to the poor on a scale never before seen in Thai politics. The 2001 elections allowed Thaksin's party to combine a new politics of offering redistribution to the poor through the budget, together with old-style faction building. This combination made the party politically unassailable in electoral contests. The fiscal programme of redistribution to the poor was at the expense of limiting access to resources for capitalist firms and the middle class, who were no longer electorally or financially important constituencies for the new party. The relatively quick recovery that was achieved after 1999 through demand expansion also reduced the pressure to implement painful restructuring policies on the productive sector that would weed out lagging firms and provide support to the others. The economic recovery was based on Keynesian spending programmes that were focused on rural spending and did not address the longer-term problems of technology upgrading and the development of new growth sectors. The initial spending was financed by borrowing the vast under-used deposits of banks that had stopped lending. The recovery meant that for a time the budget deficit did not grow and it actually began to shrink as growth picked up.

Thaksin had initially been keen about developmental interventions to enhance the competitiveness and capabilities of Thai business. The American business consultant Michael Porter was paid a hefty fee to identify sectors and policies for Thailand to develop competitive niches. By mid-2002 he had identified five unsurprising sectors: tourism, fashion, food, computer graphics and automobiles. Porter provided general and sometimes contradictory recommendations, such as more openness and an end to "business connections with government" but also micro-level support for specific

sectors and firms. He also recommended a free trade agreement with the US without explaining how this might affect industrial policy interventions. What was missing was a discussion of specific market failures constraining growth and the governance agencies and capabilities that needed to be developed to address these problems.

In the end, the government did not proceed with developmental interventions. The bailouts organised by the Thailand Asset Management Corporation (TAMC) showed why developmental policies would require a reorganisation of political arrangements and a significant improvement in the capabilities of specific agencies like the TAMC if they were to be effectively implemented. The TAMC was set up by Thaksin to assist the recovery from the crisis by taking up the bad loans from banks and lending to priority sectors. However, the immediate lending of banks and of the TAMC itself showed the enormous power of factional political organisations within the ruling coalition. The dominant party had brought within it many of the existing political organisations with their links to businesses. Phongpaichit and Baker (2009) provide examples of several big businessmen who received loans and debt forgiveness worth billions of bahts for dubious business ventures when they were clearly not short of money given their lavish spending on buying golf courses and other activities. Clearly, these individuals were connected to powerful organisations that were now part of the new ruling coalition. The competitive temporary rents that had allowed growth in the past were in danger of becoming permanent rents for those capitalists who were linked to organisations within the dominant party. While capitalists could no longer drive rent creation for themselves, the dominant party structure allowed any beneficiaries of rents to block disciplining attempts. The paradox was therefore one of greater political inclusion at the expense of some of the formal and informal arrangements that had supported processes of capability building by domestic capitalists.

This was therefore another period of missed opportunities for Thailand. The strong electoral support for a party that was initially committed to capability development could have allowed it to create technology support agencies with a narrow enough remit, and with concerted political support for capability building within these agencies, to make their rent management efforts credible. Technological capability development may have been effective if the assisted sectors and firms were selected to ensure that they were not powerful enough to capture rents without providing any social benefit. Financial instruments could also have been devised that were more difficult to capture. For instance, up-front assistance to meet set-up costs in new technologies, followed by exposing the firms to market competition, could have reduced the attractiveness of participation in such schemes for unproductive rent seekers. The successful experience of catching up in

the 1980s in Thailand shows that brief periods of support can create the right incentives and compulsions for high levels of effort in learning-by-doing. Technology support agencies may have attempted to improve their governance capabilities by focusing on support that was time bound, and by focusing on particular sectors of capitalists who were less strongly connected to powerful organisations within the party.

Setting up agencies with a defined and effective remit would undoubtedly require an internal confrontation with vested interests, but it is possible that the political moment would have allowed a victory, or enough of a victory, to address important market failures to a greater extent. All we know is that the attempt was not made. As it turned out, Thaksin's emerging response had two negative aspects. First, his own expropriation strategies involving his close family and friends became open and extensive. Tax evasion, land scams and dodgy public purchase contracts were examples. It could be that the acceleration of unproductive rent appropriation by Thaksin's family and business networks would have happened anyway, but if a developmental strategy that could have generated productive surpluses had been blocked by the power structure within the dominant party, the leadership's subsequent decision to capture rents in unproductive ways also made sense. Secondly, economic nationalism and technology policy were quietly dropped and replaced with a more populist support for the poor, for rural interests and small businesses, combined with a growing openness to foreign capital as a way of sustaining technology-driven growth. This too could have been a reflection of the poor implementation capabilities within the party that it discovered during the TAMC experience, and the failure to develop more targeted governance capabilities that could have credibly driven a domestic technology-driven growth strategy.

Around this time foreign investment increased in Thailand, with significant growth in automobiles and electronics. Foreign capital bought out distressed Thai firms and benefited from the base of skilled workers that had emerged. This brought a period of growth but also growing concerns within Thailand about entrepreneurial and technological capabilities. As Ohno (2006) points out, even the two most advanced South-East Asian countries, Malaysia and Thailand, are not close to the stage where domestic producers can develop their own design and production capabilities. Progress up the value chain has been slow because a multinational-led strategy puts countries like Thailand in a catch-22 situation. Local production capabilities will only move up the chain if multinationals move up the value chain in local production, allowing domestic producers to move into the spaces that have been vacated. However, multinationals will only move up if domestic producers can fill the gaps and local capabilities are available for the more difficult production and design processes. But these are unlikely to develop

locally at a rapid pace without learning-by-doing supported by government policies.

Thaksin's political settlement therefore proved to be particularly problematic for addressing the market failures that are relevant to sustaining inclusive growth. When the attempt to restructure the formal productive sector was abandoned, the dominant party appeared to believe that it could sustain its redistributive requirements by squeezing the middle class and domestic capitalists. It was possible to imagine this was a sustainable strategy because the economy had picked up to some extent on the back of multinational investments. However, the excluded political and economic organisations were not entirely powerless and had strong supporters within the army who feared Thaksin's populism would damage the economy and perhaps even undermine the monarchy. The excluded economic organisations and the middle class struck back in the military coup of 2006. The result was a long drawn-out constitutional crisis from 2006 onwards whose roots lie in the failure to construct a political settlement that incorporates developmental strategies for Thailand's domestic economic organisations. The victory of another incarnation of Thaksin's party in 2011 reopened these challenges for Thai policy-makers.

Our brief discussion of Thailand illustrates the importance of a number of concepts and their interrelationships. An understanding of political settlements, as well as the market failures that need to be addressed to assure employment-generating growth, are at the heart of the challenge. To a large extent, the economic analysis of market failures and the comparison of performances and strategies across countries is a technical exercise, but the design and implementation of formal strategies that have a chance of working in different political settlements inevitably involves political judgements. It is also a question of focusing on a small number of issues that are important and solving feasible problems. Thailand's growth story in the 1980s was one of formal and informal institutions working together in serendipitous ways. Its failure to sustain its capability development strategies after 1997 is a story of technocrats and politicians failing to identify the agencies that needed to be built upon and strengthened. While economic growth remains respectable, Thailand's failure to integrate political inclusion with strategies of capability development for the economic organisations that must underpin sustainable inclusive growth lies at the heart of the challenges facing the nation.

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Chapter 2

Finance, regulation and inclusive growth

Ross Levine*

Regulatory agencies that foster competition among private financial institutions, promote transparency throughout the financial system and work relentlessly to reform policies that perversely distort the incentives of private institutions encourage inclusive growth. In contrast, regulations that stymie competition in the name of stability and policies that funnel credit to politically-favoured ends in the name of the poor typically curtail inclusive growth. Political economy factors are paramount in shaping the design and implementation of financial regulatory policies since powerful segments of society may seek exclusive - not inclusive - growth.

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Introduction

Finance matters for inclusive growth (Beck *et al.*, 2007, 2008; Demirgüç-Kunt and Levine, 2009; Levine, 2008). It shapes whether credit - and hence opportunity - flows to those with the best entrepreneurial ideas, or whether economic opportunities are restricted to those with the most accumulated wealth and the strongest political connections. The financial system influences who can start a business and who cannot, who can invest in human capital accumulation and who cannot, and whether people live in a dynamic, growing economy or whether they must find work in a more stagnant environment. Consequently, finance exerts a powerful influence over the efficiency of resource allocation, the nature of labour markets and each person's economic horizons.

Past research provides guidance on which financial regulatory strategies foster inclusive growth and which policies impede it. On the positive side, Barth, Caprio and Levine (2006), Barth *et al*. (2009), Beck, Demirgüç-Kunt and Levine (2006), Beck, Levine and Levkov (2010), and Houston, Lin and Ma (2010) advertise the value of regulations and supervisory practices that foster competition and transparency and that continuously seek to eliminate policies that create incentives for financiers to undertake socially harmful - though privately profitable - investments. Such regulatory practices increase the quality of financial services, reduce the cost of those services, discourage corruption in credit allocation and exert a disproportionately large impact on the living standards of lower income households.

On the negative side, Barth, Caprio and Levine (2006), Barth *et al.* (2009), Beck, Levine and Demirgüç-Kunt (2006), Beck, Levine and Levkov (2010), Dinc (2005), Houston, Lin and Ma (2010), Khwaja and Mian (2005), Sapienza (2004) and many others raise cautionary flags regarding activist policies designed with the intention of directing credit to those excluded from normal credit channels. Greater government involvement typically tilts the flow of credit to large, politically connected firms, thereby boosting the opportunity for corruption, slowing growth and limiting the economic opportunities of many in society. This does not mean that government interventions are never efficacious; what it does indicate is that when the government takes a more hands-on approach to the flow of credit, this often has deleterious effects on growth and the inclusiveness of economic activity.

There are central political economy challenges to creating policies that foster inclusive growth. Some powerful people do not want well-functioning financial systems that give the economically disenfranchised greater opportunities; rather, they want exclusive access to credit. Put differently,

since a better functioning financial system will increase the degree to which credit flows to those with the best ideas and decrease the importance of accumulated wealth and political influence, the wealthy and connected might feel threatened by improvements in the financial system. Furthermore, even when policymakers enact well-intentioned policies to expand economic opportunities, many groups will have powerful incentives and ample capabilities to undermine those policies. These political economy considerations advertise the difficulty in promoting inclusive growth either directly through targeted credit-type programmes or indirectly by enhancing the competiveness, transparency and incentives of the financial system.

Finance matters for inclusive growth

Growth

As reviewed by Levine (2005), a large and growing body of research shows that the services provided by financial markets and intermediaries exert a first-order impact on the rate of long-run economic growth:

- Countries with better functioning financial systems grow faster over many decades (*e.g.* Levine and Zervos, 2008), and
- Improvements in the operation of financial systems accelerate the rate of economic growth within particular economies (*e.g.* Haber *et al.*, 2003).

Financial markets and intermediaries provide four critical services. They mobilise savings, choose where to allocate those savings, monitor the use of those savings by firms and individuals, and provide mechanisms for pooling and diversifying risk. Thus, the financial system affects the savings rate and the efficiency of resource allocation, with enduring ramifications on economic activity.

To the extent that the financial system performs these functions well, economies tend to grow correspondingly faster. For example, when banks screen borrowers effectively and identify firms with the most promising prospects, this is a first step in boosting productivity growth. When financial markets and institutions mobilise savings from disparate households to invest in these promising projects, this represents a second crucial step in fostering economic growth. When financial institutions monitor the use of investments after financing firms and scrutinise their managerial performance, this is an additional, essential ingredient in boosting the operational efficiency of corporations, reducing waste and fraud, and spurring economic activity. Furthermore, when securities markets allow individuals to diversify risk

inexpensively, this encourages investment in higher-return projects that might be shunned without effective risk management vehicles.

Of course the opposite is also true: to the extent that a financial system simply collects funds with one hand and passes them along to cronies, existing elites and the politically-connected with the other hand, it produces a less efficient allocation of resources, which implies slower economic growth and greater exclusivity in the availability of economic opportunities. Furthermore, when the financial system provides low quality financial services, investment can be discouraged as both returns are low and the risk of expropriation is high. Thus, finance affects both the quantity of investment and the efficiency with which capital is allocated and employed.

The evidence suggesting that finance exerts a first-order impact on economic growth emerges from cross-country and time-series studies, research using instrumental variables to reduce concerns about reverse causality, analyses that employ industry-level and firm-level data to assess the mechanisms linking finance and economic growth, and historical case studies that trace economic performance over a century or more (Levine, 2005). Furthermore, Jayaratne and Strahan (1996) show that when there are policy reforms that intensify competition in the financial system, there tends to be improvement in the services provided by the system, accelerating economic growth. Although more research is needed on the linkages between economic growth and specific financial services - *e.g.* the mobilisation of savings, the allocation of capital, the monitoring of how that capital is employed, and the management of risk - existing research indicates that the operation of the financial system exerts a powerful influence on long-run economic performance.

Entrepreneurship

One of the ways in which a better functioning financial system promotes economic growth is by spurring entrepreneurship. Indeed, one way to define a better financial system is that it does a superior job of screening firms and households, and allocating capital to those with the best projects, ideas and entrepreneurial energy. As described in Aghion and Howitt (2010), finance shapes the Schumpeterian process of creative destruction: finance can foster competition by allowing new, more promising firms to enter the market, which forces less efficient incumbent firms to exit, or it can become an impediment to entrepreneurship and growth.

Recent research, for example, shows that financial policy reforms that intensified competition in the financial system:

- Enhanced the quality of financial services provided to the non-financial sectors,
- Lowered entry barriers facing non-financial firms, thereby intensifying competition through the non-financial sector, and
- Increased both the rate of new firm entry and old firm exit.

Specifically, greater competition among financial institutions induced them to lower interest rates on loans and improve the techniques for screening and monitoring firms and households (Hubbard and Palia, 1995). This improved the efficiency of credit allocation, reduced the proportion of bad loans (Jayaratne and Strahan, 1998), and lowered collateral requirements (Tewari, 2011), which made it easier for new firms to enter the market and compete with existing firms (Kerr and Nanda, 2009). Thus, a better functioning financial system reduced the degree to which accumulated wealth shaped credit allocation and increased the degree to which the likelihood of future economic success determined the flow of credit.

Indeed, improvements in the quality of financial services both eased the entry of excellent new firms and expedited the exit of relatively low-quality old firms (Black and Strahan, 2002; Kerr and Nanda, 2009). Cetorelli and Strahan (2006) show that reforms that boosted competition in the banking sector had a particularly large impact on competition in non-financial industries, which are naturally heavy users of bank credit. Furthermore, Beck, Demirgüç-Kunt, Laeven and Levine (2008) find that financial development had a large, positive impact on small firms, again suggesting that improvements in financial services foster competition and efficiency throughout the economy.

Inclusive growth

So who benefits from a better financial system? Does financial development induce an increase in per capita gross domestic product (GDP) only because the very rich get even richer or does finance expand economic opportunities for the bulk of society?

Economic theory suggests that finance shapes the distribution of economic opportunities. The financial system affects the degree to which a person's economic opportunities are defined by individual skill and initiative, or by family wealth, social status and political connections. It influences who can launch a new business venture and who cannot, who can acquire education and who cannot, who can live in a neighbourhood that fosters the cognitive and non-cognitive development of their children and who cannot, who can pursue one's economic dreams and who cannot.

Though much less well-developed than the literature on finance and growth, a growing body of research indicates that more competitive, better functioning financial systems exert a disproportionately positive impact on relatively low-income families. This evidence emerges both from broad cross-country assessments and from individual country studies based on microeconomic evidence.

For example, Beck, Demirgüç-Kunt and Levine (2007) examine:

- The relationship between financial development and the fraction of the population living on less than $2/day, and

- The degree of income inequality as measured by the Gini coefficient of income inequality.

They use data on poverty from 68 countries over the period 1980-2005 and data on income distribution from 72 countries over the period 1960-2005. One problem with conducting cross-country studies of finance and poverty is the difficulty in measuring financial development. The theory focuses on what the financial system does: it ameliorates informational problems before investments are made; it affects corporate governance by reducing informational problems after investments are initiated; it facilitates risk diversification; and it eases the mobilisation of savings by lowering information and transactions costs. The empirical measures of financial development, however, too frequently do not bear a clear resemblance to these concepts of financial development. A common measure of financial development is the variable Private Credit, which equals the value of credit going to privately-owned firms as a fraction of a country's GDP. Private Credit isolates the intermediation of credit that goes to private firms and excludes credit that flows to the state or state-owned enterprises; however, it is not a direct measure of overcoming information or transaction costs to improve credit allocation, corporate governance and risk management. Nonetheless, in cross-country studies, these broad indicators of financial development are sometimes the best measures that we have.

Beck, Demirgüç-Kunt and Levine find a robust positive relationship between financial development and both poverty alleviation and income inequality reduction. This result holds even when controlling for average growth, initial income and a wide array of country traits.

It is worth emphasising that the positive relationships between financial development and both poverty alleviation and income inequality reduction hold when controlling for average growth. It is not just that finance accelerates economic growth, which trickles down to the poor; rather, finance exerts a disproportionately positive influence on lower income households.

Moving to a more microeconomic-based study, Beck, Levkov and Levine (2010) test whether a policy reform that spurred competition in the banking industry - and hence improved the quality of banking services - increased, decreased or had no effect on the distribution of income. They examine the individual states of the United States that removed regulatory prohibitions on opening branches within their state boundaries in different years over a 20-year period ranging from the mid-1970s to the mid-1990s. This deregulation intensified the contestability of banking markets and improved the provision of financial services.

Methodologically, the deregulation of intra-state branching provides a natural setting for identifying and assessing the impact of a regulatory reform that enhanced the quality of financial services on the distribution of income. Kroszner and Strahan (1999) show that national technological innovations triggered deregulation, which was exogenous to income distributional changes within individual states. The invention of automatic teller machines (ATMs), in conjunction with court rulings that ATMs are not bank branches, weakened the geographical bond between customers and banks. Checkable money market mutual funds facilitated banking by mail and telephone, which weakened local bank monopolies. Improvements in communications technology lowered the costs of using distant banks. These innovations reduced the monopoly power of local banks and therefore weakened their ability and desire to fight deregulation. Kroszner and Strahan (1999) further show that cross-state variation in the timing of deregulation reflected the interactions of these technological innovations with pre-existing conditions. Thus, the driving forces behind deregulation and its timing were largely independent of state-level changes in income distribution. Consequently, Beck, Levkov and Levine (2010) exploit the cross-state, cross-year variation in income distribution and deregulation to assess the impact of a single policy change on different state economies.

It was not the realisation that branching restrictions were economically inefficient that induced policymakers to remove these restrictions; rather, technological innovations reduced the rents produced by these restrictions for banks. Thus, technological innovations undermined the value of regulatory restrictions on competition.

Beck, Levkov and Levine (2010) find that regulatory reforms that intensified competition in the banking sector reduced income inequality by disproportionately helping lower income individuals and households. After controlling for national trends in income inequality, the Gini coefficient of income inequality drops after bank branch deregulation. The drop becomes statistically significant three years after deregulation. The negative impact of bank branch deregulation on income inequality is a level effect that fully materialises over the six years following deregulation. While income

inequality widened in the United States during this period, they show that branch deregulation lowered income inequality relative to this national trend by using year-fixed effects. The magnitude is consequential: deregulation explains 60% of the variation of income inequality during the sample period relative to state and year averages. Furthermore, deregulation reduces income inequality by exerting a disproportionately positive impact on the poor, not by hurting the rich.

This body of research provides lessons for financial policy. Better functioning financial systems foster economic growth and intensified competition within the financial system tends to enhance its functioning with positive ramifications on economic output.

Discrimination

Discrimination is another channel through which the operation of the financial system affects "inclusiveness". Gary Becker noted in 1957 that some employers might discriminate against particular workers based on race, gender, religion, sexual orientation, culture, etc. Without loss of generality, let us consider racial discrimination within the United States. With this type of "taste-based" discrimination, blacks with exactly the same skills as whites might receive lower wage rates because employers are willing to lose some profits in order to satisfy their preferences for hiring only white workers.

Becker (1957) argued that discrimination is cheaper when there is little competition. When an owner is earning large rents, the marginal cost of hiring a more expensive white worker rather than an equally productive and less expensive black worker is not a very large share of the profits. With more intense competition and smaller profit margins, the cost of discrimination increases. Thus, competition reduces the manifestation of racial prejudices in labour market outcomes. Competition does not necessarily change prejudices; rather, it works to eliminate inefficiencies, such as hiring lower quality white workers and paying them more than higher quality black workers.

As emphasised earlier, financial sector reforms can spur competition among financial intermediaries and therefore enhance the quality of the financial services that are provided to the rest of the economy. Furthermore, improvements in the provision of financial services tend to lower barriers to the entry of non-financial sector firms. Put simply, by enhancing the functioning of the financial system, financial policies affect competition throughout the entire economy, not just the financial system itself. By intensifying competition throughout the economy, financial policies can thus affect racial discrimination in labour markets across all industries and sectors—not just in the financial sector.

Levine, Levkov and Rubinstein (2011) examine whether the financial reforms that intensified competition throughout the US economy affected racial discrimination. They use bank branch deregulation across the 50 states as a state-time exogenous increase in competition. They examine data on hundreds of thousands of individuals for the period 1976 to 2005.

They find that the race gap - the difference in wages between "identical" white and black workers - fell after financial reforms intensified competition in banking and hence throughout the entire economy. After conditioning on individual characteristics, as well as on state and year-fixed effects, the race gap dropped by about 20% following a state's removal of restrictions on intra-state branching. More specifically, before a state deregulates, a white man with identical observable characteristics to a black man earns 14% more. After deregulation, the race gap falls to 11%. These findings suggest that improving the financial system reduces discrimination, disproportionately expanding the economic horizons of historically oppressed groups.

Financial innovation matters in a growing economy

Before turning to a discussion of the types of policies that promote inclusive growth, let us consider financial innovation. The literature on economic growth over the last two decades, if not the last six decades, has placed technological innovation in the starring role and yet the literature on finance and growth has largely ignored financial innovation. History suggests that this is a mistake. As stressed by Laeven, Levine and Michalopoulos (2011), financial and technological innovations are inextricably linked.

Financial innovations have been essential for permitting improvements in economic activity for several millennia. Whether it was (i) the design of new debt contracts six thousand years ago that boosted trade, specialisation and hence innovation; (ii) the creation of investment banks, new accounting systems and novel financial instruments in the 19th century to ease the financing of railroads; or (iii) the development and modification of venture capital firms to fund the development of new information technologies and innovative biotechnology initiatives, financial innovation has been a critical component of fostering entrepreneurship, invention and improvements in living standards.

The evidence does not imply that financial innovation is unambiguously positive. Financial innovations are frequently implemented simply to avoid regulations and, indeed, they played a prominent role in triggering our current suffering. At the same time, the evidence does suggest that financial innovation is important in fostering economic growth and expanding economic opportunities. For example, there are at least three policy

implications to the observations that (i) finance shapes the rate of long-run economic growth, (ii) finance affects the distribution of economic opportunities and (iii) financial innovation is a pivotal input into the quality of the financial services provided to the non-financial sector. They are:

1. Improvements in the financial system will generate winners and losers, which suggests that the political power of particular constituencies will play a central - if not the central - role in determining the degree to which a country selects financial policies that encourage inclusive growth, as emphasised by Calomiris and Haber (2011), Haber (forthcoming) and many others.
2. The financial regulatory regime should not focus exclusively on stability since financial development and financial innovation influence human welfare by shaping economic growth and the distribution of economic opportunities.
3. The regulatory regime must adapt to financial innovation or well-reasoned, well-intentioned, well-structured regulations will become obsolete and potentially detrimental to economic prosperity as a country grows.

What types of regulatory strategies work?

What works worst?

Abundant evidence warns against financial regulatory strategies that give official agencies excessive power over the allocation of capital (Shleifer and Vishny, 1998; Barth, Caprio and Levine, 2006) even when the advertised goals of these powers are to enhance the safety and soundness of credit allocation. For example, the recent crisis has provoked calls for "stronger" regulation; however, to the extent that this means greater direct government control over the flow of credit, past research suggests that such policies tend to reduce the quality of financial services. Similarly, there are frequently calls for policies that funnel credit to lower-income households and smaller enterprises in the name of inclusive growth. Again, research indicates that powerful groups often hijack such policies and use them to promote their own interests rather than to expand the economic opportunities for society. Whether it is Brazil or Mexico, India or Pakistan, Italy or the United States, publicly-owned, government-controlled and state-protected banks are associated with slower growth, not more rapid rates of economic development. Moreover, these government-influenced banks often lend the

bulk of their funds to politically connected firms, not to the poor and economically disenfranchised.

For example, Kwaja and Mian (2005) show that government-owned banks in Pakistan stymie inclusive growth and instead protect and promote the interests of firms with strong political ties. They examined 90 000 corporate loans in Pakistan over the period 1996-2002, together with information on the political affiliation of the companies and the ownership of the banks involved. They have several findings suggesting that the government-owned banks stymie inclusive growth and work to help the politically influential. Khwaja and Mian (2005) find that government-owned banks favour firms with politically connected executives, but - and this is a critical distinction - privately-owned banks do not; private banks do not lend disproportionately to politically connected firms. Furthermore, private banks lend relatively more to small and medium-sized enterprises than government banks, while government-owned banks lend comparatively more to large firms. Thus, government-owned banks are not expanding access; rather, they are supporting large, politically connected firms.

Similar evidence emerges from Cole's (2009) examination of lending in India. Credit from government-controlled banks flows disproportionately to politically important regions, *i.e.* regions where there is an election. Officials use the banks to maintain or obtain political power, not to expand access to credit.

Sapienza (2004) shows that government-owned banks in Italy also favour large, politically connected firms and that they favour the entrenched incumbents. She examines almost 100 000 loan contracts in Italy over the period 1991-5. Given information on both the characteristics of the borrowing firm and the traits of the lender, Sapienza (2004) assesses differences between the lending decisions of private and government banks. Government-owned banks in Italy charge lower interest rates to large firms than their privately-owned counterparts, but do not charge lower interest rates to comparable small firms than private banks. Furthermore, firms pay lower interest rates in localities where the local government-owned bank's chairperson has the same party affiliation as the ruling political party.

Similarly, cross-country comparisons indicate that direct government involvement in credit allocation, either through government-owned banks, directed credit programmes, or powerful regulatory guidance on credit allocation, breeds corruption in the lending process and lower quality financial services, and hence curtails inclusive growth (Barth, Caprio and Levine, 2005; Beck, Demirgüç-Kunt and Levine, 2006). Furthermore, Houston, Lin and Ma (2010) find that state ownership of the media intensifies the impact of government-owned banks on corruption in lending,

emphasising the "grabbing hand" of government, as argued by Shleifer and Vishny (1998). Direct government involvement in the allocation of credit tends to increase the flow of capital to the politically connected, limiting opportunities and retarding economic activity.

Dinc (2005) further emphasises that politicians use government-owned financial institutions to maintain positions of power by increasing their lending before elections. In a cross-country, cross-bank empirical investigation, Dinc (2005) finds that government-owned banks increase their lending in election years relative to private banks. Again, government-owned banks are not necessarily used to promote inclusive growth: they are used to maintain incumbent officials in power.

Although there are sound economic theories for government-owned banks, directed credit programmes and policies to encourage the flow of credit to particular ends, these programmes in practice frequently go awry (Easterly, 2002). For example, governments might have superior information about the social returns related to particular investments. Thus, government programmes could enhance social welfare. Similarly, problems with contract enforcement and collateral requirements might prevent capital from flowing to high-return endeavours. Under such conditions, governments can play a catalyzing role. Moreover, private financial institutions might find it more difficult than governments to diversify some risks, suggesting that government guarantees could foster a more efficient allocation of capital. However, in practice, well-intentioned government interventions are frequently captured by the political and economically powerful and used to increase their slice of the economic pie, not to increase the size of the pie itself.

I am not arguing that government interventions have never had positive effects or that they never will; rather, I am simply observing that the accumulated stock of evidence suggests that directed credit-type policies are not, in general, an effective mechanism for promoting inclusive growth. Indeed, the accumulated evidence advertises the comparative advantage of an alternative financial regulatory strategy.

What works best?

Research provides guidance on how to build a sound financial regulatory strategy: focus on competition and transparency, and do not perversely distort the incentives of financial markets' participants. Specifically, Barth, Caprio and Levine (2006 and forthcoming) find the following:

1. Countries that force financial institutions to disclose information in a transparent, easily comparable manner enhance the functioning of financial markets.

2. Legal and regulatory systems that both facilitate and compel equity and debt holders to oversee the management of financial institutions create more efficient, competitive financial systems that foster economic prosperity; or, put differently, growth-promoting financial intermediaries arise with a greater probability when governments refrain from enacting and implementing regulations that interfere with the ability and incentives of shareholders and creditors to monitor financial intermediaries.

3. Regulatory agencies that remove, rather than impose, barriers to competition boost the quality of financial services and expand access to financial services and private financial market participants compete for profits.

Furthermore, a broad array of research stresses the importance of incentives. For example, reasonable people can disagree about the efficacy of deposit insurance: some will argue that it is bad because it reduces monitoring by depositors, intensifying the moral hazard problem; others will argue that deposit insurance reduces extremely costly and contagious bank runs and that regulators can monitor banks and contain the moral hazard problem. Both sides of this argument should agree, however, that if there is deposit insurance, then either the regulators must monitor the banks to restrain risk or the regulators must devise other mechanisms to incentivise other investors in the bank to contain moral hazard. Both sides should agree that insuring depositors (or other debt holders) with no concomitant actions by regulators to control risk would tend to create perverse incentives, increasing the likelihood that the bank will take excessive risk. This one, simple example emphasises a critical point: regulations should focus on incentives, especially in an environment in which there are many policy distortions.

In summary, research indicates that the most effective strategy for triggering enduring, inclusive growth is to emphasise competition, transparency and the removal of perverse incentives, as opposed to focusing on the concoction of directive credit-type polices to funnel resources toward favoured ends. Although this approach does not provide an immediate link between a policy action and the poor receiving resources, which might make it seem disconnected from real, human problems, a regulatory strategy focused on competition, transparency and incentives has the advantage of fostering enduring, inclusive growth.

Post-crisis re-evaluation

Does the recent US financial crisis conflict with these policy conclusions?

The answer is no; it reinforces the earlier findings (Barth, Caprio and Levine, 2011; Levine, 2010a, 2010b). A series of regulatory policies in the United States: (i) hindered transparency; (ii) erected barriers to shareholders and creditors, effectively monitoring the activities of financial institutions; and (iii) created incentives for financial institutions to take excessive risks.

Thus, the United States did not follow the basic lessons about financial regulations with respect to competition, transparency and incentives. It is inaccurate, and ultimately unhelpful, to view the crisis as a failure of the market. The United States had, and has, lots of regulations and very powerful regulators. It is more accurate and more useful to identify the regulatory and political failures that produced the crisis, so that the United States and other countries can enact more growth-enhancing policies.

To give an example of how US regulatory policies reduced transparency, let us consider the Over-The-Counter (OTC) derivatives market. Powerful regulators and policymakers thwarted efforts to make the Credit Default Swap (CDS) market more transparent. The Federal Reserve (under Alan Greenspan), the Treasury (under Robert Rubin and then Larry Summers) and the Securities and Exchange Commission (SEC; under Arthur Levitt) squashed attempts by Brooksley Born of the Commodity Future Trading Commission (CFTC) to shed light on the multi-hundred-trillion dollar OTC derivatives market, which included CDSs, at the end of the 1990s.

Incidents of fraud, manipulation, and failure in the OTC derivatives market began as early as 1994, with the sensational bankruptcy of Orange County and court cases involving Gibson Greeting Cards and Proctor & Gamble against Bankers Trust. Numerous problems, associated with bankers exploiting unsophisticated school districts and municipalities, plagued the market. Furthermore, OTC derivates played a dominant role in the dramatic failure of Long-Term Capital Management (LTCM) in the summer of 1998. Indeed, no regulatory agency had any warning of LTCM's demise, or the potential systemic implications of its failure, because it traded primarily in this opaque market.

In light of these problems and the lack of information on the OTC derivatives market, the CFTC issued a "concept release" report in 1998 calling for greater transparency of OTC derivatives. The CFTC sought greater information disclosure, improvements in record keeping and controls on fraud. The CFTC did not call for draconian controls on the derivatives market; it called for more transparency.

The response by the Federal Reserve, the Treasury and the SEC was swift: they stopped the CFTC. First, they obtained a six-month moratorium on the CFTC's ability to implement the strategies outlined in its concept release. Second, the President's Working Group on Financial Markets, which consists of the Secretary of the Treasury, the Chairman of the Board of Governors of the Federal Reserve System, the Chairman of the SEC and the Chairman of the CFTC, initiated a study of the OTC derivatives market. Finally, they helped convince the US Congress to pass the Commodity Futures Modernisation Act of 2000, which exempted the OTC derivates market - and hence the CDS market - from government oversight.

This example emphasises that the US regulatory authorities implemented policies that are inconsistent with one of the core lessons from research on financial regulation: the need to foster transparency. Senior regulators and policymakers lobbied hard to keep CDSs and other derivatives in opaque markets. This should not be interpreted as either failure of too little or too much regulation; it should be viewed as an additional example of the wrong type of regulation. This example does not suggest that the government should have thwarted OTC trading; it emphasises the dangers of regulators imposing opaqueness.

As a second example of the failure of the US regulatory authorities to follow the basic precepts of competition, transparency and a focus on incentives, consider the SEC's supervision of investment banks. In 2004, the SEC enacted a rule that induced the five major investment banks to become "consolidated supervised entities" (CSEs), with the SEC overseeing the entire financial firm. Specifically, the SEC now had responsibility for supervising the holding company, broker-dealer affiliates and all other affiliates on a consolidated basis. These "other affiliates" include other regulated entities, such as foreign-registered broker-dealers and banks, as well as unregulated entities such as derivatives dealers. The SEC was charged with evaluating the models employed by the broker-dealers in computing appropriate capital levels and assessing the overall stability of the consolidated investment bank. Given the size and complexity of these financial conglomerates, overseeing the CSEs was a systemically important and difficult responsibility.

An obvious and well-known implication of a major regulatory agency emphasising publicly that it is effectively monitoring the risk-taking of a class of large financial institutions is that it reduces the incentives for private market participants to monitor the risk-taking of those financial institutions. This is the case for the commercial banks where the Federal Reserve, the Federal Deposit Insurance Corporation, the Office of the Comptroller of the Currency and others supervise them. It was also the case for the major investment banks. Once the SEC formally began supervising investment banks - and once the SEC argued that it was uniquely capable of and

successful at conducting this oversight - private investors had weaker incentives to scrutinise the activities of these banks. This is a classic moral hazard issue that would typically be resolved by the SEC actually doing the monitoring.

However, although the SEC advertised that it was supervising the investment banks, it actually neutered its ability to conduct consolidated supervision effectively. Although the SEC promised to hire high-skilled supervisors to assess the riskiness of investment banking activities, it did not. In fact, the SEC had only seven people to examine the parent companies of the investment banks, which controlled more than USD 4 trillion in assets. Under Christopher Cox, who became chairman in 2005, the SEC eliminated the risk management office and failed to complete a single inspection of a major investment bank in the year and a half before the collapse of those banks. Cox also weakened the Enforcement Division's freedom to impose fines on financial firms under its jurisdiction.

The tragic disregard for incentives contributed to the failure, takeover or government bailout of all of the five major investment banks. While one can logically advance the view that sound regulations should foster market monitoring of investment banks by credibly eliminating official supervision of those banks, it is dangerous for officials to claim to supervise the investment banks and then fail to do so. This schizophrenic policy reduces the incentives of private investors to monitor without replacing this monitoring with official oversight. This disastrous mixture is not a failure of free markets; rather, it is an example of how a failure to focus on incentives can produce disastrous, systemically important consequences.

Barth, Caprio and Levine (2011) and Levine (2010a, 2010b) provide numerous additional examples of how policymakers and regulators in the United States and abroad enacted and implemented policies that:

1. Failed to foster transparency,
2. Ignored the incentive effects of their policies, and
3. Frequently stymied competition in the decade leading up to the most recent financial crisis.

They show that it was not too little regulation; it was bad regulation that contributed to the collapse of the global financial system.

Conclusions

In conclusion, the operation of the financial system exerts a first-order impact on the rate of long-run economic growth and the distribution of

economic opportunities in society. Well-functioning financial systems mobilise and allocate resources efficiently, funnelling credit and opportunity to the best and the brightest. Poorly-functioning financial systems, in contrast, funnel credit to the rich and powerful, limiting economic opportunity and prosperity to only a few.

Thus, financial regulation is about much more than avoiding crises. This is not the same as concluding that financial stability is unimportant. In developing economies, the fiscal costs of banking crises in the last two decades of the 20th century were greater than all of the non-military international aid provided to developing countries during the 20th century. In the United States, the International Monetary Fund estimates the cost of the financial crisis at about USD 3 trillion, which is about USD 20 000 per US taxpayer and exceeds educational expenditures by US federal, state and local governments during the last decade. However, finance matters beyond stability and finance regulation also matters for growth and opportunity.

While far from conclusive, research provides useful guidelines regarding which financial policies have been most successful at achieving inclusive growth. Policies focused on competition, transparency and incentives have achieved the greatest success on average, while those stressing direct government guidance in the allocation of credit have had correspondingly less success. With regards to enacting and implementing sound regulatory policies, the greatest difficulty lies in creating regulatory agencies that are powerful enough to foster competition, transparency and sound incentives while also obliging these powerful regulatory agencies to act in the best interests of the public.

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Chapter 3

Individualised service provision and the new welfare state: Are there lessons from Northern Europe for developing countries?

Charles Sabel*, **

Welfare states in the advanced countries are responding to the rise of new, immeasurable risks by relying less on social insurance and more on the provision of customised social services, such as education, which enable citizens to acquire the capacities needed to respond to the risks they face. These services are provided by a novel form of organisation that addresses the classic problems of public administration - how to limit discretion while increasing the responsiveness of the organisation to changing circumstance - by authorising front-line workers to search for new solutions, but with the requirement that they explain and justify their decisions to peers. The successful Finnish school system exemplifies this new type of organisation. Research on the limited effectiveness of conditional cash transfers, which is the favoured strategy for improving social services in developing countries, suggests the need for customisation in this setting too, so changes in advanced country service provision may hold lessons for development.

* Charles Sabel is at Columbia Law School. For reasons that will become obvious, but hopefully not burdensome, the author is even more indebted than usual in the composition of this paper to able and well informed colleagues. The author owes especially large debts to Reda Hamedoun, Matteo Morgandi and Ruslan Yemtsov of the World Bank and Natasha Iskander of NYU, on whose deep and diverse insights into the changing nature of social welfare institutions in developing countries he has relied to mitigate his own ignorance and confusion. If there is any interest to what the author says in this topic here it is due to them; if not, his own limits have been proved incorrigible.

** This paper draws extensively on "Individualised Service Provision in the New Welfare State," a more comprehensive discussion of the organisation, origins and difficulties of the Finnish special education, co-authored with AnnaLee Saxenian, Reijo Miettinen, Peer Hull Kristensen, and Jarkko Hautamäki for Sitra, Helsinki, October, 2010.

Introduction

The welfare state is in transition. It is widely acknowledged that schooling in the broadest sense - the acquisition of the capacity to learn to learn in primary and secondary school; the application and development of that capacity throughout all phases of an ever longer work life - is increasingly a necessary condition for employability and through employability continuing, active and honourable membership in society. Conversely, redistributive transfers from market "winners" to market "losers", which is the insurance mechanism at the heart of the traditional welfare state, are diminishing in relative importance as a guarantor of decent social inclusion, although such transfers are still far from irrelevant as a component of social security. Underlying the relatively recent yet widespread realisation of the requirement for life-long learning for diverse kinds of students,[1] and the increasing emphasis in policy discussion on skill development in "active" labour market policies for different groups at risk of exclusion, is the dual recognition that to safeguard social solidarity, a welfare state must today provide enabling or capacitating services to equip individuals and families to mitigate risks against which they cannot be reliably insured, *and* that to be effective, these services must be tailored to the needs of individuals or groups. The shift away from insurance and towards skill-based risk mitigation, moreover, can increase the productivity of the economy as well as its capacity for innovation: the increased availability of skills makes firms more flexible, allowing them to undertake novel projects that would have previously overtaxed their ability to respond to unfamiliar situations. At the limit, in tight labour markets, competition for skilled employees may induce firms to look for innovative projects to attract workers who demand challenging tasks as a condition of continued learning. To the extent that increases in individual skill levels reshape the labour market and the reshaped labour market influences the organisation and strategy of firms, the shift towards a welfare state based on capacitating servicers of each can contribute to the prosperity of all.

This shift towards an enabling welfare state providing individualised services is incipient and more pronounced, for historic reasons, in some countries or welfare-state "families" with similar origins and trajectories than others. It is far from being the dominant, let alone exclusive form of welfare provision even where it is most salient. Indeed, due to the fact that institutions of the new, enabling welfare state often arise from piecemeal adaptation of traditional organisations to current circumstance, their novelty has gone unremarked even where their success is most striking.

Nonetheless, despite these qualifications, the emergence of capacitating welfare institutions commands attention. The financial crisis has exacerbated

the long-standing debate about the vulnerabilities of the traditional welfare state in the advanced countries. The alternatives posed for public discussion and policy makers are stark: an explicit return to *laissez faire*, which has been repeatedly rejected, at least until now, by electorates in the advanced countries over recent decades; more open toleration of the cruel dualisms - welfare for the well organised and relatively well-to-do, *laissez faire* for the weak - that have crept into many of these societies even as they refuse to abandon the current order; or a deliberate effort at renewal along the lines of the capacitating welfare state, or a strategy of "social investment" as it is sometimes called. Reform of this latter kind has been, of course, often promised but seldom enacted successfully on a large scale. The promise is tainted by lingering doubts about the feasibility of the reforms, especially regarding the ability of even the richest societies to build the kinds of organisations that they seem to pre-suppose. For example, traditional public schools, organised as bureaucracies, have often failed to teach diverse student populations the basics of literacy and numeracy. Why should we be confident that we can create institutions that will do this and more? Simply to assess our possibilities at this crucial juncture, therefore, requires that we understand better how institutions providing customised services function and the paths that lead to them.

The shift towards a new form of welfare state is, moreover, potentially of great relevance to developing countries. The formation of global supply chains, which are based on just-in-time production and demanding quality requirements, opens new possibilities for development, but also places new demands on the skills and capacity for continued learning of employees and thus on national education and training systems. Put bluntly, countries that can only offer potential multinational partners a low-cost, disciplined, dexterous workforce will be outcompeted by countries that provide a better educated and trained one. Improving school possibilities, especially for large, disadvantaged populations, confronts policy makers with dilemmas related to those faced by school reformers in the rich countries. The same goes for efforts to improve the delivery of health care and social services, which are valuable in themselves and often a necessary complement to the reform of schools.

However, the organisational challenges to this kind of reform, daunting in the context of the advanced countries, appear to be overwhelming in the context of the developing ones. In the worst cases, the true function of school systems and social welfare bureaucracies, along with state-owned firms, in developing countries is not to provide services to the public, but rather a safety net of steady employment to a modestly privileged minority with the academic attainments or political or social connections required to occupy it.

Such employment providers are not a foundation for reform but rather an obstacle to it.

Moreover, the concern continues even when schools and social welfare ministries do actually provide some services, as their utility is best increased by modest interventions that are aimed at changing the behaviour of users, not by bolder reform that is aimed at the operation of the service provider. Conditional cash transfers (CCTs) are an example: a mother is provided a cash benefit on condition that her child regularly attends school, or her infant is seen periodically by a nurse or other health worker. Simple as they are, it is argued, programmes of this kind test the organisation capacities of developing countries. Farther-reaching reforms are, by implication, impossible.

There is truth in these observations, but they overlook much of significance. First, while CCTs regularly achieve their explicit aims, their effects are narrow and do not reach the broad goals motivating reform. Thus CCTs that aim to increase attendance rates do so; however, given the defects of the schools that students are attending, increased attendance does not result in improved educational performance - the "final" outcome towards which the reform is directed; nor do programmes that directly incentivise better performance or that - again avoiding bureaucracy - induce tightly specified improvements in particular school inputs (better textbooks, flipcharts, etc.) produce the desired "final" effects. As a result, thoughtful advocates of CCT-style reforms that put minimal burdens on organisational capacity have begun to underscore the importance of, for example, remedial educational programmes that are targeted to the needs of particular groups of students (Banerjee *et al*., 2004). At the very least it is clear that CCTs are not a substitute for the provision of enabling services.

Second, while CCTs may turn out to provide some of the building blocks and impetus for service-based welfare, their implementation turns out to require extensive organisational reform - creating bank accounts for beneficiaries without them, establishing methods for registering attendance and systems for collecting the resulting data, and so on. These "preliminaries" to reform require innovative collaborations among many departments that have seldom, if ever, cooperated before. Whether these efforts are any less demanding than those required for restructuring poorly performing institutions, or help generate the capacities needed for such reforms, are very open questions. Moreover, successful CCTs produce self-reinforcing follow-on effects: systems for registering incentivised attendance at school, for instance, may also alert parents to the absence of teachers, and these alerts can lead to complaints, reductions in teacher absences and (in combination with improved pupil attendance) better learning outcomes. Whether it is possible to build further reforms on these effects, or adjust the incentive programme to induce them when they are not by-products of the initial

intervention, are again very open questions. In any case, it seems worth considering the possibility that both kinds of reform rely on and develop related kinds of capacities, and that it may be easier to combine both approaches, or transition from one to the other, than the clear differences in their underlying conceptions would suggest.

Quite apart from experience with CCTs, there is evidence from middle-income countries, such as Brazil, that experimentation with reform of traditional systems of tax collection and labour inspection is, in some instances, leading to the independent discovery of the same kinds of organisational innovations that permit customised service deliver in the advanced countries (Pires, 2011).

Finally, though incremental reform is often a prudent strategy for maximising the possibilities for learning and self-correction, a commitment to incrementalism is no license to ignore revolutionary moments such as the Arab spring. This vast movement is partly the result of successes and failures of development polices of the last decades: the Washington Consensus of the 1990s urged the privatisation of state firms and the reduction of the size and budgets of public bureaucracies. These measures rend the social safety nets provided by these institutions, usually without generating economic growth and employment alternatives. Related policies expanded educational opportunities, increasing the number of graduates with higher degrees and spurring their ambitions, even as the number of accessible jobs with the corresponding formal requirements remained fixed or even decreased.

The upshot is the formation of a mass of young people with skills, degrees and ambitions, but few prospects. The systems of social protection of many developing countries are therefore under substantial strain; the role of the state in fomenting growth and promoting forms of social protection that are adapted to current circumstances will be, as in the advanced countries, open to discussion. As part of larger programmes of reconstruction, might the most dedicated and alert of these generations be recruited to staff a reformed, perhaps re-founded, public administration? To dismiss the question as utopian is to ignore how much the fragile *status quo* has been undermined in many developing countries. To assume that the answer is "yes" is to overlook not only enormous political obstacles but also the same kinds of questions about organisational feasibility that haunt the discussion of welfare state reform in the advanced countries.

The aim of this paper is accordingly to specify the organisational challenges posed by the provision of individualised services; to show how in principle and by example they can be overcome in the advanced countries; and to suggest some connections between this experience and continuing discussion of improvement of social welfare benefits and services in

developing countries. The rest of the argument is in four parts. The next section briefly surveys the pressures that induce a shift towards an enabling welfare state based on the provision of customised services; illustrates its broad promise by reference to the recent, surprising success of the Nordic countries in combining superior economic performance with superior social protection; and suggests revisions in the dominant conception of organisations to account for otherwise unintelligible institutional achievements. The following section uses a case study of the Finnish school system to exemplify the alternative principles of organisation. The outstanding performance of Finnish schools in international comparisons has been widely noted. Much less remarked is that most of the overall success of the Finnish school system is due to the superior performance of the lowest quintile of the pupils compared to the corresponding group in other countries, and that these pupils - "low" performers by Finnish standards, high performers by most other ones - benefit from short-term, special education support, which is tailored to overcoming specific learning problems and so avoids cascades of failure. A recent comparison of the performance of a group of current Finnish students on a reading test originally administered in the 1960s with the performance of a like group of the initial test takers confirms that the current achievements are indeed due to the introduction of special education and other changes in the school system beginning in the 1970s. A second study, comparing teaching routines in Finland and Denmark - the latter with equivalent traditions of egalitarianism and respect for education, but mediocre school outcomes - corroborates the finding that superior outcomes are due to distinctive classroom practices, not features of the larger society. The following section discusses the implications for the provision of social services in developing countries. A final section concludes.

It will already be clear that this paper trades depth for breadth. In the compact format available, it is simply impossible to treat the shift towards a service-based welfare state, the exemplary case of Finnish special education and their relation to public administration in developing countries in the warranted detail. The impossible is not attempted. The aim is simply to induce reflection on policies toward improvement of social welfare services and social protection generally in the developing countries by examining them in the mirror of recent and, in many ways, counter-intuitive experiences in the advanced ones.

Individualised service provision and the organisational puzzle of its success

The shift to service-based solidarity is ultimately driven by the breakdown of key elements of the transfer-based, insurance system that defined the welfare state from the post-World War II years through the 1980s, and the need to find a workable alternative. The source of the difficulty - crippling for any insurance system - is the rise of uncertainty or, as it is sometimes called, non-actuarial risk: unforeseeable risks of harm make it impossible to say who should pay how much in premiums to create an insurance pool that is sufficient to indemnify those who actually incur losses. Changes in the labour market illustrate the problem. If risks of unemployment in a particular line of work are mostly seasonable or cyclical, it is straightforward to set aside funds from fair-weather earnings as a reserve on which to live during periodic bad spells. But if, as is increasingly the case, unemployment is structural and caused by radical shifts in product design or production technology that permanently devalue whole skill categories (*e.g.* a shift to computer-controlled manufacturing that displaces conventional machinists), unemployment insurance, by itself, is not a bridge to another job in the same line of work, or indeed to any job at all.

When risk pooling fails, the effective strategy is to help individuals and families to self-insure against risks by enabling them to acquire the capacities that they need to surmount the disruptions that they face. If each of us can acquire, with the support of public training or capacitating services, general skills that make us employable in a wide and changing range of jobs, this employability protects us against labour market risks even when conventional unemployment insurance cannot.

Explaining the shift to service-based social security

For three general, mutually complementary sets of reasons, these capacitating services will only be broadly effective if they are customised to individual needs, and if individualised services addressing different domains are bundled together. The first set of reasons concerns what might be stylised as the new understanding of learning. This is an understanding of what is entailed in overcoming obstacles to attaining the capacity to do something - and, conversely, the self-reinforcing consequences of failure to acquire basic capacities. This understanding has emerged in recent decades in education and vocational training, as well as in human services such as child welfare and the treatment of substance abuse. Variants of it inform Finnish education in general and Finnish special education in particular.

In the new understanding, learning is idiosyncratic. In a population of learners, all acquiring some new skill or capacity at their normal rate, each person engages in a different and unique activity: mastering the new skill by combining basic abilities in an individual way. For example, learning to read always requires ability to decode phoneme strings - the "phonics" approach to literacy - and ability to recognise words in semantic context - the "whole language" approach. However, the combinations are idiosyncratic: at various stages in the progress to literacy, some pupils find it easier to "sound out" words rather than to identify them from their setting, while for others the setting is rich in clues about the word, and pronunciation rules distract. Effective teaching under these conditions means choosing the combination of pedagogic approaches best suited to each child in their phase of development: customising the pedagogy to the child.[2]

A correlation to the idea of the idiosyncrasy of learning is the idea that learning problems arise from disruptions in the normal flexibility of individual personality, and that such disruptions typically result from co-morbidity: cognitive difficulties exacerbating behavioural difficulties, exacerbating family or psychological problems. If each learning task can be mastered in many different ways, a normal learner will by trial and error eventually find a way that works, even if, with expert guidance, he might have come to another method that would have produced better or quicker results. However, if this search process is obstructed by other, more urgent individual concerns that are unrelated to the cognitive task itself, the learner is thwarted by the first difficulty encountered. A familiar and common example is attention deficit disorders, which make it difficult to focus on the cognitive task at all. Hence, given co-morbidity, individualised capacitating services in different domains have to be provided in customised bundles: the learning problem can't be addressed (or in many cases even properly diagnosed) if the attention problems are not addressed as well.

Since learning problems or disorders are in this way deeply rooted in many aspects of a learner's life, they are seen in the new understanding as chronic and relapsing. As in substance abuse and eating and mental disorders, the frequency, duration and severity of "spells" of learning problems can be reduced. But there are seldom definitive cures for the underlying condition. Customising a learning plan, especially for a student with difficulties, is therefore a continuing, not a once-only task: strategies have to be revised in the light of breakthroughs and reverses, and it is crucial to have a reliable record of what has and has not worked in the past in determining what to try next. In anglophone literature this approach is known as response-to-intervention (Haager *et al*., 2007).

Realisation of the need for continuing support goes hand-in-hand with the recognition that the costs of early failure - an incapacity to learn to read at the

normal rate, for example - are rapidly compounded, narrowing life chances in ways that frequently crush individuals and cumulatively impose large burdens on society. Those with poor reading or math skills are at high risk of leaving school early, with grim prospects on the labour market if they do. Conversely, apparently small gains in reading or mathematical proficiency in the early years of formal schooling increase the chances of later school success, with corresponding labour market rewards. Thus provision of customised, continuously adjusted bundles of capacitating services must, in the new understanding, begin as early as possible.

Customisation of services is, second, a response to the increasing differentiation - or heterogeneity - of the population. Even as it is recognised that the "same" kinds of people with the "same" kinds of problems require differentiated services to address the idiosyncrasies in their problem solving, the number of different kinds of people requiring services is increasing dramatically. Changes in migration patterns, family structure and labour-market behaviour - especially the massive entry of women into the work force - have put an end to the era of the standard household headed by a native-born male, working full time - often for decades at the same firm - to support a stay-at-home housewife and children. The multiplication of new living situations and domestic arrangements, with new burdens on family members often regardless of marital status, entails new demands for the diversification and coordination of social services.

These changes are reinforced by a third set of changes in the understanding of disability and what society owes persons with disabilities. Through roughly the 1970s disability was understood medically, as a significant, well-defined impairment of normal or healthy human functioning that persistently obstructed participation in the work force and other spheres of social life. Governments in the developed countries and organisations representing the disabled took the corresponding public obligation to be the provision, through transfer payments, of a decent standard of living. A decent society, in other words, was obligated to ensure that disability did not lead to degradation.

However, since the 1970s the disabled themselves and their organisations have rejected this medical model in favour of a social one that takes disability as a normal, not an extraordinary or pathological condition. Most of us, after all, will at some point in our lives be impaired in a way that does or could threaten our capacity to participate in many life spheres. Exclusion stunts development; what is stunted atrophies and degrades. To the extent that disability in the sense of a risk of degradation through stunted development is indeed a pervasive social condition, not a cluster of medical abnormalities, the appropriate response is not to provide a variant of accident or health insurance. Rather, the response to disability as a social condition requires a

comprehensive social response, which nowadays is commonly given legislative expression as a requirement of "reasonable accommodation" to risks of exclusion: social adjustments to include those with disabilities - in this view, nearly all of us, at one time or another - as fully as possible in education, the workplace and public life. This is done both by providing services that increase individual capacity to participate and by re-configuring these life domains to make them more amenable to such participation. Thus the social model of disability shares with the new understanding of learning the assumption that, given widespread but corrigible limits in our abilities to respond to developmental challenges, we will need at least occasionally and often periodically the support of customised capacitating services to avoid a cascade of exclusionary failure (Perju, forthcoming).

All these changes are, finally, contributing to a slow redefinition of the very idea of social justice: a shift away from understanding fairness or equality as treating all in the same way, and towards an understanding of equality as an obligation to give due regard to the needs of each and so enable all to flourish. The old understanding of equality as equal treatment made it awkward to speak of individualising services precisely because equal treatment required that services be uniform to be legitimate. It is partly for that reason that the shift towards individualisation has often gone almost unremarked in countries such as Finland and the other Nordics - in transition from one concept of equality to the other - where it is most pronounced.

The Nordic welfare states as frontrunners in the shift to the service-based welfare state and the puzzles that success poses

Although there are significant signs of the shift to service-based solidarity in many advanced countries, the Nordic countries are regarded, certainly within the European Union and increasingly in international discussion, as the exemplars of the new type of welfare state. What is distinctive about them is precisely that they spend a higher share of public revenues on services, ranging from day-care to active labour market policy, than do countries in other welfare "families" (such as the Continental or Bismarkian systems) that collect an equivalently high share of GDP in taxes, but redistribute this income as insurance payments and other benefits typically linked to occupational history (Kautto, 2002). Table 3.1 indicates the magnitudes of the differences.

Table 3.1 Public sector social outlays

(Share of GDP)

Countries[1]	Cash transfers	Direct provision of services	Active labour market policies	Total public sector social outlays
English speaking	9.8	7.2	0.4	17.4
Continental Europe	16.8	8.0	1.0	25.8
Nordic	14.2	11.4	1.2	16.8
United States	7.9	6.7	0.2	14.8

1. Figures are unweighted averages across countries. English speaking includes Australia, Canada, Ireland, New Zealand, UK and US. Continental Europe includes Austria, Belgium, France, Germany, Italy and the Netherlands. Nordic includes Denmark, Finland, Norway and Sweden.

Source: OECD (2004), Social expenditure database 1980-2001 (www.oecd.org/els/socialexpenditure). Values cited are for 2001; Sachs, 2006.

The relatively high expenditures on services in the Nordic welfare states correlate during the last decade and half with, on the one hand, high rankings in the league tables of international competiveness (including capacity for innovation, flexibility in the labour market and so on) and increased social protection. Sapir (2005) for example, finds that the Nordic model of service provision combines "high efficiency" in the economy with "high equity" in the distribution of life chances: it attains the first by facilitating access to labour markets and so leading to comparatively high employment rates; it achieves the second by reducing the risk to individuals of falling into poverty. He finds that the reduction of poverty risk is only in small part explained by redistribution through taxes and transfers. But he detects a stronger link between poverty reduction and educational attainment, which serves as a proxy for provision of capacitating services in a general sense.

Ideally we would like to connect these and other studies of broad outcomes to an analysis of the Finnish school system and other such institutions, and show how exactly the organisational mechanisms produce the benefits apparently associated, in the aggregate, with them. However, it is extremely difficult to infer institutional mechanisms from highly aggregated data on their effects, just as it is, conversely, extremely difficult to draw out the overall social contributions of particular institutions from even a careful analysis of their organisation. Fortunately, for now, we need not link micro, institutional mechanisms to macro, social welfare outcomes. Instead it is enough to note that the combination of plausible accounts of individualised service delivery and data on general effects of service provisions suggest at least *some* significant development in the direction of the logic of the customisation of capacitating services, and that *any* development in this

direction poses theoretical puzzles that invite us to re-examine familiar, perhaps half-forgotten but still influential ideas about the feasible extent and organisation of the public sector.

The organisational dilemma

To see why this is so you need to recall that the consensus that was articulated in Anglo-American scholarship in the 1970s and 1980s (and never broadly and emphatically repudiated, although less frequently and aggressively asserted in many quarters today than then, was that welfare states were self-defeating and simply unworkable. The high share of GDP (around 45%) collected in taxes and expended by the state at various levels, together with the high marginal rates of taxation that went with it, dulled the incentive to work and invest of the most capable. Social-welfare payments dulled the work incentives and led to a culture of dependency among the most vulnerable. Public borrowing crowded private borrowing out of financial markets, further discouraging investment, it was claimed (Buiter, 1977).

Apart from these concerns, the welfare state was taken to be simply impractical because it depended for the distribution of benefits, whether in the provision of services or in the determination of eligibility for transfers, on public bureaucracies. These were doomed to failure both because they were bureaucracies and because they were public (Niskanen, 1968, 1978).

The general problem with bureaucracy, indeed of any large organisation, was the impossibility of controlling low-level discretion. The situation of potential beneficiaries was typically complex. It was up to the teacher or perhaps the school to determine whether, all things considered, a particular child qualified for a specialised class; it was up to the social-service caseworker to determine whether a particular family qualified for certain grant programs. These decisions by front-line workers, or "street-level" bureaucrats as they were often called, frequently depended on subtle, discretionary judgments that could not be observed and could only be very imperfectly reconstructed for the purposes of (infrequent) review by superiors (Lipsky, 1980, 2010). The life chances of individuals were thus often significantly affected by the discretionary decisions of unaccountable front-line workers who, it was feared, could privilege those they found sympathetic or punish those who offended them in any way. Indeed, applying and interpreting general rules to particular cases under these conditions, the street-level bureaucrats in effect inverted the hierarchical pyramid: they, not the high-ranking and formally accountable officials at the apex of the organisation in effect made policy.

Efforts to limit their discretion by imposing more detailed rules - a strategy pursued especially vigorously in the United States - proved

self-defeating. Adding more and more detailed regulations made the organisation as a whole more rigid and so less able to respond to even large changes in its environment, while creating potential conflicts among rules - which allowed street-level bureaucrats to again exercise discretion in choosing which to enforce.

These inherent problems of bureaucracy were compounded by public control (Chubb and Moe, 1988). Successive political fights over which rules to embed in the bureaucracy led, with changes in upper-level administration, to a cumulative hodgepodge of conflicting instructions. Public-sector unions increased the rate at which the problems compounded. Under these conditions public administration could hardly be an instrument of public policy; and much effort was consequently devoted to exploring the possibilities of achieving the purposes of the welfare state by market means - vouchers for the purchase of school services, for example - that would eliminate the need for detailed planning and control of over-provision by large, public providers.

Given this consensus, the most plausible explanation for the continuation of the welfare state in any particular country was political: welfare states persisted where the immediate political costs to political incumbents and their parties of dismantling them were higher than the benefits that would accrue to them for reducing the burden of the state on the economy (Pierson, 1995, 1996). By making welfare benefits universal - conditional on citizenship, rather than occupational history or (with regard to services like day care) need - the Nordic countries built on and re-enforced broad coalitions; and the breadth of these political alliances, and the common interests they generated, accounted in the consensus view for the particular robustness of the *folkhem* variant of the welfare state. The continuing requirement for rapid restructuring of the economy from the 1970s onwards, combined with the shift towards service-based solidarity, and the accompanying requirement of customising and bundling services should have increased the inefficiencies associated with the welfare state, pressing on inherently flawed organisations tasks that were more demanding than the ones at which they were already failing, and raising the costs of new failures. Through the mid-1990s this seemed to be precisely what was happening. Hence the recrudescence of the Nordic welfare states and their economies, as reflected in many of the closely followed international rankings of competitiveness, suggests that actors in the real world have found ways to do things that were not contemplated in our theories.

In retrospect, the answer to the concerns about tax burden and the concomitant dulling of incentive turned out to be fairly straightforward, at least as seen from the perspective of the Nordic welfare states. Citizens put a high value on education, healthcare and daycare services that they and their families can really use; they are willing to pay high taxes to support them.

The availability of these services makes it easier to enter the labour market (and of course to change jobs, since benefits are not tied to particular employers); they certainly do not eliminate the incentive to work. Active labour market policies combine income supports for the unemployed with training possibilities (and requirements for making use of them) that likewise encourage (re)-entry in the labour market. The availability of effective capacitating services and the heightened expectation of employability to which it leads makes it reasonable, furthermore, for wage earners to forgo traditional, seniority-related job guarantees. This increases the security of individual employees while also increasing the flexibility of the labour market and the economy as a whole - the "flexicurity" associated with the Danish labour market model. Taken together, this characteristically Nordic bundle of welfare state policies clearly creates (or is consistent with) incentives to work, as reflected in the high labour force participation rates of both genders across all stages of life, which is reported by Sapir and many other studies. This same bundle of polices also incentivises family formation, as reflected in the high fertility rates of the Nordic countries, which are among the highest in the OECD, having declined much less than in other wealthy countries since 1970 (OECD, 2010).

There has been, in contrast, much less discussion of the way in which the problem of organising flexible yet accountable public services is being addressed. Evidence of reorientation is hard to come by here, in part because (as in the case of Finnish special education) systemic change often emerges as the unplanned result of piecemeal modifications; in part because even when change is deliberate and systematic, reform programmes are formulated in the argots of the particular sectors from which they emerge and to which they are addressed, disconnected from the general discussion of the possibilities of policy and organisation; and in part because of hesitations to discuss changes involving the redefinition of equality.

An alternative to bureaucracy

However despite these obstructions in the field of view, a fundamental innovation in the organisation of public administration is visible. This innovation officialises the topsy-turvy world of street-level bureaucracy, but in a way that makes it accountable and capable of learning from its own diverse experience. Instead of trying to limit front-line discretion as the consensus view indicated, public-sector actors in many settings openly authorise it, actually increasing the autonomy accorded to front-line workers: the case worker for, example, is tasked not with determining which clients are eligible for which programs, but devising, in consultation with the client and a team of expert service providers, a plan that brings the relevant resources to bear on the client's problems. As a condition of this autonomy, however, the

front-line worker (or, increasingly, the multi-professional, front-line team) must provide a detailed report on the client's progress under the plan and evaluate progress by agreed metrics. The plan and monitoring reports are in turn reviewed by a group of the front-line workers' (or team's) peers in the light of the experience in comparable situations (Noonan *et al*., 2009).

It is peer review of this kind that creates a mechanism for accountability. The front-line worker is accountable when, in the judgment of her peers, she can justify her actions as in the best interest of the client, given the overarching purposes of the public organisation that provides the service, and given the range of results obtainable in similar cases. If doing this requires deviation from the rules, then the rules need to be re-examined in the light of the higher purposes that they are intended to serve. This dynamic or forward-looking accountability contrasts with conventional forms, in which agents are accountable to principles precisely to the extent that they comply with the rules established by the latter.

This peer review also creates a mechanism for institutional learning. It allows local error to be identified and corrected, dead ends in policy development to be detected and promising successes to be generalised or subjected to more intense scrutiny to verify initial results. Put another way, peer review as part of dynamic accountability affords the case worker and his team an opportunity to improve their decision making, while allowing the institution as a whole to reconsider current rules and routines in light of their successes and failures. Think of this as learning by monitoring. As such organisations share with philosophical pragmatism the assumption that routines and even guiding assumptions will be in need of correction, and put that philosophy into practice by developing routines for regularly exploring the advisability of doing so, they are called pragmatist or experimentalist.

Development paths

Very broadly speaking, there are at least two paths in the advanced countries that lead to the formation of such experimentalist organisations. The first might be called the direct or natural path because it develops the professional tradition informing clinical social work, education and health care that emerged "naturally" in Europe and the US in the early 20th century. It takes professionals as independent flexible problem solvers and enhances their capacity to address a widening range of (more and more individual problems) by decentralising authority within the large-scale organisations that typically employ them to regional and local levels, increasing the training and support available to individual practitioners, encouraging them to work in interdisciplinary teams, and introducing elements of peer review and dynamic accountability. Cumulatively these changes ultimately transform traditional

professional identity, especially the understanding of professional accountability, which is highly deferential to individual autonomy, only intervening in cases of gross, manifestly "unprofessional" misconduct. So the direct path is direct and natural only in the sense that it involves no abrupt and highly visible break with traditional and apparently "natural" forms of association, but not in the sense of leaving these entities unperturbed, in some imaginary original state.

As we will see in more detail in a moment, this is the path taken in the Finnish school system, particularly in special education. It is also the path taken in Danish labour market policy - especially continuing education at the heart of activation and flexicurity (Cohen and Sabel, 2010). Given its association with these salient cases, we will also refer to this path as the Nordic way; however, keep in mind that in many cases Nordic societies started down this path to reform only to lose their way, not least because they were too dependent on or perhaps deferential to the existing corps of professionals. For example, in the case of Danish schools, which we will consider in some detail, efforts to regenerate teaching focused on encouragement of new and more intense forms of cooperation among teachers, rather than on peer review and other elements of dynamic accountability - with unsatisfactory results. Conversely, there are many examples of the gradual transformation of professions in an experimentalist direction outside Scandinavia - in the health care sectors of the US and Great Britain, for example. So there are no uniquely Nordic prerequisites to this path to development.

The second or roundabout route is via the reconstruction of broken public bureaucracies and it is characteristic of the US. Large, highly formalised bureaucracies emerged there in public administration starting in the 1960s, mainly in response to the fear of front-line discretion that is mentioned above: the Left feared street-level bureaucrats, such as police officers on the beat, would be unsympathetic to the poor and persons of colour. The Right feared that social welfare workers might be unduly generous to claimants. Both could agree on the need for rules to restrict discretion, with the results noted (Titmuss, 1971). After years of crisis, public institutions as diverse as schools and child welfare agencies came independently upon the solution of enlarging the autonomy of front-line workers, but at the same time obligating them to explain their use of discretion, with peer evaluation of their results. As the enlargement of autonomy is often perceived as a (re-) professionalisation of front-line service occupations, this "top-down", deliberate reform generates a "bottom-up", cultural complement, just as the Nordic path introduces elements of "top-down", deliberate review into traditional "bottom-up" professional culture.[3] There are, moreover, strong affinities between this path to experimentalist institutions and the Toyota production system developed in

Japan - particularly the idea of using the detection and correction of local problems as an indication of systemic problems and how to address them. As the Toyota system has now diffused to countries around the world (Womack, 2010), there is nothing peculiarly American about the roundabout, US path, just as there is nothing uniquely Nordic in the Nordic way.

To judge by experience so far, neither path is superior. Their advantages and disadvantages mirror each other. Thus the advantage of the natural path is precisely that it is natural. Existing professions and institutions grow almost effortlessly, it seems, into new roles and responsibilities. Change is organic, incremental, and all but invisible. Deep assumptions can change, or at least relax their grip on practice, without contentious, potentially paralyzing debate about first principles. A system capable of collaborative learning and cooperative provision of specialised services emerges, but few of the actors have a sense that they are acting in a system - and still less of design principles that (have come to) shape their interactions.

However, this same natural, almost invisible process of change can become an obstacle to continuing development when several existing professional practices need to be reconsidered and revised jointly to reach emergent problems. In that case the informality of learning and self-revision that made adjustment seem automatic, and the corresponding inattention to the design of the system as a whole can be a barrier to more deliberate and analytic reconsideration of strategy and organisation. Indeed the very effort to organise such systematic discussion can seem, given the continuing emphasis on the primacy of individual self direction and responsibility, as an assault on professional dignity and autonomy. Such strains are apparent in the halting efforts of school reform in Denmark, and they are coming to light in current discussion about the need for more systematisation in the interests of more reliable and effective customisation of services in Finnish special education as well.

The strengths and weakness of the roundabout path are the reverse of these. Change is hard, nearly impossible it seems, to initiate. It takes a crisis, often decades of crisis, to force serious reconsideration of broken bureaucracies. Normally incumbents are sheltered from the need to change by the familiar logic of collective action: the costs of institutional failure are diffused over large numbers of supposed beneficiaries, none of whom has an incentive to fight for change, while the advantages of the *status quo* confers large rewards on the small group of incumbents, who are therefore motivated to defend their privileges against reform (Olson, 1974). It is only when the costs of failure are broadly seen as unacceptable - when parents see failed schools as crippling their children - that this logic loses its grip. But once change is seen as necessary, the only means by which it is possible involves identification and remediation of successive constraints - a continuing process

of collective enquiry into the operation of the institution or system in relation to its goals. This process too is incremental; but it is, unlike the natural development of professional competence, not tacit or nearly so. On the contrary, it relies on the ability of teams at all levels in the organisation to make explicit the limitations of their current activities and ways to redirect both their efforts and those of the institution. The introduction of methods of this type, diffusing rapidly in the New York City school and other US school systems could, we will see, help address some of the problems emerging along the Nordic path to customised service provision in Finland.

How individualised service provision works: the Finnish special education system

In a world that increasingly sees effective education as an indispensible form of both collective and individual insurance against economic instability, the success of the Finnish school system naturally draws attention. Finnish 15-year olds regularly outperform their peers in other advanced countries in the quite demanding PISA test of reading, mathematics, problem solving and scientific knowledge. The distribution of these results strongly suggests that schooling in Finland is contributing greatly to social solidarity: the variance or divergence of individual students' results from the mean result is smaller in Finland than in any other country, as is the variance of the performance between individual schools. While each quintile in the Finnish distribution of science scores (the lowest scoring 20% of the test takers, the next highest 20% and so on) outscores the corresponding quintile in other countries, it is the bottom quintile of Finnish students that outperforms the most and thereby raises the mean to the top of the international league tables. As might be expected from this outcome, the influence of the parents' social and economic status (SES) on the test performance of their children, while still detectable in Finland, is more attenuated there than anywhere else. The Finnish school system is thus an institution for disrupting the transmission of inequality in life chances from one generation to the next. By the same token (and given that a score in the highest three of the six categories on the PISA science scale, where most Finnish students place, arguably demonstrates capacity for life-long learning), the school system provides an essential capacitating service that reduces the risk of inequality and exclusion within each generational cohort. Understanding how the Finnish school system produces these results is thus likely to shed significant light not only on the conditions for success of a fundamental building block of the new welfare state - primary and secondary schools - but also on the encompassing question of how to institutionalise effective capacitating services.

However it is precisely here, in explaining how the Finnish school system actually works, that discussion and analysis falter. Current explanations of the PISA success focus largely, almost exclusively, on circumstances outside the school, indeed often outside the educational system broadly conceived - on inputs to schooling rather than the organisation of and activities in schools and classrooms.[4] Perhaps the most prominent explanation of this general type points to the contribution of a homogeneous society that values education (and indeed long took the imparting of literacy to be a family, not a social responsibility) and reading in particular (as evidenced in strikingly high rates of library utilisation by students and citizens). Another explanation focuses on the role of highly competent teachers, who are selected by rigorous competition, thoroughly trained in substantive disciplines and pedagogy in demanding university courses, and rewarded for their accomplishments by high social prestige (including attractiveness as marriage partners) and professional autonomy in the classroom (but not especially high pay, as judged by OECD averages). Other related accounts emphasise the importance of a national curriculum directing attention to essentials but leaving room for adjustment to local needs, and the absence of testing, especially high stakes testing (where test results have important consequences for individual pupils, teachers or schools), with a corresponding reliance on the judgment of teachers to guide pedagogy. Still others look to the fundamental importance of a national commitment to equity and equality.

There is no doubt something in each of these explanations - how could it be proved, for instance, that the Finnish Lutheran esteem for reading has no influence on schooling - and we will see that teacher training does play an important part in school success, although in combination with distinct forms of classroom collaboration. Moreover, in light of the manifold and manifest failures of large-scale organisations in recent decades and the resulting scepticism about their capacity to carry out complex and rapidly shifting tasks, it is entirely understandable to assume that the schools' success must reflect features of the society in which they are embedded, rather than of the organisation of the schools themselves. However, there are six circumstances that strongly suggest that none of these explanations alone will bear the weight that is placed upon it in current discussion, and that all together they are partial or limited in the sense that they simply do not address school practices - together, a distinctive form of organisation - which is evidently crucial to explaining educational success.

First, Finland's extraordinary educational performance is a relatively recent development of the last decades, not an abiding or traditional feature of the society. Until the 1970s Finland, like most other Northern European societies, had a two-track system of education, with one track leading to the university and the professions, and the other to vocational training and skilled

blue-collar work. In the 1970s Finland, in response to long-standing egalitarian complaints against the rigid and early tracking of students, and again like many other societies in its neighbourhood, created comprehensive schools in which students of differing aptitude were taught together in the same building and often in the same classes. Before these reforms, which included transferring teaching education from specialised seminaries to the universities, the scores of Finnish students (apart from reading) were mediocre in international comparisons and their rates of grade repetition were high. This is a characteristic indication of a low-quality school system, as it is typically much more effective, for students and schools, to detect and correct individual learning problems as they occur, rather to compel a student to repeat a whole grade on the off-chance that they will overcame obstacles the second time around that went unnoticed during the first. After the reforms grade repetition rates went down, even though teaching to classes of mixed aptitude might be considered more difficult than teaching to homogenous groups, and performance in international comparisons went up. Thus no feature of Finnish culture - neither love of learning nor respect for teachers - can explain current performance.

Second, even within Finland's immediate Nordic neighbourhood there are countries with relatively homogeneous populations, egalitarian traditions, commitments to education for all (as measured by expenditures per student) that are at least equal to those of Finland, as well as similar combinations of national curricula and a deep respect for school autonomy, and yet they do not do well in the PISA tests. Denmark is a striking example. It spends more per pupil than any other country in the OECD except the US, and shifted to comprehensive schools at about the same time and for the same reasons as Finland. Yet whereas the PISA results of 2000 and the following years were a pleasant surprise for the Finns, they were an unpleasant one for the Danes: despite a demonstrated willingness to expend resources and a respect for schools and teachers as keepers of the living word of the nation's culture, Denmark usually places near Germany, slightly above the OECD average. To put the difference in educational performance with Finland more starkly: 7% of Finnish 15-year olds scored in the lowest PISA reading category in 2003 - a level indicating functional illiteracy - while 17.2% of Danish 15-year olds scored in the bottom category (Hattie, 2003). Plainly, egalitarian commitments, even in combination with marked attention to schooling, are not enough to ensure high performance.

The Danish result is especially interesting because the country is generally recognised as a successful pioneer of comprehensive, active labour market policies that create life-long learning opportunities for those who have already entered the labour market, and especially for those who, having done poorly at school, entered the labour market with few skills. Finland does

much less well in this domain; and recent efforts to address the problem are judged unpromising. One implication of the contrast is that national traditions of solidarity do not themselves yield successful institutions of solidarity, even in countries in which there is no general obstacle to creating such institutions. Indeed the contrast raises the further and broader question of whether the decisive conditions for success of the institutions of life-long learning, and the capacitating services of the new welfare state generally, are to be sought at the level of national endowments, rather than in the specific domains of activity and policy.

The third circumstance concerns testing. While the Finnish system does not use high stakes tests until the transition from general secondary to tertiary (university) schooling, it is simply wrong to conclude from this, as some observers apparently do, that teachers rely almost exclusively on their own evaluations of student performance, to the near exclusion of standardised instruments for assessment. In fact, Finnish education relies on the information from diagnostic testing from the start, well before the beginning of formal instruction. At two-and-half years of age, Finnish children are tested for emergent cognitive problems and by the time they reach pre-school, at age six, their teachers will be able to anticipate learning difficulties on the basis of a rich battery of further tests. Once formal schooling begins students are frequently tested - and recent legislation will make this continuous monitoring even more fine-meshed.[5] These tests, in addition to being low-stakes (with neither punishments nor rewards attached to outcomes), are also typically diagnostic and formative: their aim is not just, and usually not even primarily, to register failures in learning but to indicate where, at what step in problem solving, a breakdown occurred, and thus to help suggest what might be done to overcome it. These diagnostic tests are created and continuously refined by a battery of institutes specialising in cognitive development and related disciplines, as well as specialised textbook publishers, in close consultation with the classroom teachers who actually use the instruments. Thus Finnish teachers do indeed play a crucial role in student assessment, but they do so with the help of tests and in collaboration with test makers, and this has gone largely unremarked in the discussion of the school system.

The fourth circumstance likewise concerns an underexposed aspect of school activity: special education. Some 30% of Finnish comprehensive school students receive special education services, by all accounts a much higher fraction of the school population than in other OECD countries, although precisely comparable data is hard to come by.[6] More than two-thirds of these students (22% of the 30%) receive short-term special-needs instruction in standard classroom settings, with the aim of addressing particular learning problems and continuing with the normal course of study.

The remaining students have deeper and more pervasive cognitive or behavioural problems. They are diagnosed by a school psychologist as requiring more intensive and continuous attention and are often grouped for instruction in specialised classrooms. Special education teachers - certified teachers who must compete for the opportunity to complete rigorous, further courses on responding to a wide range of learning disorders - provide both kinds of services. The students who access short-term special instruction - each will typically receive several "courses" of such educational "therapy" while proceeding through comprehensive school - are of course the ones most likely to score in the lowest quintile of the distribution of PISA outcomes. As we have just seen, it is the outperformance of the lowest Finnish quintile in international comparison that contributes decisively to the overall result. So it follows that a significant part of the Finnish success in primary and secondary schooling is owed to special education teachers who, in turn, rely on and are also active in collaborating in the creation of (diagnostic) test instruments.

The fifth circumstance concerns monitoring. The provision of special education services of all kinds is carefully and regularly monitored in each school by a student welfare group (SWG). The SWG includes the school principal, the school psychologist (sometimes working for several schools and with several SWGs), the school nurse, special education teacher(s) and sometimes, as requested, a representative of the municipal social welfare administration. In the normal case, the SWG reviews the performance of each class (and sometimes each student) in the school at least once a year. This allows identification and tracking of students in need of remedial, part-time special education. When a student is identified as requiring full-time special education, the SWG checks that the individualised study plans - the Finnish acronym is HOJKS[7] - guiding the development of each pupil needing support are being followed to good effect, and if not, what corrections are necessary. It is the SWG, in close collaboration with classroom and special education teachers, that bundles services according to individual needs, including, where necessary, calls for services outside the school system itself: municipal social-welfare services, for example, or mental health services provided by a local teaching or psychiatric hospital.[8]

Sixth and finally, a National Board of Education (NBE), which is officially part of the Ministry of Education but with substantial autonomy, provides the school system as a whole with some capacity for self-reflection and correction. The NBE, in consultation with the relevant stakeholders, prepares the framework or core curriculum for public schools. It participates in an annual evaluation of the performance of a sample of 5% to 10% of the student population to monitor the extent of regional or social disparities and, if need be, prompts improvement in individual schools included in the sample. (Schools are never ranked.) Together with the Ministry of Education

and other public agencies, the NBE funds the co-development by classroom teachers and outside experts of diagnostic tools, and training for special education teachers in their use. It also funds in-service training of teachers, principals and SWGs. On the basis of these continuing and rich interactions with all parts of the school system, the NBE indentifies shortcomings in the organisation of the school system and suggests ways of addressing them (which are then formally presented by the Ministry of Education to parliament as draft revisions of education law). Put another way, the NBE is broadly responsible for guiding or steering the implementation of current reforms (within the limits afforded by school and municipal autonomy), and in light of the experience thus gained proposing the next round of improvements.

Overall then, there is strong circumstantial evidence that the success of the Finnish school system depends significantly on classroom, school and school-system practices - collaboration between regular and special teachers, as well as between teachers and test makers; the review of service provision by the SWG; some monitoring of system-wide performance by the NBE - whatever the role (if any) of very broad societal inputs, such as egalitarian values or love of learning or books. More precisely, the Finnish school success depends on classroom practices that systemically tailor pedagogy to the needs of individual students - the same kind of capacitating services on which the new welfare increasingly relies.

In the terms introduced above, the Finnish system is an experimentalist organisation: the special education teachers are the front-line workers. They, in consultation with other relevant experts, make and periodically update individual education plans for each student with whom they work. Peer review is conducted by the SWG in each school. It aims to ensure that the plan is at least as effective as the best that current experience suggests it can be, and to strategise about remedial measures if it is not.

The Finnish special education system does not, however, have well-developed mechanisms for generalising and exploring the organisational implications of the successes and failures of individual schools, although there are many informal means for doing so, particularly at the municipal level. One important consequence is that decision-making practices vary, sometimes widely, from municipality to municipality, typically for reasons unrelated to attempts to adjust to differences in local needs. Pupils in similar circumstances may therefore be offered quite different special education services; in some cases, intervention may come too late to be effective. In view of these problems, recent legislation requires further formalisation of frameworks for decision-making and review. The framework education law of 2010 requires, however, that municipalities address these irregularities (principally by intervening earlier, and providing “intensified support” to

pupils with difficulties before making decisions regarding full-time special education) and make a detailed report to parliament on progress in 2013. To the extent that the school system succeeds in meeting these new requirements (avoiding paper compliance that could undermine its current successes) it is likely to do so by developing the higher-level monitoring and information-exchange capacities that it currently lacks, and in that sense becoming more fully experimentalist.

Finland's present compared with its past: some quasi-experimental evidence that the system works

The single most compelling piece of evidence that the success of the Finnish school system in international comparison is due to the role of individualised pedagogy, and especially (part-time) special education in the comprehensive schools, is the striking performance of the bottom quintile of the school population in the PISA exams. This group does so much better against its peer quintile in other countries than the higher scoring Finnish quintiles do against theirs that its achievement accounts for much of Finland's overall high standing. And it is of course the lowest quintile that benefits most from the provision of part-time special education services.

Still, a more direct confirmation that the comprehensive schools and special education account for the superior performance of the bottom quintile would be welcome. It might be, for example, that in a highly egalitarian society such as Finland good students are traditionally under a moral obligation to tutor struggling ones, or that traditional forms of group study have this effect - as they have been found to do among Asian-American students of college-level math (Treisman, 1992). In that case the superior performance of the bottom group would owe more to traditional practices of solidarity than to institutional innovations in schooling in recent decades.

The methodologically pristine way to ascertain the importance of comprehensive schools and special education to the Finnish outcome would be to establish a sample that mirrors the relevant features of an entry-level school cohort and then randomly assign part of the sample - the control group - to a school setting with no part-time special education, and the rest - the treatment group - to a school setting that provides such services in the "typical" form, duration and frequency. The differences in outcome, measured periodically, would then reflect only the influence of the "treatment" - here, customised pedagogy directed especially to students with learning problems.

In recent research Moberg and Savolainen (2006) have designed an historical comparison that captures many of the advantages of a random

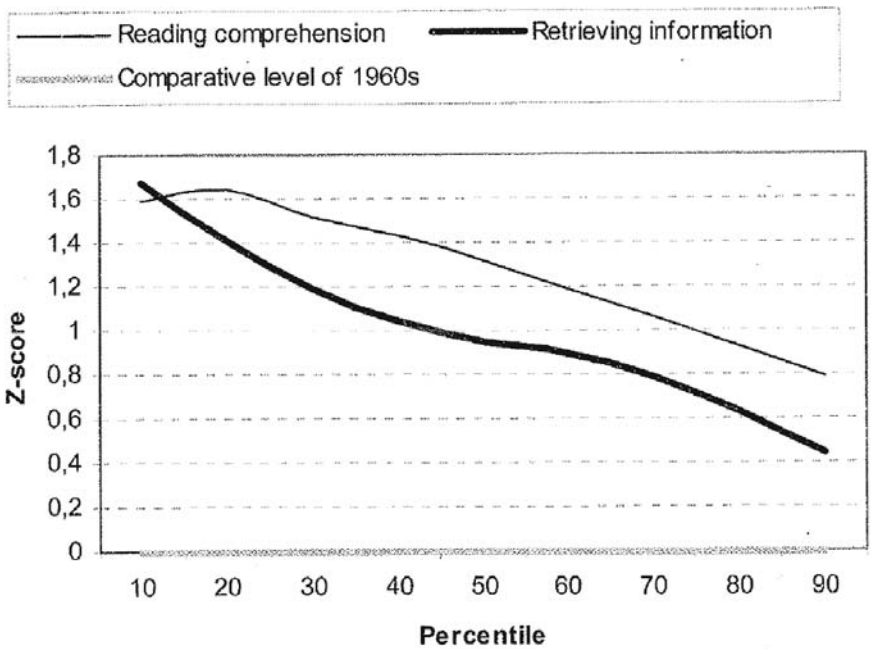
assignment experiment. Their control group is a random sample of 9th grade pupils from four schools in the city of Jyväskylä in 1966 - before the introduction of comprehensive schools and the wide diffusion of part-time special education. Moberg created the sample for his Master's thesis on reading comprehension and the speed of retrieval of written information. In 2005 Moberg and Savolainen used a random sample of 9th grade Jyväskylä students from the same schools as a treatment group. Pupils with severe learning disabilities and non-native speakers - about 2% of the student population in both cases - were excluded from the study. The shift under the new school regime to customised pedagogy for students with less severe learning problems was conspicuous. Whereas just 2% of the pupils in the 1966 sample received part-time special education services, they were provided to 29% of the pupils in the 2005 group.

To measure the contribution of the new school regime to pupils' reading proficiency, Moberg and Savolainen simply administered the 1966 tests for information retrieval and comprehension to the 2005 treatment group, in effect transporting them back in time for purposes of comparison with their untreated peers. The improvement in performance is striking. The mean score of the treatment group was sharply higher on both tests (by some 50% in comprehension and 30% in information retrieval). Expressed as effect sizes - roughly, the difference between the means of two groups adjusted for the variation within them - the changes are large (1.18 and 1, respectively) and statistically highly significant ($p < .001$) (p. 486). The variance within the treatment group was smaller than in the control - performance had become more homogeneous.

As Moberg and Savolainen emphasise, the crucial finding regards the distribution of these overall improvements in reading. It is the poorer performing students in the treatment group - the lower deciles in the 2005 sample - who improve the most relative to the 1966 control-group baseline. Figure 3.1 displays the difference in performance of each decile, expressed in terms of the distance above the 1966 mean (set at zero) that was obtained in 2005.

Figure 3.1. The change in reading comprehension and speed of retrieving information

Across performance percentiles, from 1960s to 2005



Source: Sachs, 2006.

These results - an outperformance by low-deciles, a reduction in variance and an under-population of the low-performance categories - reproduce the defining features of Finland's showing on the PISA tests. Thus Moberg and Savolainen demonstrate that Finland's relation to its own recent past is like its current relation to lower-performing school systems in other countries. What has changed in Finland - the treatment that explains the improvement in performance - is the introduction of comprehensive schools that mitigate learning disorders through part-time special needs education.

Finland and Denmark compared: more evidence that customised pedagogy helps weak students

A complementary way to increase understanding of Finland's customised classroom practices is to compare the Finnish school system with a very similar school system and country that tried to introduce individualised pedagogy in comprehensive schools by a different strategy of professional

development and transformation, yet failed to achieve Finland's superior results.

Denmark is the obvious comparator. As noted earlier the Nordic countries, and Denmark in particular, are equally committed to egalitarian values (with service-based welfare states and universal, not occupation-specific entitlements), at least as committed to funding high-quality public education and have (by US standards) equally homogeneous populations. On closer scrutiny the similarities are even more extensive and striking. The other Nordic countries, and particularly Denmark, share with Finland a view of early childhood as a time of creative play and fantasy. For this and other reasons child-initiated activities, rather than structured learning, is the focus of pre-school and kindergarten, and the start of primary public education is delayed until the age of 6 or 7. Consistent with this, schooling in all the Nordic countries tends to be child-centric: the pupil is seen as naturally curious and enquiring, and the teacher's role is importantly to encourage and support these dispositions. All the Nordic countries have comprehensive schools, as in Finland, and none streams pupils in compulsory education; so the same children can typically attend school together as a class for 9 years.

Yet despite these and other similarities the two systems perform very differently. In the PISA 2006 tests Finland was 1st in science, 2nd in reading and 2nd in math; Denmark ranked 24th, 19th and 15th respectively. What explains the divergence?

For starters, the difference in outcomes cannot be explained by inattention to the problem or lack of determination to solve it. In the 1950s the Danes were fully aware that the eventual transition to comprehensive schools would require differentiated pedagogy - teaching the same things differently to each student according to need. A commission formed under the aegis of the Ministry of Education and including representatives of all the stakeholders in Danish education emphatically embraced both in an official report on curriculum planning in 1960 (*Det af Undervisningsministeriet under 1. September 1958 Nedsatte Læseplanudvalg*, 1960). Schools were in fact gradually integrated and tracking was slowly eliminated, starting in the 1970s. A school reform law of 1993 finally ended tracking, made differentiated instruction a requirement and obligated teachers to prepare individual study plans (*elevplaner*).

The differences, then, were not in intention but rather in organisation - in the way the Danes institutionalised their commitment to unitary schools and differentiated teaching. Where the Finns integrated teaching training into the universities so that teachers were (after 5 years of education) fully accredited in their fields and received carefully supervised clinical practice in teaching,

the Danes kept teacher training in separate seminars, which attracted and attract mediocre students. Nor did the Danes create a still more highly trained corps of special education teachers (with an additional year of instruction and practice) as the Finns did (Sahlberg, 2010).[9]

Instead of the Finnish ensemble of reforms, or some equivalent of it, the Danes tried to transform the practice of teaching almost exclusively from the bottom-up, relying on the initiative of thoughtful, engaged and experienced teachers. The vehicle for these efforts from at least the 1970s until the present (though less energetically in the last decade), was the pilot project,[10] in which groups of motivated teachers undertook to demonstrate to themselves, and eventually to their colleagues and the larger educational community, how the new or anticipated demands on teaching could actually be met. The goal is to inspire diffusion by emulation. The emphasis was on differentiated teaching and other aspects of child-centric development, rather than on the monitoring of student performance that figured importantly in Finland (and has become more prominent in recent school reforms in Denmark).

Due to the focus on the experience of the teacher, rather than what the pupil learned, and for many other reasons, this bottom-up strategy failed. In the absence of any alternative, the Danes neither systematically improved the skills of beginning teachers nor fostered new forms of classroom collaboration by creating a corps of especially selected and trained special education teachers. There is no equivalent of the SWG in Denmark to monitor the provision of services in each school. As a result, special education has developed haphazardly, in response primarily to local and often idiosyncratic perceptions of need. A recent study (Egelund and Tetler, 2009) finds that rates of referral of students to special education vary greatly among municipalities, with the lowest rates in settings where the actors have informally cobbled together resources for prompt and continuing intervention. It is telling that the "culture of collaboration" in these more successful settings approximates the relation between special and general education in Finnish schools:

> T*eacher cooperation in self-organising teams is a feature of the work culture in schools where formal special education referrals are infrequent. It seems to be especially significant that there are in these schools teachers with expertise in teaching social skills and literacy, together with knowledge of the general principles of special education. These teachers can function as consultants for their colleagues.* (Egelund, 2009)

A flood of recent reports confirms that Danish classrooms offer scant support for weaker students. Danish (but not Finnish) classes are organised as self-directed modules, but the weaker students are left to their own devices

when they lose direction at the end of the one-and-half hour periods (Ørsted Andersen, 2010).[11] Danish teachers understand differentiated teaching as helping students to realise special projects, not helping the individual student to master a skill their own way (EVA, 2011), and so on. Plainly organisational differences have a large effect on the effectiveness of service delivery in the advanced countries. Are lessons learned there relevant to service provision in developing ones?

Individualised service provision in developing countries

The currently favoured strategy for reforming services in developing countries is the contingent cash transfer, or CCT. As noted at the outset CCTs typically involve payment to a mother or other head of family, of a cash benefit in return for a child's regular attendance at school or at periodic visits to a doctor or dentist. Since their introduction in the mid 1990s, CCTs have diffused rapidly to some 30 countries on five continents because they promise to increase the utility to citizens of existing institutions without requiring much, if anything, by way of additional organisational capacities of the kinds in short supply in developing countries. Due to the fact that the allocation rules are simple, corruption is easily detected and therefore more easily deterred. This same simplicity means that the programmes are not administratively burdensome and that the burdens that are generated can often be shouldered by ad hoc organisations outside existing bureaucracies, at some remove from entrenched interests inside and outside the government. The simplicity of the "treatment" - cash or a cash equivalent to the family and participation in a beneficial activity for the child - makes it relatively easy to assess the effects of the programme by random assignment experiment, and thereby heightens its appeal to accountable donor organisations. In sum, CCTs have been adopted for cogent reasons. If they produce substantial benefits, or promise to do so, speculation about the potential of more demanding reforms, untested in these harsher environments, is moot.

However, the evidence, which is unusually ample and probative because the programmes were often designed to be evaluated, is that CCTs do precisely what they were explicitly intended to do, but no more, and manifestly not enough. A recent World Bank review of the performance of CCTs finds that programmes (six in Latin America, two from outside the region) that were designed to increase reliability in school attendance demonstrably do so - and with greater increases, as is to be expected, where attendance rates are initially very low (Fiszbein *et al*., 2009). The same report finds, however, that the effect of the programmes on "final" outcomes - better education performance by beneficiaries - is negligible. Attendance improves but learning does not. The report is blunt:

> *This pattern of programme effects - increases in enrolment without attendant improvements in learning outcomes - ...is sobering because it suggests that the potential for CCTs* ***on their own*** *to improve earning is limited.* (Fiszbein *et al*., 2009, p. 163, emphasis in the original)

This finding is unsurprising. A small incentive that is carefully directed is enough to move a pupil from absence to presence in school; but without an enabling environment in school or an extraordinary effort (with no assurance of success) by the child, mere presence does not result in learning, even when - as in several CCTs - improved performance is explicitly incentivised. Thus a CCT in New York City, inspired by the highly successful *Opportunidades* programme in Mexico, rewarded students, among many other things, for improved performance on standardised tests. The programme was abandoned, not least because it was quickly discovered that it had insignificant effects on learning outcomes for elementary and middle school pupils, and significant effects only on those 9th graders (roughly a third of the treatment group) who were exceptionally well prepared, as measured by a score of "proficient" on a state test (Miller *et al*., 2009).

Moreover, programmes that do not incentivise behaviour but otherwise strongly resemble CCTs in aiming to improve school performance by narrowly targeted interventions (more textbooks, provision of flip charts, etc.), thereby requiring little administrative adjustment, have also yielded meagre results. The upshot is that researchers who began by favouring programmes like CCTs for all the reasons that have been set out are coming to the view that the only effective way to address learning problems is to try to remedy them directly. Banerjee *et al*. (2004) puts this shift in perspective most clearly:

> *Policies that promote school enrolment may not promote learning. And indeed, the recent evidence suggests that many interventions, which increase school participation, do not improve test scores for the average student. Students often seem not to learn anything in the additional days that they spend at school.*
>
> *It is therefore clear that efforts to get children into school must be accompanied by significant improvements in the quality of schools that serve these children. The problem is that while we now know a reasonable amount about how to get children into school, much less is known about how to improve school quality in a cost-effective way. Worse still, a number of rigorous, randomised evaluations have confirmed that spending more on resources like textbooks, flip charts or additional teachers has no impact on children's test scores.*
>
> *These results have led to a general scepticism about the ability of interventions focusing on inputs to make a difference (echoing*

> *Hanushek's earlier assessment for both the US and developing countries) and have led many… to advocate more systemic reforms designed to change the incentives faced by teachers, parents and children.*
>
> *It is not clear, however, that we know enough to entirely give up on inputs. Based on existing evidence, it remains possible that additional inputs actually can work but only if they address specific unmet needs in the school.* (Citations omitted)

Banerjee and his collaborators then go on to show that, in the context of the Indian schools that they are investigating, a remedial reading programme and a computer-assisted programme in mathematics both improve the performance of weaker students. Calling these programmes "inputs" is a misnomer to the extent that it blurs the distinction between interventions, such as improved access to textbooks, that provide tools beneficial to those (and only to those) who already have the skills to use them, and interventions that develop tool-using capacity. In the terms used here, they are more accurately characterised as special-education programmes or, more generally, capacitating programmes customised to the needs of particular groups of students.

In fact, Banerjee *et al*. are well aware that pedagogy has to be tailored to particular needs to be effective. They ascribe the failures of the (efficient) "more-of-the-same" policy implicit in CCTs and related programmes to the failure to realise that the "same" was in fact tailored to the needs of one (advantaged) group, while the students who now need "more" belong to different (disadvantaged) ones:

> *Neither the pedagogy nor the curriculum has been adapted to take into account the influx of children and their characteristics: many of these children are first generation learners whose parents are not in a position to follow what is happening in school or to react if their child falls behind. Yet, in many countries, the school system continues to operate as if it were catering to the elite.*

Thus CCTs are not a substitute for customised service provision; rather, the limits of CCT-type interventions draw attention to the need for customisation of enabling services.

This conclusion does not, of course, entail the further one that CCTs are dead ends, or even substantial detours. Improving attendance in schools or visits to doctors or health clinics are necessary, though not sufficient conditions for raising educational levels and improving the delivery of health care. What is less obvious but potentially more directly relevant to the discussion here, is that the organisation of CCTs, though advertised as minimal - because the rules are clear and decisions regarding eligibility are

close to automatic - is in fact extensive. Frequently it requires innovation, and particularly collaboration across departmental and other lines, of a kind that seems closely related to that required for the construction of the institutions that deliver customised services.

The organisation of a CCT recently in Morocco illustrates the point. Outwardly the programme is simplicity itself, involving the usual payment of a cash benefit to a household on the condition of a child's regular attendance at school. However, many of the mothers targeted for the programme did not have bank accounts, so bank services had to be made available to them through the post office. As the country does not have a comprehensive system of identity cards or equivalents, a system of unique identifiers had to be organised so that participants could be reliably registered. Attendance had to be verified by an official, either the child's teacher or a school inspector. But teachers are frequently absent themselves, and neither can the inspectors be counted on to inspect school regularly, so an elaborate system involving checking by teachers, checking by inspectors and student self-registration by time-clocks purchased from China was devised to track attendance and catch errors in the tracking. A data system had to be built to manage the information after it was collected.

All of this activity would be invisible not only to most participants in the program, but also to most outsiders - in donor institutions or university research centres, for instance - unless they were themselves directly involved in building the institutions themselves. None of this machinery is likely to appear in any official or academic account of how the programme functions.

So what? Surely it doesn't follow that because the actors who designed and built the programme engaged in demanding activities that were invisible in its daily operations, that they must have possessed unlimited organisational capacity, or even that they had just the capacities needed for constructing a system of (more) customised service delivery in Moroccan education. However, it does follow from this list of activities that organising CCTs, in their official simplicity, does not exhaust or even begin to describe the organisational capacities of many Moroccan actors. It follows too that the idea that countries must climb a familiar ladder of development in public administration - first the Weberian bureaucracy, then, if ever, the "post modern" networked successor - reflects more a habit of mind than a thorough canvass of possibilities. By what measure is it "easier" to build a bureaucracy than to solve all of the (hidden) problems that need to be addressed before a CCT can function in all its elegant simplicity? And even if it is (marginally?) easier to build a CCT than an experimentalist service provider, what is the point of economising on costs if the institution does not work as intended? There is simply no way of knowing what the protagonists in the Arab Spring - and of course many others like them in developing societies - are capable of

doing without looking more closely at what they have actually done to organise "simple" programmes like CCTs; just as there is no way to think about what kind of education system will serve the needs of young people in developing societies today without taking account of the lessons of the Nordic experience, on the one hand, and the findings of Banerjee and his collaborators on the other.

This would be the conclusion in normal times, but we do not live in normal times. The Arab spring, the partial result, as noted above, of the successes and failures of the Washington Consensus, has revealed whole generations with unexpected energy, courage and capacities for self-organisation - and imprecise projects. It has, we may presume, done in (what seems like) a twinkling what it took decades of controversy and failed reform to do with regard to schooling in the advanced countries: exploded the Olsonian logic of collective action by showing "diffuse" beneficiaries - the public - the unacceptable costs to them and their children of failed public services, and thus making it irresistibly reasonable to contemplate or insist on change. To assume that these generations already know what needs to be done to reform their countries - that they are the new subject of history - is to repeat a cardinal error (once more than understandable, now unpardonable) of many past revolutions. To imagine policy makers, in collaboration with donor institutions and researchers, can go about their business without engaging these generations and devising with them ways of connecting their initiative and resolve to large reform projects, is to make the equal, opposite and equally unpardonable error of those who learn nothing from revolutions because they are imprisoned in a moderation or liberalism of fear not hope.

The example of Finnish education shows that our desperate hopes for renewal of the welfare state are not unfounded. The experience of the CCTs shows that the current strategy of reform without organisational innovation, indeed almost without organisations, must be extended and itself renewed. The Arab spring reminds us that the constraints of politics can, on occasion, be less binding than we normally fear. There is need for discussion and room for hope.

Notes

1. One measure of the novelty of the recognition that education is fundamental to social solidarity is that standard treatments of the welfare state in the 1970s and 1980s excluded it from consideration, sometimes with the historical justification that creation of public schools antedated the 1883 German sick-pay statute, which is usually taken as the first piece of modern social welfare legislation. The consensus was, as Wilensky (1975) put it, that "education is different" (p. 3). See also Iversen and Stephens (2008), p. 3.

2. For a good discussion of the concepts underpinning both approaches see Dahl, Scharer *et al*. (1999). For their combination in practice see Fountas and Pinnell (1995).

3. For historical reasons "professional" remains the omnibus term for a decision maker who is authorised to exercise independent judgment - rather than following a rule or executing a command - in addressing technically and morally complex problems.

4. An important but limited exception is the brief account of the school system currently posted by the Finnish Ministry of Education, which points in the direction of the analysis pursued below. See http://www.minedu.fi/OPM/Koulutus/artikkelit/pisa-tutkimus/index.html?lang=en, visited 12 May 2010.

5. Formally the new school law entered into force on 1 January 2011, but three sections, having to do with the rights of parents to participate in student welfare work and with confidentiality and data access have been applicable since 1 August 2010.

6. See European Agency for the Development in Special Needs Education, http://www.european-agency.org/country-information.

7. Henkilökohtainen (personal) Opetuksen (teaching) Järjestämistä (organisation) Koskeva (regarding, concerning) Suunnitelma (plan)

8. To avoid misunderstanding at the outset: integration of services functions better within the school than between the school and the municipal social

welfare administration. One aim of the reform proposals to be discussed below is to improve this link. See *infra*.

9. Teaching thus became much more demanding and selective (in 2008 only one applicant in 10 was admitted to the Master of Teaching programme at the University of Helsinki) even as it became collaborative in new ways, as exemplified in the cooperation between special and general education teachers, and peer review by the SWG. The regime or "treatment" that produces the improvement in school outcomes is an amalgam or fusion of the two; and because the two changes occurred together in Finland, near-natural experiments, such as the Jyväskylä comparison, cannot distinguish the respective contributions of each. It is, moreover, proving difficult to specify the individual attributes that predict success as a teacher, quite apart from any consideration of the possible contribution of collaboration to individual success. Thus it is possible to identify consistently superior teachers by their on-the-job performance - those capable of helping a class achieve above-average gains one year are likely to do so the next; however, there is, surprisingly, little direct connection between high qualifications, such as a degree from a prestigious teachers college or high test scores, and superior teaching. See Gordon, Kane and Staiger, 2006. Still, a rich anecdotal literature suggests subject mastery is an important, perhaps indispensible component of good teaching (Liping, *Knowing and Teaching Elementary Mathematics*, 1999). Finnish experience suggests that certain types of collaboration may catalyze individual attributes so that systematically successful teaching depends on (various?) combinations of both.

10. Krogh-Jespersen, 2005.

11. As a result Finnish students of all backgrounds have regular periods of "flow" while the weaker Danish students did not. On the concept of flow see Csikszentmihalyi, 1991. Flow can be interpreted as the experience of learning in what Vygotsky called the "zone of proximal development": engagement with demanding tasks that stretch existing skills to new limits, without overwhelming the learner (Vygotsky, 1978).

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Chapter 4

Making green sources of growth more inclusive

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A Green Growth Strategy pursues economic growth combined with significant improvements in environmental quality and sustainable resource use. Such a policy requires a shift in production and consumption, which is potentially costly for major production sectors, certain types of households or entire economies. Technological change can reduce the cost but the extent of cost reductions depends on the nature of knowledge spillovers and technology policies. With appropriate burden-sharing rules and complementary policies, low-income groups and countries can gain, thus making green growth inclusive. We discuss several aspects of the mechanisms behind inclusive green growth and the policies that could support it.

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Introduction

In 2010, Ministers of 34 countries committed to develop a Green Growth Strategy, which aims at pursuing economic growth while preventing environmental degradation, biodiversity losses and unsustainable resource use (OECD 2010, p. 9). The OECD's Green Growth Strategy focuses on policy options for making a cleaner, low-carbon economy compatible with growth by looking at ways to spur eco-innovation and by addressing other key issues related to a transition to a greener economy, such as jobs and skills, investment, taxation, and trade and development - in addition to correcting prices to reflect externalities. The Green Growth Strategy is intended to be a flexible policy framework that can be deployed in a wide variety of countries in various stages of development.

Such a strategy works better if it is internationally adopted on a large scale and nationally supported by and targeted to the main sectors and socio-economic groups. In other words, the strategy requires inclusiveness. First, this is because many environmental problems and resource scarcities are global phenomena. Whether policy initiatives by some countries are effective depends on the policy response elsewhere. Second, while green policies are more affordable for the rich, the cost could fall disproportionately on the poor. If green policies in the rich parts of the world result in lower growth and fewer development opportunities in the poor parts of the world, the policy can hardly be called sustainable. Therefore the overlap between green policies and "inclusive growth policies" has to be studied.

This paper discusses some of the possible conflicts and complementarities between green policies and inclusive growth, as well as the implications for policy making. I focus mainly on the interaction between technology policy and environmental policy, as well as on the question of how these policies must be different across rich and poor countries in order to be effective.

Technology plays a large role in the debate about green growth. With the technologies that are currently available, it is hard to maintain high growth rates and reduce harmful emissions from energy use for the simple reason that a large part of the global economy is fuelled by fossil fuels. Large numbers of people living in developing countries depend on renewable natural resources (water and land) that are increasingly over-exploited due to population pressure and economic growth, while others have only recently made the transition to modern energy systems and may therefore become locked into the same fossil fuel dependence as richer countries. Switching to new non-fossil energy sources is costly in most sectors in the world. Producing more at reasonable cost while using fewer natural resources and less pollution-generating energy sources therefore requires new technologies that

are cleaner or more efficient in the use of conventional inputs. The key question is where these new technologies should come from. Will they be developed as a by-product of growth and development? Will resource scarcity and pollution policies induce the technical change or are specific technology policies needed? In the international context, the question is will green technologies diffuse to parts of the world where different growth and development patterns prevail and where such policies are not implemented.

The structure of the paper is as follows: first I shall discuss the objectives of an inclusive green growth strategy; then I shall argue that three types of changes are necessary for such a strategy to succeed; finally I shall discuss the policies that can bring about these changes.

Green growth - feasible and desirable?

The OECD's Green Growth Strategy is motivated by the desire to build a sustainable economy, especially in the wake of the financial crisis of 2008, which has made a return to robust growth and the avoidance of collapse more desirable than ever before. And so you might ask: how could a polluting resource-depleting economy ever be compatible with these goals? Well, green growth seems to be the only long-run answer to the financial crisis.

It is nevertheless easy to be sceptical about the idea of green growth. Some might claim it is an oxymoron. The degradation of environmental quality and natural resources, as well as the rise of atmospheric greenhouse gases seem to have been a side-effect of economic growth, and therefore it is often said that only by stopping the unprecedented growth in resource use and emissions can we stop environmental problems. To stop environmental degradation, economic growth does not need to be stopped; however, it does need to be de-linked from growth in material input flows through the introduction of new energy sources and new technologies that are more resource-efficient. The extent to which this is possible (in the short run and in the long run) is not yet clear. However, it seems less productive to speculate on the strength of the trade-offs between growth and green, than to try to find policies that combine growth and greening of the economy.

Few things can be said with certainty. Over history, growth has been remarkably robust, and environmental and resource-related problems have been overcome, although not without major crises and transitions. Over the long term, growth typically takes the form of an ever-growing population that can be sustained. Although per capita average income remains almost stagnant, aggregate production from the earth's finite resources rises - not declines - as a rule. It is only over the past few decades that population pressure and growth in material input usage have both reached historically

unprecedented levels. In fact, after centuries of slow population growth and glacially slow increases in per capita income, it is only in the last few decades that the world economy has combined per capita income growth for a majority of people with population growth in virtually all regions (of course, the very richest countries are the exception here because of population ageing). Due to the green revolution in agriculture, growth has been land-saving at a pace that is faster than ever before in history. Per person, less land is needed to produce food. However, population levels have increased fast enough to still raise aggregate land demand. Certainly, growth has been energy-consuming in the sense that it has increased per capita energy use. GDP has grown faster than energy use, which indicates a relative de-linking of GDP and energy. If anything, from the perspective of the physical resource constraints in the global economy and from an historical perspective, growth (of both population and per capita production) seems to be exceptionally fast - maybe faster than is compatible with sustainability. In this case, green growth would mean slower growth; inclusive growth would mean mainly redistributive growth.

At the same time, technological change has been exceptionally fast over the past decades. Recent history has shown that technology should not be considered as something that slowly develops in a way that is disconnected from society and the economy; rather it offers great potential for solving problems. Technology develops differently under different economic conditions and responds to economic policies: it is endogenous rather than exogenous. However, the implications for sustainability are not clear as technology can be devastating for the environment (*i.e.* resource-consuming) or friendly to it (*i.e*. when replacing scarce resources). Hence, what matters is the direction of technical change: are there sufficient incentives to develop the type of technologies that we desire in the global economy, that contribute towards greening the economy and making growth more inclusive? How can these incentives be affected by policies? Are "market-based" policies, such as tax incentives, sufficient or is direct regulation more (cost-)effective?

Before moving to policies, we should be a bit more explicit about the goals that we want to pursue. In particular, we need to ask if it is growth or something more encompassing that we should aim at? The OECD (2010) interim report outlines a broad range of policy goals. Not surprisingly, the Green Growth Strategy prioritises "sustainable development". The latter term, which became a key policy target after the Brundtland report (WCED, 1987), is defined most commonly as meeting the needs of the present without compromising the ability of future generations to meet their own needs. The decision to focus on growth rather than development should be understood in the light of the practical applicability and political viability of the strategy.

Policy is likely to be most successful in areas where "growth" and "sustainability" are complementary.

On the one hand, equating growth and development seems to run against the message from the Sarkozy report (Stiglitz *et al.*, 2009), which attracted so much attention by discussing the fundamental difference between economic production (*cf.* the level and growth of GDP) and well being (*cf.* sustainable development). On the other hand, sustainable development without growth has drawn criticism ever since the term "sustainable development" became a part of common speech. In particular, one specific (narrow) interpretation of sustainability is maximising the well being of the generation that is worst off, which prevents growth by construction. Development with growth is less specific and more palatable, but only if - in accordance with the recommendations from the Sarkozy report - the metric of growth encompasses things that we care about: useful consumption goods, public goods, leisure time and so on. GDP is not such a metric but there are ways to construct "green GDP" figures. Part of the development of the Green Growth Strategy therefore requires that we make the use of these new or expanded metrics more common in decision making.

It is not only the "growth component" that needs further qualification as the label "green" also has many meanings: pollution abatement, resource conservation, even equity and social objectives. A choice of priorities has to be made here as well. Currently climate change attracts most attention but it is still not clear at all how much policy attention and effort should be devoted to it (*cf.* The Copenhagen Consensus reports). More traditional environmental problems concern air pollution, water scarcity, land erosion, loss of biodiversity and vulnerability to natural disasters. It is hard to quantify how the size of these problems compares with the relatively recently recognised problem of climate change and therefore which prioritisation this implies. Nevertheless, both old and new environmental problems have to be addressed in the policy portfolio. In the short term, more people, especially the poor, will suffer from land and ecosystem degradation or indoor air pollution than from climate change, but the future burden of the latter might have a big impact on the poor if no immediate action is taken. Furthermore, traditional problems and climate change are interacting: reducing CO_2 emissions yields co-benefits in the form of less air pollution and positive health effects, and this can be significant for the poor in the short term.

How big is the climate change impact relative to other environmental problems? Stern (2007) labels climate change as the biggest market failure currently before us. Yet estimates of the mean cost of global warming can be called small, with a "consensus" of around 2% of GDP for a three degree Celsius warming (see Tol, 2010, for a concise overview of damage and abatement costs). This number amounts to one or two years of lost growth in

the world economy. Of course, this number is an average in many respects and therefore not very relevant (and it is only partly a "greened" GDP measure). It is an average over time, over regions and over possible scenarios. What matters in the end is the relative cost at which these climate change effects can be avoided. The average cost is lower than the average damage, which means that based on a cost-benefit analysis, climate change action seems justified. However, the cost-benefit analysis tends to become less favourable very quickly if less than perfect policies are implemented to address the problem. Moreover, it is questionable if conventional cost-benefit analysis can be applied to a problem with the pervasiveness and timescale of climate change (Van den Bergh, 2004) and in the presence of small probabilities on big-impact events (Weitzman, 2009).

In this area one needs to be visionary; precautionary action should prevail over inertia as long as there are no unambiguous signs that the policy is a waste of money. Moreover, climate change may affect the world economy in a disastrous way through low-probability, high-cost events (*e.g.* permafrost melting or a shutdown of the thermohaline circulation). Climate change mitigation policies should perhaps be seen as insurance policies in the first place. Although global warming seems to be partly irreversible already, the cost of reducing climate change is relatively low worldwide as well, justifying action that is moderate in terms of loss of GDP.

With so many uncertainties remaining, an important line of action must focus on reducing the uncertainty about possible outcomes, and possible costs and benefits of climate policy. Since it seems unlikely that we can quickly reduce uncertainty about the physics behind climate change, the best strategy seems to be reducing the uncertainty about the cost of several possible solutions, in particular through research into new energy sources and less conventional measures like carbon capture and geo-engineering. Ideally this technical research will yield a bigger menu of "no-regret" options (*i.e.* solutions that will have benefits even if the climate problem is of a different nature than anticipated).

A large part of the controversy centres around the position of developing countries in the climate change debate. Average statistics that summarise the damage of climate change hide the factors that seem to work against the fate of the poorest countries. Relatively speaking, developing countries in already-warm regions suffer most from climate change: their incomes will be affected to a larger degree, and yet due to their "low" weight in total world income, their plight does not show up in the average figure. Furthermore, uncertainty of cost estimates is bigger for developing countries than for developed countries. Dell *et al.* (2008) find econometric evidence for a permanent slowdown of the growth rate in less-developed countries (LDCs) of 0.6 percentage points, which easily amounts to a decade of lost growth (in

terms of consumption equivalents). The cost of mitigating climate change might easily become unacceptably high for these countries as well, given the large gap between sustainable fossil energy use and the level of energy use that brought industrialised countries to their current welfare levels.

How important is the North-South divide? The North caused the problem, and wants to get rid of it. Moreover, if any region has the means, knowledge, and institutions to cope with climate change, it is the North. The South could help the North, but only if it is fully compensated by the North. At least in the coming decade when emerging countries will continue their relatively fast pace of economic growth, they may be more willing to join climate change agreements in the future, maybe even according to a pre-set participation time line (*cf*. Frankel, 2009). For developing countries, a markedly different strategy may be needed to that for richer countries. *First*, "grow now - abate later" sounds irresponsible towards future generations, but only if we mean the future generations of rich countries: future generations in the South will be helped by growth, and current emissions in most of the South are still too small to be of a direct concern, compared with the emissions of the North. *Second*, adaptation to climate change seems inevitable. Since individuals do not always have the means or the knowledge to make the long-term investments that are needed for adaptation, due to several market imperfections, there is an "adaptation-deficit" that has to be addressed. However, the long-term policy might be different and might call for both much more and early attention to green policies: if being green is the norm in the future, a country should build its green future now and avoid locking in old technologies.

What changes are required for green growth and for whom are they costly?

Three things are required for growth without deteriorating the environment: substitution, technical change and transformation.

First, through substitution, economic activity can shift away from dirty resource-intensive activities. On the input side, polluting inputs are replaced by less harmful inputs; on the output side, consumption shifts to less-polluting consumption goods. These shifts require a sufficiently high and possibly rising relative price of resource inputs and polluting inputs, possibly through taxes. Low-emission energy replaces polluting sources of energy, waste is reduced and cities become more compact.

One important question is the cost of this substitution. Environmental regulation makes green sectors emerge at the cost of polluting sectors. The environmental gains may be less visible and accrue to a diffuse group, while

the old sectors lose employment and profits. Standard economic reasoning indicates that the loss from the declining sectors is not fully offset by the gains in the new sectors: if this were the case, the shift would have occurred even in the absence of environmental regulation. In contrast, according to the so-called Porter hypothesis, firms could gain from the policy. Negative costs arise if firms are initially operating an inefficient process: the environmental regulation increases attention to inefficiencies and improves profitability, even competitiveness. What is somehow puzzling in this reasoning is why firms need environmental regulation to become aware of their inefficiencies. Despite anecdotal evidence in favour of the Porter hypothesis, empirically the mechanism is not very robust as there is little evidence of systematic gains from environmental regulation on firms (Brännlund and Lundgren, 2009).

A similar mechanism is documented for improvements in energy efficiency. Households and firms are often not aware of the cost-saving potential of energy-efficient devices, such as light bulbs or fuel-efficient cars. They appear to apply an irrationally high discount rate, weighing the up-front investment costs very heavily against the long-term returns; or similarly, applying a very short pay-back period. As a result, they fail to pick the low-hanging fruit. However, awareness of energy-efficiency improvements can change very quickly, possibly guided by energy price spikes, market dynamics or policy actions. Low-hanging fruit is therefore quickly harvested and not many negative-cost options to environmental policy persist.

Hence, environmental policy is costly, but of course only in a narrow sense. The cost should be seen as the investment cost for improvements in the environment. Unless environmental policy is designed to be overly strict or implemented with an inefficient instrument, the benefits exceed the cost so that the overall gain is positive. What really matters is the closeness between those who receive the benefits and those who pay for the cost. In the Porter hypothesis and the low-hanging fruit discussion, the two groups coincide and only the net benefits matter for decisions. However, such a situation is rare. After all, environmental problems reflect externalities, with one party inflicting damage on another party without this damage being reflected in market prices. Then again, environmental problems differ greatly depending on the distance between the two parties involved.

If we think of local pollution in a small geographical area with homogeneous economic agents, for example, a village that depends on the proceeds from land that is threatened by erosion and overharvesting, environmental policy is costly for all group members, but also beneficial for all group members. No conflict needs to arise if coordination failures can be solved. The work by Elinor Ostrom shows how local communities in certain circumstances have indeed solved coordination problems. The other extreme is the example of climate change, in which those who pay and those who

benefit are far apart, both in a geographical sense and over time. Coordination is definitely more challenging here, and the dynamic and international aspects of environmental policy are much more demanding.

Environmental policy also becomes intertwined with income distribution and inclusiveness. In a general case involving dispersed winners and losers from environmental policy, one could design a policy package of various measures in such a way that costs and benefits are, in the end, evenly distributed, or that the poorest groups bear the smallest costs and experience growth in income or a reduction in poverty.

Second, innovation can make substitution towards environmentally friendly activities cheaper. Innovation takes time and requires investment since new technologies need to be developed. The fruits can be reaped later. However, not all innovation makes it easier to reduce pollution. For example, by the "rebound effect", improvements in energy efficiency make energy-using appliances effectively cheaper to operate and therefore may increase their use, thus increasing the demand on energy. Other examples come from cost reduction of energy-intensive goods, for example, progress in the automobile industry or ICT production. Below we will return to the question of what stimulates "green" innovation.

The cost of innovation is hard to predict as it relies on how useful the new technologies will be in the future. Furthermore, part of the costs and benefits are hidden due to the presence of spillovers (on which more below). What matters in the context of green growth is how costly is the redirection of innovation into a sustainable path, compared with the business-as-usual scenario without redirection, and for whom is it costly? Of course, the same caveat applies as outlined above: the (upfront) cost of changing to green innovation is to be matched by (future) gains, and some sectors will lose for other sectors to gain. New jobs opportunities will be created in energy-efficient sectors that employ the new technologies; however, it will be at the cost of old sectors.

Third, transformation - defined as a drastic change in practice - is needed for green growth. In particular, new General Purpose Technologies (GPTs) need to be developed that relate to energy supply and materials. GPTs can potentially be applied in a wide variety of sectors in the (world) economy; they can be further improved over time and supplemented by complementary innovations. The switch from an economy based on fossil fuels to one based on renewable energy is such a major change that it is likely to have pervasive effects throughout the economy. A transformation may also be difficult and costly because the changes that need to occur across different sectors have to be coordinated. The economy is currently locked into a certain GPT and its associated pollution, mainly because past investments have been made in the

old GPT. This puts the old GPT at an advantage relative to a new GPT because the latter's infrastructure has to be first built to replace the old. However, new technologies may actually be introduced quickly because of this pervasiveness. The large potential market of a GPT based on renewable energy creates increasing returns to scale, which implies that a small cost reduction for the GPT will make a large market take interest in it. Instead of a slow diffusion and gradual learning, a sudden change (or tipping point) may be the outcome.

While it is hard to predict whether gradual change and learning curves are more relevant and realistic than big transformations and tipping points, we can be sure that both pathways require a combination of innovation and substitution. Hence in the rest of the paper I will concentrate on the latter two mechanisms behind green growth.

Growth driven by environmentally friendly technological change: a framework for understanding green growth and associated externalities

To identify where policy is needed, it helps to identify the main interactions between growth and resource use. I shall focus on the two most direct sources of interactions and associated externalities: environmental externalities and knowledge spillovers.

Long-term growth is driven by input growth and technical change. Inputs not only include labour and capital but also resource inputs and polluting inputs, thus bringing the environmental aspects into the picture. Technological change can enhance or reduce the demand for resources and polluting inputs, thus opening up the possibility of "green growth", *i.e.* growth without deteriorating the environment. The main question is how does the current availability and regulation of inputs, as well as deployment of technologies, affect future inputs and future technology. Technological change responds to profit incentives and builds on previously developed knowledge, and it is this dynamic interaction that should create green growth.

Growth in capital and growth in labour services are the proximate sources of growth; however, improvements in technology that enhance the productivity of inputs are at least as important. The total of small and large process and product innovations over time raises the value of aggregate production. Behind the aggregate growth pattern is a complex pattern of sectoral developments. New products or even sectors replace old ones, certain sectors grow faster than others and technological change may be more important in some sectors than others. The uneven impact of technological change across products and sectors can be called biased technical change. One possibility is that technological change will occur mainly in

skill-intensive sectors, causing demand to shift to these sectors, and resulting in an increase in the wages of skilled workers (*e.g.* Acemoglu, 2002). Similarly, technological change could occur mainly in resource-intensive or polluting sectors, with the result that pollution increases. This type of resource-using (or pollution-using) technological change is not an exception. In fact, the rise of fossil fuels as a main source of energy is an expression of this. Empirical estimates show that various sectors in various time periods have experienced energy-using technical change, while in others energy-saving technical change has been dominant (Jorgenson and Fraumendi, 1981; Sue Wing, 2008).

To understand green growth, we need to know whether growth can be driven by resource-saving or pollution-saving technical change and, if so, how this type of technical change comes about. In particular, we need to know how various types of technological change are related to resource use and environmental policies.

Due to negative externalities, resource use is inefficient and pollution is excessive in the absence of regulation. Environmental policy, *i.e.* reductions in emissions and resource use, reduces input use in the economy. Lower input use means lower output, although the loss in output can be limited if factor substitution is easy. Unfortunately, elasticities of substitution between energy inputs and other inputs are low (Van der Werf, 2008), so that energy reductions are typically costly. Induced technical change may reduce the cost of environmental policy and higher energy prices may spur innovation in energy-efficient applications, as we will discuss below. However, other types of innovation may be crowded out by environmental policy: if the resource-base of the economy is smaller because less energy can be used, then the market for innovation shrinks. If externalities are more or less equally important in both types of innovation, the crowding-out effect dominates and the aggregate rate of innovation falls in response to environmental policy (Smulders and De Nooij, 2003). In this case, "greener" means slower growth. "Greener" goes together with faster growth only if the positive externalities are relatively large in the "green" sectors to which innovation shifts in response to environmental policy (Gerlagh, 2008). Crucial for policy evaluation is therefore to know how large the relative spillovers are in green sectors versus brown sectors.

Technical change is the result of deliberate efforts by innovators, including firms, which spend resources on improving technologies. Hence, technical change is endogenous. The direction of technological change is to some degree a matter of choice: firms choose what part of their production process they want to improve and in what type of markets they would like to introduce new products. As a result, R&D might be directed towards certain types of innovations. Whether technological change is pollution-using or

pollution-saving depends on the profits that entrepreneurs expect to reap. High energy prices make energy-efficient devices more attractive to consumers and expand the market for them, and this may in turn attract innovation. This phenomenon goes under the label of Induced Technical Change. Newell *et al.* (1999) found that the energy-efficiency of air-conditioners improved faster in times of high energy prices, although a substantial part of the improvements were autonomous. Similarly, Popp (2001) finds that two-thirds of the change in energy consumption with respect to a price change is due to simple, price-induced factor substitution, while the remaining third results from induced innovation.

Not only does the (expected) market size matter for specific innovations, like energy-efficiency improvements, but also the cost and technological opportunity for specific innovations relative to innovations in other directions. This means that "green innovation" may be more difficult and costly since firms lack the required background or "knowledge base".

The knowledge base from which R&D builds can be seen as a repository of ideas that have previously been developed, usually by a large group of firms, engineers and scientists. Each innovation contributes to this "spillover pool" and makes subsequent innovation easier. In general, the knowledge spillovers affect private net returns to innovation and cause them to be different from the social net returns. The concept of knowledge spillovers as the main externality in R&D is well developed in the literature on innovation (Griliches, 1979) and growth (Romer, 1990). When thinking about the direction of technological change, it is important to know more about the exact nature of these spillovers. Are the spillovers within-sector or across-sector? Are they mainly national or international?

With spillovers mainly restricted to certain types of innovations, coordination failures can easily arise. If energy-efficiency improvement requires specific knowledge that is not used in other types of R&D, and this specific knowledge is lacking, starting to develop efficiency improvements is likely to be difficult. If all firms avoid innovation in this direction, the knowledge base never becomes established. Hence, the combination of path dependency and coordination failures may prevent green innovation taking off. Path dependency arises because current research and innovation typically builds on previous research and innovation. Coordination failure and free riding arise because firms learn from each other: there are inter-firm knowledge spillovers.

However, if knowledge spillovers cross technology fields, energy-efficiency improvements might build on general principles that have been developed elsewhere and coordination failures are less likely.

Green growth requires boosting "eco-efficiency" and "energy efficiency", the development of emission-free technologies and the introduction of a cradle-to-cradle principle in production chains. Can these innovations be developed from knowledge about other types of innovations or is highly specific knowledge required? This is a question that cannot be answered yet. Research on R&D spillovers has focused mainly on geographical spillovers and only in a limited way on inter-industry spillovers (Wolff, 2011, for a recent overview of results). The main finding of the patent-based literature is that spillovers are international in scope but are also diminishing with geographical distance.

Jaffe (1986) is the seminal paper on inter-firm spillovers. He first constructs a measure of technological similarity of firms and then constructs firm-specific knowledge spillover pools by adding up the R&D by other firms, giving firms that are technologically more similar a higher weight. Firm-specific knowledge spillover pools turn out to be a significant positive determinant of R&D performance. This provides the evidence for inter-firm spillovers: firms learn from other firms, and they learn mainly from other firms that are active in similar technology fields.

Unfortunately, the implications for "green R&D spillovers" are not immediately clear from Jaffe's evidence. The basis for the spillover weights is the patent classification system, which is technology-based rather than product-based. There is no direct connection as to how the technology classes that are identified match the technologies that are important for green R&D.

Popp (2002) looks specifically at knowledge spillovers related to green innovations. Using patent citation data, he finds that innovation directed at energy improvements builds on the total stock of knowledge embodied in the (quality-adjusted) stock of patents for energy efficiency improvements. However, he also finds that there are diminishing returns associated with this knowledge stock. This finding implies that start-up costs for eco-innovation reduce over time as more specific knowledge is accumulated and - due to diminishing returns - stabilise at a lower level.

Nevertheless, what remains untested is whether breakthroughs in other technology fields, *i.e.* outside energy efficiency improvement, could also significantly reduce innovation costs in energy efficiency. De Serres *et al.* (2010) notice that this hypothesis might be relevant when they write:

> *"Some of the fundamental breakthroughs in energy technologies, such as the use of smart grids and the growing penetration of ICT, come from very different areas and sectors than energy. Hence, spending on the development of more generic technologies, such as materials technologies, nanotechnologies and ICT, may be even more important than focusing too narrowly on energy or environmental R&D."*

Even strong spillovers from "dirty" to "clean" industries may be relevant. One example comes from the oil industry where pipe technologies reduce extraction and distribution costs for fossil fuels. This means that improvement in pipe technologies results in "dirty" (resource-using) technical change. One important clean technology option would be carbon capture and storage (CCS). Improvements in CCS would be resource-saving (since they reduce atmospheric CO2). However, CCS requires improved pipe technology, which can be learned from the oil industry.

Green growth policies: technology policy versus environmental policy

There are two main externalities that call for policies: the pollution (or green) externality and the R&D (or technology) externality. The green externality is the fact that a clean environment has no price and is over-exploited. As a result, emissions are too high and call for environmental policies. Spillovers in R&D imply insufficient spending on innovation and call for technology policies.

First-best policies would get the prices of R&D and emissions right. R&D subsidies and emission taxes or markets for emissions would do the trick. Although the idea is simple and intuitive, the translation of this policy prescription to the real world situation is not straightforward. The main problem arises with the possible interaction between the two types of instruments. Are specific subsidies for green innovation needed? Are emission taxes to be differentiated according to opportunities for green innovation? In a second-best setting, should we put more emphasis on technology policy or on environmental policy?

Let us first consider the case in which technology policy is not available, but various other policy instruments are available and already applied. The pre-existing tax structure can be inefficient with respect to environmental and innovation goals. In particular, fossil fuel energy is subsidised and energy-intensive sectors are exempted from certain taxes. Removing environmentally harmful subsidies helps the environment, helps the government budget and frees up revenue for growth-promoting and efficiency-enhancing policies. The gains from tax reform can be large (*e.g.* OECD, 1999; Van Beers and Van den Bergh, 2009). General principles of tax reform are that efficiency gains are likely to materialise if: (i) environmentally harmful activities are taxed, instead of environmentally friendly activities being subsidised; and (ii) market-based instruments are used that generate revenues that can be employed ("recycled") to reduce other, distortionary taxes, such as labour taxes (Bovenberg and Goulder, 2002). The tax reform should also consider removing trade barriers

and barriers to foreign direct investment (FDI) since they may be major barriers for technology diffusion.

Let us now turn to a situation in which many policy instruments are available, in particular both environmental taxes and technology subsidies. We may now ask if these two instruments are interdependent in an optimal setting. The emission tax on pollution should reflect the marginal social damage, while the R&D subsidy should reflect the wedge between the private and social returns to R&D. This wedge is a result of the spillovers, and hence a result of the nature of technology. The more spillovers there are, the larger the subsidy. However, spillovers cannot be anticipated in advance. All we know is that spillovers are likely to occur, but we do not know by how much. Moreover, spillovers are likely to differ across sectors, products and technologies. It is therefore impossible to determine the specific wedge for every R&D activity and subsidise accordingly. The practical solution is to have a generic R&D subsidy and to try and find reasonable, specific rules to supplement the generic subsidy (*cf.* patent law which generically protects inventions for 20 years, while from a welfare-maximising perspective, the patent length should differ to account for technology/sector-specific externalities). The question is whether environmental R&D justifies such a supplement.

Green innovation should get a larger subsidy if the social-to-private benefit ratio is larger than that for other innovation. At first sight this seems too complex to determine. If green innovation is possible in a variety of sectors, with an associated wide range of degrees and potentials for learning and spillovers, it seems hard to imagine a systematically larger wedge for green innovation. The best guess would be that green innovation has on average the same wedge. Grimaud, Magné, and Lafforgue (2011) make an "agnostic" assumption in this spirit: they calibrate a model in which innovation in energy efficiency, alternative energy and CCS has the same private-social return wedge, and they assume in addition that this wedge is constant over time. The optimal R&D subsidy is therefore generic and constant over time in their simulations. They find a surprising lack of interaction between environmental and R&D policies: adding R&D subsidies to an environmental tax hardly affects emissions (but does affect welfare), while subsidies without environmental taxes hardly affect emissions. The latter is due to the fact that emissions come from a non-renewable resource stock and resource owners will want to deplete this stock until the extraction costs equal the price of alternative energy. Nordhaus (2002) and Popp (2004) make similar assumptions with respect to the fixed wedge between social and private returns to R&D and also find small effects of R&D policies on emissions.

Recent research has shown that R&D policies have substantially bigger effects if the spillovers from different types of R&D are modelled in a more detailed way. This literature finds that specific green technology subsidies are justified even when environmental taxation is in place.

Acemoglu *et al.* (2009) distinguish between green and brown firms, which both produce a similar good, but only the former produce without emissions. Firms can reduce their cost by undertaking R&D. Without environmental taxes, brown firms are cheaper because they have a longer history of cost-reducing R&D. Brown firms learn from other brown firms, and green firms learn from other green firms, both to the same degree; both types of firms also have the same cost of R&D. Without environmental policy, only brown firms undertake R&D since they have a larger market. Thus, brown firms become even more productive over time and capture an even larger market: the economy becomes locked into a more polluting industry structure and the productivity gap between brown and green goods simply becomes wider. This path dependency is a result of the lack of spillovers between the two types of firms.

Efficient environmental policy requires both pollution taxes and R&D subsidies in this model. Pollution taxes internalise the damage from emissions and shift demand to clean goods. R&D subsidies internalise the spillovers among green firms. Although both green and brown firms face spillovers under perfectly symmetric conditions, the R&D subsidy still must be larger for the green firms. R&D effort has to be completely redirected from the dirty to the clean sector.

Although the model is quite specific in particular, only two sectors are distinguished and only one of them innovates at any point in time), the main mechanism of the model is quite general. R&D subsidies should be bigger if the ideas that they generate benefit more producers. This is an expression of the well known Samuelson (1954) condition for public goods: the social value of the innovation, which is a public good as far as it benefits many firms, equals the sum of the benefits that all the firms derive from it in the form of knowledge spillovers. With environmental policy, there will be a substitution to green methods of production and as a result more firms (or firms with larger markets) will benefit from spillovers from green R&D. Hence, the total value of spillovers is bigger. For R&D related to polluting sectors, the opposite happens. Thus, the R&D subsidy for green technologies is larger. Hart (2008) has already pointed this out.

Heggedal (2008) discusses the implications of diminishing returns on developing new knowledge in a specific field, here to be interpreted as green technologies. When a new technology field is opened, progress may initially be relatively easy, but will run into diminishing returns later on. In particular,

the initial progress may be easy to absorb by other firms so that spillovers are relatively large in the early stages. Evidence for this is provided by Popp (2002). Large yet falling spillovers imply that high initial R&D subsidies may be optimal; the subsidies can be phased out later on. In Heggedal's setting, an exogenous event creates new technological opportunities, for example, a breakthrough in nanotechnology or carbon capture. This is very different to the setting in Acemoglu *et al.* (2009), in which green technologies never make a "jump" akin to Heggedal's breakthrough - instead it is policy that has to jumpstart their green technology. In Heggedal's setting, the breakthrough could easily be a non-environmentally friendly breakthrough, maybe nanotechnology with great increases in productivity but harmful effects on living organisms. In this case, additional technology support is justified on efficiency grounds for brown, rather than green, technology! Of course, emission taxes are still justified as well. In normal cases, the positive technology shock raises the efficient emission tax through an income effect. As a result, efficient green policy has to shift from technology instruments to environmental instruments. However, it is also conceivable that the pollution-using breakthrough lowers the efficient pollution tax. Intuitively, a high pollution tax would kill too many of the opportunities opened up by the brown breakthrough (Smulders and Di Maria, 2008).

Green growth meets inclusive growth: national policies

We shall now consider the links between green growth and inclusive growth. In particular we shall consider how green growth policies can enhance - or be reinforced by - investment in skills, education, poverty reduction and employment opportunities.

If there is a need to combine inclusive growth and green growth somewhere, it is in the rural areas of low-income countries. Currently 25% of the population in developing countries - almost 1.3 billion people - make their living on "fragile lands", which are defined as "areas that present significant constraints for intensive agriculture and where the people's links to the land are critical for the sustainability of communities, pastures, forests and other natural resources" (World Bank, 2003). The major part of these people's income depends on the land or coastal areas (fishery), so that making resource use more sustainable both reduces poverty and increases opportunities. The main problem is that the poor are asset-deprived, having no claims to the land on which they depend, no access to education and no access to credit. More powerful groups control the resources; commercial interests lead to deforestation, land degradation and fish stock depletion, depriving the poor of their livelihood. Barbier (2008) discusses the policy options. Tax reform and

reduced support for cattle ranging, forestry and large-scale agriculture is needed to remove the bias against the poor. Once the local communities can manage their own natural resources, coordinated sustainable resource use may become established. Payments for eco-service systems may not help the asset-deprived poor, but may be a solution in situations with more equally distributed land ownership. Land reform might be needed otherwise. Education and credit market improvements may improve the bargaining position of the poor and reduce their need to over-harvest the resources themselves, thus escaping the "poverty-environment trap".

The poor in urban areas, including low-skilled workers in richer countries, face a different situation: their opportunities are linked more to the world market and the international division of labour. Their jobs depend on international competitiveness and price competition. For them, environmental policy may be quite costly. If the policy takes the form of reduced emissions and higher energy costs, their production becomes less competitive. Switches to greener products almost certainly increase the demand for skills, disadvantaging low-skilled workers. In general, the transition from resource-based growth to green growth implies a transition to a more knowledge-based economy. In this respect, green growth is non-inclusive for the low-skilled. This calls for major supplementary policies in terms of skill formation, training and education. Once green technologies become standardised, they might move down the skill ladder again and benefit the poor. Policies that stimulate entrepreneurship could speed up this transition.

The poor are not only low-skilled workers in the main; they are also low-income consumers with a distinctive consumption pattern. They spend a relatively large proportion of their income on material goods and are thus hurt relatively more by emission taxes than the non-poor. This implies that the poor face a higher cost of reducing their emissions, both as a consumer and as a worker. At the same time, they may depend relatively more on natural resources, especially in poor countries where harvested resources (from land, fuel, wood) supplement income and protection against air pollution and heat stress is less affordable for them.

Table 4.1 sets out the schematic difference between two income groups. It is clear that green inclusive growth requires that the poor be somehow exempt from emissions reductions and that most of the burden be placed on the rich, while the benefits accrue to both groups.

Table 4.1. Distributional effects of environmental policy

	Abatement cost	Environmental benefits	Capacity to reduce emissions
Poor	high ↓	high	low ↑
Rich	low ↓	low/high	high ↑

Note: The arrows denote direction of change when pollution-saving technology becomes available at low cost.

Source: Author.

What can be concluded about the within-country sharing of the burden of environmental policy? In the absence of full redistribution, poor individuals should abate less (and be favoured with a lower energy tax). However, the cost of greening the national economy would be lower if there was trade in abatement options, such that rich individuals would receive tax exemptions when they take care of abatement in poor neighbourhoods. This sounds abstract, but there is a variety of ways to generate such a transfer. One possibility is to levy a uniform energy tax on fossil energy and use the proceeds to subsidise the building of alternative energy infrastructure in poor neighbourhoods. In a first-best situation, earmarking and subsidising of goods without positive externalities cannot be optimal, but in the second-best setting (in which no personalised lump-sum transfers are available), investing in energy infrastructure seems to be a feasible and relatively less distortionary way of redistribution.

The link between income distribution and the burden of environmental policy is also relevant in richer countries. For example, in the United States an energy tax is likely to be regressive and thus energy taxation would worsen the income distribution (equity) if not compensated by redistributive measures. Carbon taxes are usually thought to be regressive (see Büchs *et al*., 2011, for a survey of the literature), but this is not generally the case because there are two opposing forces at work. On the one hand, the expenditure side matters: energy is a basic good (not a luxury good - although flying might change the picture) so energy taxation disproportionately affects poor energy users (*i.e.* the price index of their consumption basket increases relatively more). On the other hand, there is an effect through income: if high-income groups derive their income mainly from energy-intensive industries, then the rich are the ones mainly hurt by taxation. In the US study by Oladosu and Rose (2007), coalminers are relatively rich so they spend relatively little on energy; however, their real wage still falls because their earned income is very sensitive to energy taxation.

The picture necessarily varies over countries. In Africa, the elite own natural resources. When this is oil resources, a global carbon tax is pro-poor. In Latin America, the elite hold land and therefore the green policies in the form of bio-fuel subsidies are pro-rich.

Technological change has a big role to play when dealing with distributional issues. The introduction of energy efficient appliances (but also low-emission cooking stoves) largely reduces the abatement costs of the poor and enhances their capacity to contribute to environmental improvements (Table 4.1). Hence, technology-driven green growth may very well be inclusive for the poor.

Green growth meets inclusive growth: international policies

We shall now consider the links between green growth and inclusive growth in an international context. In particular, we shall consider how environmental policies can be compatible with growth in the low-income regions of the world. We shall focus on climate change policies since climate change poses the main challenges in terms of international coordination. How should green growth policies be designed to reflect the differences in opportunities and needs across rich and poor countries?

The first key question is how the abatement efforts should be divided among different countries. The standard economic recommendation is to impose a tax on harmful emissions of a global pollutant, with the tax uniform for all emitters across both sectors and regions. The idea behind this is that one unit of greenhouse gas emissions does the same harm, no matter where it is emitted. A given target of damage reduction is therefore cost-effectively met if the total cost of reductions is minimised, which requires equal marginal costs at all sources. However, we should be careful in specifying what we mean by cost. Of course, ideally this is cost in terms of welfare or utility, rather than "(international) dollars". Hence, welfare-cost-effectiveness requires the marginal utility of emissions (or, equivalently, the marginal utility loss from emission reductions) to be equalised across sources. Poor LDCs have higher marginal utility from production and consumption than rich LDCs, and hence face high abatement costs. The money-equivalent carbon tax in the poor countries should be much lower than in the rich countries (Eyckmans *et al.*, 1993; Chichilnisky and Heal, 1994). Surprisingly, the differentiation of the carbon tax is derived from an efficiency argument, since it maximises the sum of utilities. It is not motivated by equity concerns *per se* - in other words, the differentiation is not designed as a policy tool to affect the income distribution.

Note that this argument is about burden sharing in a second-best world. First, if transfers were possible, the first best in achieving global welfare maximisation would be to redistribute income to poor countries such that the marginal utility from production becomes equalised and uniform carbon taxes are again optimal. Second, the Chichilnisky and Heal argument starts from a missing market: each country has its own abatement options and there is no trade in these options. The Kyoto protocol has introduced a kind of trade in abatement, in the form of the Clean Development Mechanism (CDM). When developed countries (DCs) finance abatement in LDCs, the former can replace high-cost domestic abatement by low-cost foreign abatement, and the LDC gets a transfer that is at least sufficient to cover the cost of abatement. However, CDM is under considerable attack. Monitoring problems and "additionality requirements" make it imperfect, and this, together with the low transfers from rich to poor, ensures that the Chichilnisky and Heal argument maintains its force.

However in the future, the argument may lose ground. Growth is faster and more robust in many low-income countries compared with that of high-income countries. The OECD Development Centre (2010) reports that a remarkable and significant shift in wealth has become increasingly pronounced, from the old rich to the new emerging countries. Convergence between poor and rich regions has accelerated since the early 2000s and a growing number of countries have joined the group of converging countries. With smaller income gaps, efficient carbon taxes should converge internationally. A successful inclusive growth strategy will simply speed up the international income convergence process, thus stimulating cooperation in climate change action.

Furthermore, actual taxes on fossil energy should not only reflect the damage from global warming, but also consider local, country-specific damages. A country's attention to energy security and its potential desire for a reduction in fossil fuel dependence depend on the level of its own supplies of fossil resources. Local air pollution from energy use must be regulated and damage from this source could become an important concern in countries like China and India. It is these co-benefits of reducing local air pollution that provide an argument for low income countries to start taxing energy even before the income gap with richer countries is closed. The increase in household income and the change in life-style in emerging countries not only lead to expanded demand for material consumption goods, but also for immaterial goods, such as air quality and health.

Unquestionably, health-driven environmental regulation is important for all countries, even the poorest of the world. Ikefuji *et al.* (2010) compare the impact of fossil fuel usage on global warming and on local health. Aerosol particles related to energy usage cause lung and other respiratory diseases;

temperature increases affect malaria incidence. They find that in a Nash non-cooperative setting, poor warm regions suffer disproportionately from these health effects and they show that this has a significant impact on the poor regions' willingness to reduce emissions.

Extending the argument outlined above - that within a country, the poor cannot be expected to bear a large share of the burden of national environmental policy - we could argue that we cannot (yet) expect the poorest countries to incur costs to reduce their emissions. Instead, it should be rich countries that mainly finance any reduction in emissions in LDCs, whether this means substitution to cleaner goods and processes or by introducing new technologies ("Annex B countries" in the parlance of climate negotiations). The issue then is to find out how much has to be done in the North and how much has to be financed by the North in the South in order to minimise the (aggregate net present value) cost of green policies. Let's first look at where to reduce emissions and then concentrate on where to introduce green innovation.

Some experience has been cumulated with CDM as a policy tool to reduce emissions in countries other than those that bear the cost of reductions. Together with stimulating and facilitating foreign direct investment (FDI), CDM is also a policy tool for technology transfer: firms from Annex B countries get emission reduction credits for investments in non-Annex B countries that reduce emissions. The investment often involves technology transfer.

With CDM, abatement becomes cheaper on average because abatement can take place first where it has the lowest marginal costs. However, this is only the "static gain" from technology transfer. The dynamic gain, in the form of knowledge spillovers, may be more important. Lovely and Popp (2008) show that access to better pollution control technologies results in countries adopting environmental regulation at lower levels of per capita income over time. By allowing more FDI and CDM, the knowledge base on which domestic firms can build expands and this reduces the cost of environmental policy. The problems with CDM identified above typically refer to the static part of the story. The dynamic gains may very well offset the static losses.

The policy to enhance LDCs' knowledge base in green technologies is a long-term policy. In the short term, these countries will initiate their own emission reductions on a much smaller scale. It will also take a longer time before the knowledge base can be effectively exploited. The bottleneck is the limited absorptive capacity of the recipient country. Absorptive capacity describes a country's ability to do research and to understand, implement and adapt technologies that arrive in the country. It depends on the technological literacy and skills of the workforce, and it is influenced by such factors as

education, the strength of governing institutions, and financial markets (World Bank, 2008). Countries with greater absorptive capacity are more likely to receive spillovers from technology transfer.

Rosendahl (2004) derives some insights about when LDCs should think about green technology policies. He considers the situation that technological innovation (in the green direction) takes place mainly through learning-by-doing and he argues that in LDCs less learning takes place. The interpretation is that the DCs have the capacity to do R&D, and R&D will be more if the base is larger. So R&D to reduce abatement costs will increase with abatement, and hence with the carbon tax. The result is that in a second-best world with only carbon taxes (*i.e.* no technology subsidies), the carbon tax has to be higher in DCs than in LDCs. In other words, it is optimal for the world as a whole if the LDCs delay their implementation of a green policy. Note that the traditional view seems to be the opposite: LDCs have cheap abatement options (*e.g.* replace coal plants, cover methane fields) and therefore should do more abatement. The learning-by-doing argument is more about the timing: it is an argument to postpone abatement in the South while moving abatement forward in the North. Only in the long run, when cheaper technology has been developed in the North and has diffused to the South, should both regions reduce to the same degree.

One could wonder whether the analysis will change if the assumption of learning-by-doing in abatement was replaced by R&D-based cost reductions in abatement. From the seminal study by Goulder and Mathai (2000), we know that learning-by-doing calls for early abatement action, while R&D calls for a strategy of "first innovate, then abate". Suppose the North can do R&D but not the South. If so, the North should heavily invest in R&D first to reduce abatement cost, and then both regions can postpone abatement until the new abatement option comes on line. However, the crucial question is whether the North is still the only player in the world when it comes to improving abatement technologies. China and India are becoming serious technology players, certainly when judged by R&D expenditure per unit of GDP. The key question is, again, whether green innovation mainly benefits from R&D in general or one in green R&D. If the latter, there is no reason not to do R&D in LDCs.

Conclusion

A successful green growth strategy needs to cover a wide range of policies in order to deal with the specific characteristics of the countries in which it is applied, as well as the existing institutions and regulations in those countries, and the relevant nature of the environmental problems involved, which can range from short-term local problems to the long-term global

problem of climate change. Inclusive green growth requires attention to the role of the poor within countries and the burden-sharing between rich and poor countries. We have reviewed some of the possible policies, complementarities and opportunities for inclusive green growth and have focused on the interaction between the growth and the environmental improvements that arise from new technologies. Technology development can, in principle, help the environment and at the same time stimulate growth and reduce poverty, but this requires a balanced package of measures, as well as international coordination, appropriate burden-sharing rules and time-lines. However first and foremost, it requires international commitment to putting green inclusive growth on top of the policy agenda. While a first step has been made in this direction, it does not seem obvious that the political economy aspects of green growth will support enough further action in the future.

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Chapter 5

Fiscal democracy or why sound fiscal policy, budget consolidation and inclusive growth require fewer, not more, attempts to control the future

C. Eugene Steuerle*

Tackling deficits is like treating a symptom, not the disease. Today's disease is largely related to something unique in all of modern history: officials who have increasingly competed to control most, all, or more than all of the resources that are likely to be available to government for the future. This has created four related economic problems: unsustainable long-term budgets; a weakened ability to conduct future counter-cyclical policy; fiscal sclerosis due to budgets being increasingly focused on consumption; and an aged set of policies to promote inclusive growth. Meanwhile three political dilemmas arise: a decline in fiscal democracy and in the related ability of each generation of voters to decide what it wants to do with the revenues that accompany economic growth; a classic prisoners' dilemma where both the political left and right lose by acquiescing, respectively, to spending cuts or tax increases; and difficulty in "fixing" government, since to do anything new requires reneging on some past promise.

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Introduction

This paper will address some of the implications of the long-term budget problems that derive from attempts by policymakers to control the future of expenditure and tax policy for decades to come. The focus, however, will not be on what happens when and if these systems blow up when they continually run large deficits, for which there is a growing literature (Burman *et al*., 2010; Cottarelli and Schaechter, 2010). Instead, it will suggest that the problem facing democratic government is far greater than the deficit or fiscal sustainability or budget consolidation, as it is commonly described. Deficits or fiscal imbalances are merely symptoms of a broader disease, which I define broadly as the decline of fiscal democracy.

Accordingly, attacking short-run deficits, as valuable as that might be (or dangerous for short-run fiscal policy), never really addresses the disease itself, which is largely related to something unique in all of modern history: officials who have increasingly competed to control most, all, or more than all of the resources that are likely to be available to government for the future, not just for the present. Although there is variation across countries, for several decades legislators from almost all parts of the political spectrum have tried to put in place programmes with eternal growth, while reducing the taxes that would support those promises. The consequence: removal of the give or slack necessary to meet new economic opportunities and crises, as well as to respond to changing democratic demands. When combined, these legislated and multiplying pre-emptive promises command ever larger shares of many countries' resources, while restricting the taxes that current generations pay to fund the future benefits promised (often to themselves, after they have stopped paying taxes). This creates the following four related economic problems, which mistakenly tend to be treated as separate diseases:

1. Long-term sustainability. Long-term deficits - that is, deficits that mount if today's policies do not change - become unsustainable and threaten economic viability.
2. Short-term or counter-cyclical policy. The ability to conduct short-term counter-cyclical policy - a different issue than sustainability - is threatened.
3. Fiscal sclerosis. Budgets increasingly reflect those of declining nations - tilted towards spending ever larger shares on consumption and leisure, and threatening investment, including education and children. Sclerosis can also be enhanced during periods of fiscal tightening that leave even less "fiscal space" for investment

4. An outmoded set of social welfare policies inadequate to provide inclusive growth. Sustainability and sclerosis issues aside, social welfare systems at the margin become increasingly unfair, inefficient and regressive - as in the case of elderly policy, where decades of benefits per retiree become so expensive that government not only starts providing less for children and working families, but for older generations as well when they truly reach their later senior years.

Meanwhile, three related political dilemmas arise:

1. Fiscal democracy. The law now commands such extraordinary commitments of limited revenues to "mandated" programmes under rules written by yesterday's legislators that democratic decision-making is taken from today's and tomorrow's voters, placing fiscal democracy at risk.
2. A classic prisoners' dilemma. Without constitutional (not necessarily Constitutional) reform, both the political left and right are *correct* in assessing that they will "lose" by acquiescing, respectively, to spending cuts or tax increases to reduce deficits.
3. Difficulty in "fixing" government. To do anything new, substantively reform any major programme, or undertake most discretionary actions, elected officials must simultaneously renege on other expectations - telling people they are no longer entitled to some higher benefit or low tax already promised.

Why it really is different this time

Before elaborating on each of the four economic and three political problems, I build my case around a simple index of fiscal democracy that has now been developed for two nations - the United States and Germany -with hopes that it can be developed for other countries as well. The calculation in the United States is simple: what percentage of revenues is left after taking into account mandatory spending (entitlements) and interest on the debt. Mandatory spending in the United States basically covers permanent programmes that need no annual appropriations. It provides a good, albeit imperfect, representation of items to which people have come to feel entitled and from which even a lower growth rate is treated as a "cut". In different countries, of course, different legislative traditions require different interpretations of what might be "mandated" or analogously considered by the public to be a committed and permanent promise for the future.

The largest and most important tax subsidies tend also to be permanent in nature and in theory should be included in a definition of mandatory

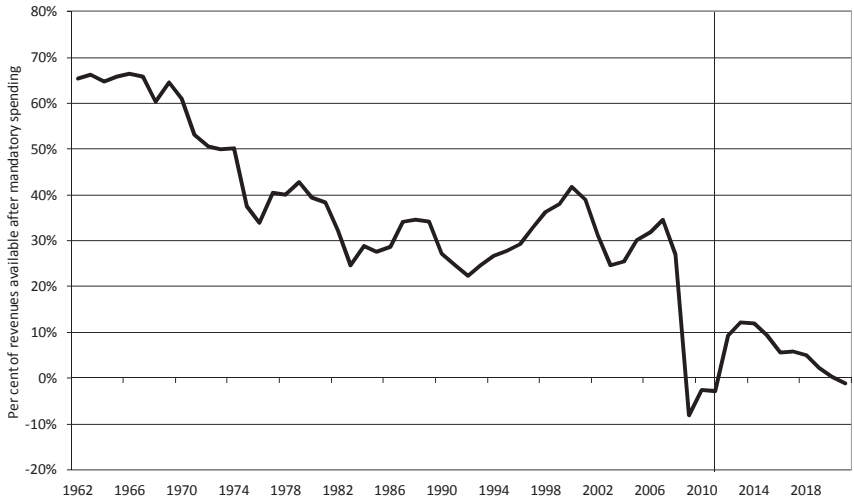
spending. For reasons of accounting that I will not discuss here (OMB, 2011), however, these types of expenditures are treated as a reduction in tax revenues. Nonetheless, that accounting issue has little effect on the measure of fiscal democracy since it is reduced whether there is an increase in direct mandatory spending or an increase in the subsidies provided through the tax code.[1]

The index itself is more or less neutral with respect to any conservative versus liberal political debate over size of government. Both tax cuts and increases in permanent or mandatory spending reduce the amount of slack in the government budget and increase the share of the budget more under the control of past, as opposed to current, legislators.

In the United States in 2009, for the first time in its history, all revenues essentially had been committed before Congress walked in the door. While the trend was accelerated in 2009 due to the recession, the index will become even more negative within a few years under reasonable projections of current law. Thus, all discretionary spending and any increases in mandatory spending or tax cuts require either more borrowing or taking back some promise from someone. But even Germany, often considered well ahead of most countries in the OECD in limiting one symptom (deficits) currently, has the same disease (Figure 5.1).

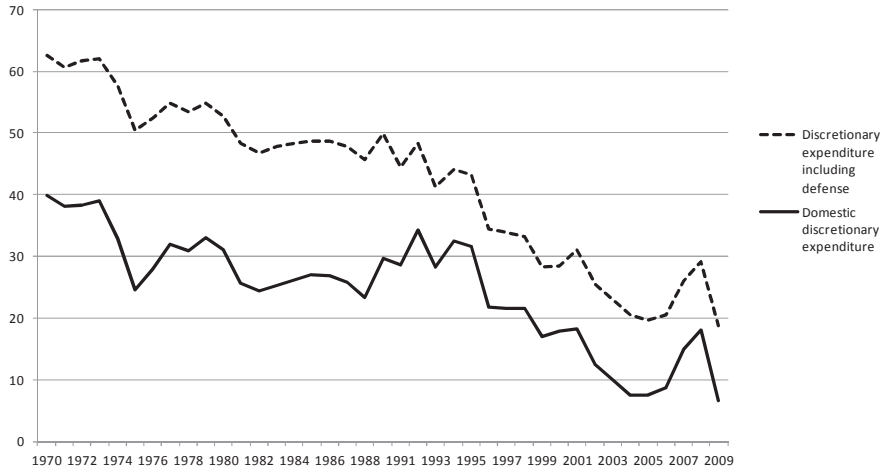
I am certain similar calculations for many other countries will produce the same result: over the past few decades—and, under current laws, continuing well into the future—an ever-rising portion of available revenues will be considered to have been committed by past legislatures and parliaments. The degree and timing may vary, but the overall direction is the same, with three caveats about the variation across countries and time.

Figure 5.1a. Fiscal Democracy Index, U.S. Federal Government



Source: Steuerle (2010), updated, with assistance from Timothy Roeper and Stephanie Rennane.

Figure 5.1b. Alternative Fiscal Democracy Index, Germany



Source: Streeck and Mertens (2010). Source for federal government data: Bundesfinanzberichte 1975-2010, see also: http://www.mpifg.de/pu/workpap/wp10-3.pdf.

- First, a brief review of health and retirement programme data from many countries appears to show that the combination of several factors - including the temporary labour supply provided by a baby boom generation, long periods of economic expansion prior to the Great Recession, low interest rates and, in some countries, tax increases - sometimes led to stable or very modestly declining indices during the 1990s and the first decade of the 20th century up to the Great Recession. Thus, in developed countries, the decline in fiscal democracy seems especially concentrated in the early post-World War II decades and in the future, despite some temporary reprieves. In the latter case, interest costs from the Great Recession combine with ever-increasing health cost growth and the effect of demographics on both health and retirement systems.

- Second, the calculations are made more complex by: (a) comparing centralised systems with more federal systems, where there may be relatively more discretion at the regional level and less at the national level; and (b) comparing governments with and without "private" pay-as-you-go systems, such as unfunded pensions that are mandated on the private sector but do not show up in government accounts.

- Finally, the story for middle-income and developing nations is more complex. For those with high economic growth rates, or a large current ratio of the young to old, the fiscal index - a measure of the degree of prior commitments - may be more moderate in size or delayed to later generations. At the same time, these nations may still face two dangers: copying the style of social insurance commitments of more developed nations in ways that reduce fiscal democracy too much in future years; and, in the interim, leaving inadequate "fiscal space" for making investments when fiscal consolidation is under way (Ley, 2009).

By asserting that this budget situation is unique in history - and even dangerous - I do not mean to claim that other budget crises, such as those that arose in the past from war or depression, were somehow less severe. Only that its unique application to this time requires unique solutions.

This story requires a merger of economics and politics. Throughout most of history, spending was discretionary, while revenues grew with the economy. Hence, long-run budgets - defined as future spending under "current law" - would have always shown (had the calculations been made) future surpluses (see Figure 5.2A). Legislatures could use these potentially available surpluses to spend or cut taxes according to the needs of the time or

the whims of voters. Although elected officials occasionally might do so (particularly in time of war), they didn't necessarily have to rescind some past promise for growing spending or lowering taxes to be able to do something new.

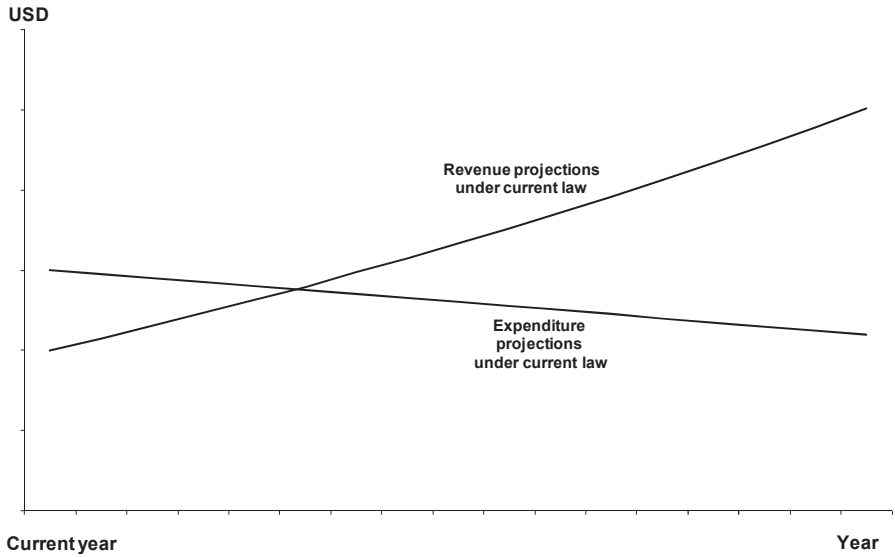
As a simple example, suppose that because of recession or temporary profligacy, all spending was discretionary at 120% of revenues in a given year. Even if that spending were committed at some constant real level into the future, it would represent an ever-declining share of future taxes. After all, those taxes could be expected to grow under almost any revenue regime, even a tariff. For instance, suppose that a roughly proportional tax rate system resulted in revenues rising by 3% each year as the economy grew at the same rate. Then, long-term estimates of what "current law" entailed in the future would show no deficit within about six years. After about 30 years, about half of all future revenues would be left up to the choices of future legislators.

The traditional amount of give or slack in the projections of a current budget into the future was normally even greater than this example. Most likely, the amount of future discretionary spending that might be considered obligated under any "current law" would decline (rather than remain flat, as in the example); after all, at some point the past spending on building each new post office or battleship would end. Also, progressive tax systems often caused revenues to rise faster than the economy. Typically, then, legislators came into office with significant amounts of money to appropriate.

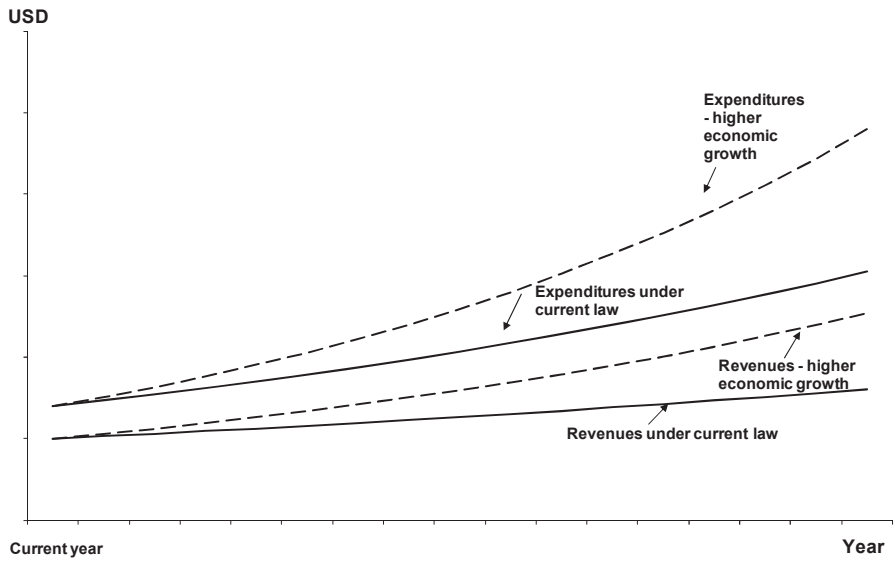
It wasn't so long ago that this slack or give in the budget even led to debates over "fiscal drag" - potential economic contraction in the absence of future spending increases and tax cuts (CEA, 1964; Packer 1965; OECD, 2008).

Figure 5.2. Revenues and expenditures

A. With flat spending



B. With growing spending



Source: Author.

Here it is important to make another subtle but crucial distinction. As legislators attempted to control more of the future, they did not just establish programmes with promises or expectations that were eternal, they also built growth into those programmes. Thus, it was the automatic growth in many of these programmes - not just their permanent (or, in the language of the United States, "mandatory") aspects - that led in many cases to expenditure curves eventually rising faster than revenue curves (see solid lines, Figure 5.2B).

Why economic growth is not enough?

Would not higher levels of economic growth push up the revenue curve so that it could start to grow faster (its slope would be more steep) than the expenditure curve? The answer, in a number of cases, is no, largely because the programmes are often designed so that when the economy grows faster, they grow faster (see dashed lines, Figure 5.2B).

Let us begin with retirement programmes where there are three factors - life expectancy, fertility, indexing of annual benefits - that play out not only within social security systems, but on economic growth and on the budget in ways that stretch well beyond the social security systems themselves. Thus:

- Social security systems are often indexed to grow with wages; the faster that wages grow, the higher the benefits paid to future retirees.

- The chronological age for benefit receipt, with some minor exceptions, is often kept constant or raised at a slower rate than life expectancy. Thus, ever-more years and often ever-larger portions of a person's life become eligible for social security benefits. For decades in many countries, much of the resulting long-term impact on spending relative to revenues was masked by the increase in workers (and the taxes that they paid) due to women entering the workforce and a baby boom glut.

- A decline in the birth rate adds to the decline in the worker-retiree ratio within social security, but any impact on government cash flow can be hidden for decades, especially when a baby boom glut intervenes initially to increase the supply of available workers.

- Finally, scheduled declines in worker-to-retiree ratios (because of the additional years of benefits and declining birth rates) have some of their biggest effects outside the social security system - on lower output and income due to a decline in adult employment rates and on revenues from income taxes.

Some countries have begun to make adjustments to these ageing pressures (which also play out on health programmes, as discussed below), although those efforts have often proven inadequate (OECD, 2005). Japan, Sweden and Italy, for instance, have moved towards notionally defined contribution systems that automatically pare benefits to keep systems closer to longer-term balance. However, even the most effective of such adjustments do not create any new "give" or slack, and the retirement programmes still grow largely in line with, although perhaps at some point (almost always in the future) no longer faster than, economic growth. Even reformed retirement systems, I should also note, focus narrowly on retirement system balances: they usually do not adjust for the impact of higher ratios of retirees-to-workers on the rate of growth of economic output itself and on lower income tax revenues due to this lower economic growth.

Next, let us consider health benefits. In addition to the pressures that arise with the greater health demands of an ageing population, almost all government health insurance programmes grow automatically to accommodate new discoveries, drugs and methods - not to mention modern science's increasing ability to identify diseases and disabilities, both physical and mental (Cottarelli and Keen, 2010). Health care is also considered by some to be a superior good: we demand an increasing portion of it as we get richer. In that case, a faster-rising economy leads to an even larger increase in the demand for health care. Of course, in those parts of systems where patients pay close to zero at the margin for additional health care services, health care demand also stretches toward infinity. Thus, health costs also grow relative to the economy, especially in countries that do not exert budget control through regulation (price and quantity controls) or conversion of pay-for-fee services into premium support or vouchers. Even in countries with more global constraints, controlling health cost growth has proven difficult (IMF, 2010).

From the supply perspective, an open-ended definition of what can qualify as reimbursable health care leads to supply-led growth, and not always in the most efficient manner. As an example, one company executive told me that his company worked much more on drugs for chronic care, where reimbursements would be received for years, than on cures, where there might be a one-time payment. As a simple mechanical matter, moreover, the faster growth of an economy partially reflects a faster growth in growth of its industries, and that includes the health care industry.

Again, while there are significant variations among countries, these factors, which affect growth in the share of national income and revenues that is devoted to retirement and health care, are quite common. Regardless of whether the expenditure curve achieves a tipping point of eventual or actual unsustainability under some current law - so that its slope or automatic

growth rate (under current law) exceeds that of the revenue curve - more built-in promises still reduce fiscal democracy. Even if they are finally made sustainable, these large retirement and health programmes can still leave little room for such fiscal democracy to operate if they continue to absorb too large a share of available revenues. Such lack of choice plays out not just across budget categories but within them as well (*e.g.* between payment for chronic care or cures). The more that past legislators build in permanent promises, the less the give or slack is available to future legislators (with this absence leading to a reneging of past "contracts" with citizens).

As noted, this decline of fiscal democracy can be true for developing as well as developed countries, even when the changes are masked by short-term factors, such as temporarily high economic growth rates or temporarily high birth rates. However, here I want to put in a very important caveat. Not all declines in fiscal democracy are bad and balance is required. A government can breed disrespect for the law either by making too many long-term promises that cannot or should not be fulfilled, or by failing to continue worthy commitments that should be sustained. For example, once eligible, retired people should be able to trust their government to provide a level benefit as they age, even if future generations of retirees should not be promised in advance an ever-rising and unsustainable growth in such benefits.

The revenue side

As the base for the fast-growing expenditure curves increased, particularly in retirement and health programmes, the compounding effect led to past promises absorbing an ever-increasing amount of revenue. Even if revenues were simply increased in line with mandated spending, legislatures would continue to witness ever-declining shares of the budget as discretionary.

While revenues often were increased in many countries during the post-World War II period, there have been periods of revolt. Jude Wanniski, who wrote for the *Wall Street Journal* editorial page, argued for a "two Santa Claus" policy in the United States: Democrats shouldn't be the only ones who can make unfunded promises as Santa Claus. Republicans should have their own Santa Claus - tax cuts that do not need to be matched with spending cuts. He also made the extreme supply-side argument that tax cuts would pay for themselves (Wanniski, 1976).

Looking back on his writing, I have come to conclusion that he was partially right about the potential for revenues to rise enough to reduce deficits, but for reasons that had little to do with supply-side economics. That is, normal economic growth can easily solve temporary fiscal problems as long as the budget is primarily discretionary, or there is limited automatic

growth in mandatory spending. Of course, for those projected reductions in deficits to be sustained, future Congresses must also restrain their instincts to increase spending or cut taxes.

When later viewing the budget numbers from the early 1960s, Wanniski might naively have concluded that the tax cuts did not lead to future deficits. However, given the discretionary budgets and the bracket creep of the 1960s, almost any economic growth - whether spurred further by the incentives or stimulus of a tax cut - would eventually lead to revenues growing fast enough to fill any gap caused by the tax cut itself. Thus, it did not matter whether the Keynesians or, later, the extreme supply-siders were right or wrong in arguing that the 1960s' tax cuts helped the economy. If right, the gap would be closed in a couple years; if wrong, the gap would be closed soon thereafter.

In the United States, however, the push for tax cuts that were unmatched by expenditure reductions eventually resulted not in a new Santa Claus at war with the old one, but rather in a cooperative venture that I call a "two Santa Clauses at the same time" policy. The United States got tax cuts and spending increases - in fact, domestic discretionary spending increases, defence increases and domestic mandatory spending increases - all at the same time. Measured as a percentage of GDP and excluding world wars, no decade in US history has been more profligate in that respect than the first decade of the 21st century, even independently of the Great Recession (author's estimates).

In recent decades, most countries in the OECD have been more willing to increase taxes as a percentage of GDP than in the United States and Japan, but at the end of the day they have still struggled to close the gap between automatically growing expenditures and revenues, much less leave slack.[2] See, again, the fiscal democracy curve for Germany, among the most successful of countries in working its way through the Great Recession without large deficits. On the other hand, many countries also have much worse demographic problems than the United States, which are now coming home to roost.

Extending the story to middle- and lesser-developed countries is again more complicated, as in these countries commitments considered by the public to be permanent might arise less from retirement and health programmes and more from promises of, say, free or subsidised food, water or electricity. However, the need for give or slack in these countries can still be serious, especially in the many cases where basic legal or other infrastructure limitations tend to limit what can be collected in taxes. Growth can still do wonders to create additional slack if the commitments do not grow automatically without new approvals over time (*e.g.* rather than occur automatically when, say, demand for subsidised electricity grows, or some commodity prices rise at an above average rate).

Let us now turn to the economic and political consequences of these developments.

Long-term unsustainability

The first economic consequence of this decline in fiscal democracy is receiving substantial attention today. It is now well recognised that unsustainable budgets are unsustainable. The Great Recession has merged traditional concerns over when short-run deficits might end with the newer and historically unique concern that they never end if mandated or more permanent programmes grow too fast and absorb too large a share of the revenues that grow with recovery.

The only major source of disagreement among economists on long-term unsustainability - perhaps because it is often expressed as a mathematical impossibility - is at what point large levels of debt endanger economic growth.

While fiscal sustainability is extraordinarily important, I fear that economists become too attracted to a non-growing debt-to-GDP ratio as a measure of success when such a minimum bound does not adequately account for a variety of risks (Baldacci *et al.*, 2010b). Thus, it is not surprising that the European Union's effort to keep deficits to 3% of GDP, which was largely an effort aimed at levelling out debt-to-GDP ratios, proved inadequate.

Of course, it might have been expected. Fascinatingly for today, the constant attention of legislators to a short-term deficit never really solves much when they continually run into the unfixed long-term problem. Fix the long-term, and the short-term is easier to bring around. However, budget processes that are built around the short- or even the intermediate-term typically leave them unprepared for future surprises - recessions, financial collapses, wars, environmental degradations, natural disasters - that can and should be expected.

Put another way, *the purpose of government is not to temporarily or even permanently adjust its debt-to-GDP ratio*! Such targets may be better than current practices, but they are almost inevitably doomed to long-term failure because they attack the symptom, not the problem, and neglect many needs likely to arise in the future, including the changing demands of the electorate that are almost never factored into mechanical formulas for measuring whether a budget is sustainable.

Short-term or counter-cyclical policy

Running short-term counter-cyclical policy and attacking the longer-term fiscal problem are confused in most people's minds because these tend to get labelled as "deficit" issues; however, it is entirely possible to engage in short-term counter-cyclical policy and maintain sustainable long-term budgets at the same time. For instance, one can lower taxes by $100 for one year and at the same time increase taxes by $20 each year thereafter - thereby providing short-term stimulus and long-term reductions in deficits and total debt.

Indeed, looking back at previous counter-cyclical efforts - accidental or purposeful, automatic or through legislation - short-term counter-cyclical policy generally did not put long-term budgets into jeopardy. I have already noted that in the early 1960s, automatic tax increases due to economic growth and bracket creep made it easy for long-term budgets to stay in balance when counter-cyclical policy was engaged. Even wartime policies often involved more permanent tax increases to pay for the temporarily large costs of war. Yes, there was still a danger of continual short-term deficits - for instance, extreme Keynesians might find the economy almost always in a recession, going into a recession, or coming out of a recession, and extreme supply-siders might always find a need for further incentives through more tax cuts. Still, these threats to the budget presented a different issue than today: future profligacy was not built into the budget but the result of consecutive and continual actions.

Unfortunately, prior to the recent Great Recession, many countries did not immediately put into place the scheduled spending cuts and tax increases that down the road would compensate for the increases in debt that were required during the downturn. Now, having failed in most cases to gain control over automatic spending growth, these countries' ability to engage in future counter-cyclical policy has become seriously threatened. In some cases, including the United States, there is a danger that the budget has become pro-cyclical as well (OECD, 2003). In most cases, I doubt whether a recession in the near term would be met by anywhere near the level of counter-cyclical policy that was used during 2009 and 2010.

A different "take" on this problem was recently presented by Ostry and colleagues (2010). Although fiscal space has been defined in different ways, they define it as the mathematical difference between the current public debt and the debt limit that is implied (or estimated) by the country's historical record of fiscal adjustment. They point out that at high debt levels, further increases in debt lead to dynamics that become unstable. While we might have discussed this under the topic of sustainability more generally, it also suggests that countries approaching this limit may become incapable of

engaging in counter-cyclical policy - hence potentially exacerbating the consequences of some subsequent downturn.

Fiscal sclerosis

A government might well succeed at attaining long-term sustainability or fiscal consolidation while engaging in policies that still reduce or deter long-term growth. The logic here is twofold: (1) allocating too many future resources on the basis of today's, not tomorrow's, knowledge is inherently inefficient; and (2) governments that devote ever-larger shares of their budgets to consumption must by definition be devoting ever-smaller shares to investment.

Imagine a business signing contracts into the indefinite future for the equipment it is going to buy. Anticipating that revenues will double in the next two decades, it signs contracts to double its equipment purchases over that time. Now the company, looking at its projections, might conclude that it can afford these purchases without additional borrowing. But its ability to respond efficiently to changes in demand, supply, and other opportunities would be greatly diminished. Or imagine a household performing similar actions, perhaps with the husband signing contracts for ever-more-expensive future vacations and the wife signing contracts for future houses to be built with specifications laid down today. While these examples appear outrageous, modern governments have been behaving in exactly this way. Such contracts simply cannot be well negotiated, since people today do not have the knowledge base that will only come available in the future.

The second aspect of fiscal sclerosis - the threat of too little investment - is not new. Both the Lisbon Agenda and the recent Europe 2020 strategy document (European Commission, 2010), for instance, gave attention to such goals as investing significant shares of GDP in research and development.

In developed nations, the anti-investment proclivity of these permanent contracts derives mainly from retirement and health programmes that shift ever-greater shares of the budget toward consumption (Baldacci *et al.*, 2010a). Admittedly, "investment" is harder to measure in the modern economy, as more of it is in the form of human, not physical, capital. Nonetheless, almost regardless of how one measures investment, the same conclusion holds. For instance, even before the Great Recession, Adam Carasso, Gillian Reynolds, and I undertook a study examining what was happening to the investment budget in the United States. What was clear was that despite growth in revenues over time - such as an increase in federal revenues of approximately $650 billion expected in a decade - almost nothing

was going toward increased investment (Steuerle, Reynolds and Carasso, 2007).

I have also led or participated in several related studies showing projected declines in the share of budgets devoted to children and to programmes that might be thought of as trying to enhance absolute or relative mobility (without judging their success).

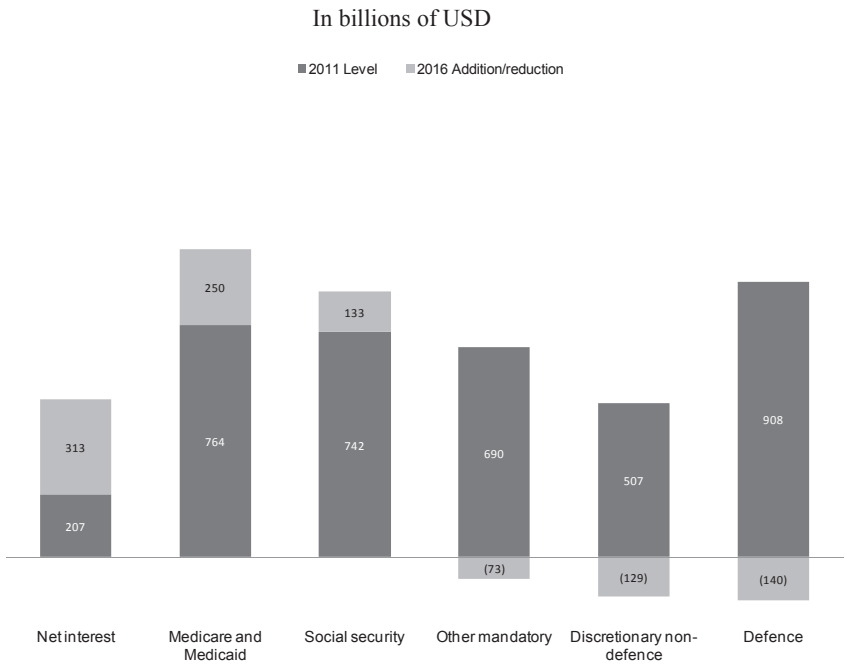
How I get similar or correlated results across these studies and under a variety of measures is easy to understand. Essentially, the growth in health and retirement benefits dominates the consumption side of the budget, while the remainder of budget tends toward decline as a share of total spending and of GDP. For a long time in the United States, some of the potential decline in spending on children or in non-defence, domestic discretionary spending as a percent of GDP due to the juggernaut of mandatory spending growth was deferred by a drop in the defence budget (from about 14% of GDP post-Korean War to about 5% today). Defence declines of even a fraction of that magnitude are not possible in the future. For most other OECD countries, the defence budgets fell much faster earlier in the post-war period. Among developed nations, Japan is somewhat of an exception on the investment and saving front, with its significant focus on infrastructure spending and with its large deficits being balanced in part by high individual saving rates, but its current demographics are especially threatening. Remember also that in a country with declining population, the workforce declines at a much faster rate than does the population.

Despite variation and perhaps a few exceptions, the orientation of almost all developed nations toward a consumption budget is fairly clear. In addition, because so much of this consumption is made available to those who retire (and often only available when they retire) or to those who do not work, these budgets increasingly disfavour productive activity.

An argument can be made that some of this anti-investment proclivity can be offset by greater reliance on consumption taxes (Lindert, 2003). He suggests, for instance, that economic growth rates in Europe have been maintained even in the presence of higher taxes partly because those higher taxes are largely consumption taxes. However, I do not want to stretch that argument too far, since higher consumption taxes also reduce the reward from work and saving. More importantly, minimising distortions in the tax system ignores behavioural effects on the spending side of the budget. There, distortions may well be greater than those arising from the taxes themselves - not simply because income effects make work and saving less necessary, but also because of the higher implicit tax rates from moving out of various support programmes. My own work has tended to show that 60% marginal tax rates and higher are common in the United States, as higher taxes

combined with reduced benefits (Steuerle and Carasso, 2005). Countries with larger social welfare sectors are likely to have even higher explicit plus implicit marginal tax rates.

Figure 5.3. The U.S. President's priorities for changes in outlay



Note: Medicare outlays assume Sustainable Growth Rate relief is continued through 2016. Other mandatory includes unemployment insurance, SNAP (Supplemental Nutrition Assistance Program), other income security programmes, as well as disaster costs and funds reimbursed from TARP (Troubled Asset Relief Programme). Discretionary non-defence includes, among others, most education funds, and energy.

Source: Author's calculations. Data from OMB, FY2012 Budget.

In developed nations, this tendency toward fiscal sclerosis has been present for some time - independently of downturns or short-term deficits. The above-cited studies on investment, children and mobility in the United States were conducted before the Great Recession, but as already noted in another context, the short-run and long-run issues have merged. Thus, we must now also consider whether the fiscal consolidation that is under way in so many countries will add to the pressure on investment activities (OECD, 2003).

As only one example, Stephanie Rennane and I examined President Obama's proposed fiscal 2012 budget where he advocates strongly for increased "investment" - a vocal stance that is similar to that of many foreign officials. Yet his own Office of Management and Budget study on investment under his budget shows almost no increase in investment spending over one year. Then, given large proposed declines in discretionary spending (where most investment takes place), investment would likely fall significantly in future years (see Figure 5.3).

Put another way, partly because of the recession, investment falls in a category that is already being squeezed by growth in mandatory spending and low taxes, and the further deficit reduction that is required during the recovery from the recession puts on yet a further squeeze.

For developing nations, a parallel debate has arisen over give and slack in the budget but with less emphasis on the long-term and more emphasis on whether there is adequate investment-type spending during fiscal consolidation. Here the issue has also been defined as related to "fiscal space", and institutions like the World Bank and the International Monetary Fund (IMF) have given renewed attention to the mix of consumption and investment while deficits are being reduced. While suspending investment projects that have not yet been implemented may be easier politically, such efforts reduce a country's capacity to attain the growth that helps bring it out of its problems (Ley, 2009). As an empirical matter, a recent study on Brazil noted that "investments are the expenditures category that suffers the most when fiscal adjustments are implemented" (IMF, 2009).

An aged set of policies inadequate to provide inclusive growth

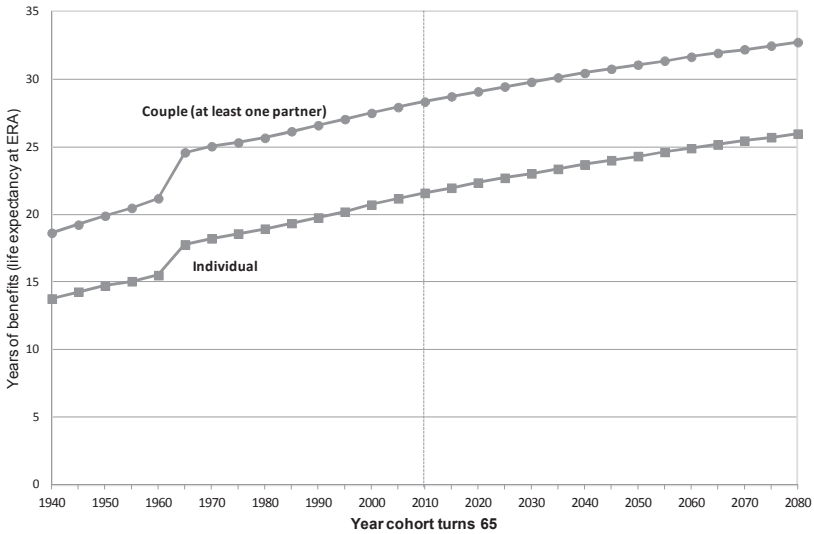
Most of the social welfare structure that has been created in developed nations has become aged itself, and in a way that works against equity and inclusiveness, not just growth or sclerosis. For instance, the continual expansion of years of retirement support (see Figure 5.4) is neither progressive nor good for the macro-economy. It provides more benefits to higher-income than to lower-income individuals (higher-income people receive higher benefits and so gain more from additional years of support). By encouraging retirement for ever-more years, it reduces output in many of the same ways as an increase in the unemployment rate. It reduces personal income and saving rates (more years of dissaving, fewer of saving), as well as income tax revenues. In fact, its impact on deficits within a social security system may be the least of the problems it creates (Steuerle, 2011).

More generally, as social welfare programmes extend significant support towards half or more of the population in developed nations, simple

arithmetic on shares of the pie tell us that the share of spending that is devoted to, say, the quarter of the population with the greatest needs is likely to decline. As a specific example, in the United States, over half of social security spending for males used to go to those in the last 10 years of their lives; today the fraction approaches a third.

Figure 5.4. Expected years of retirement benefits, earliest retirement age

Couple (at least one partner) and individuals



Note: Calculations based on mortality data from the 2010 OASDI Trustees' Report. Calculations for a couple assume that at least one partner is still living. ERA was set at 62 for women in 1956 and men in 1961.

Source: Author's calculations.

In discussing fiscal sclerosis, I noted the threat to spending on investment and children. But even if investment were maintained, I seriously doubt that many nations will address the broader issue of reform of these now aged social welfare structures until a process is under way to restore more give or slack in the budget. Again, even where growth or fiscal sclerosis is not the issue, a modern economy must continually adapt - if for no more than reasons of fairness - to changing family structures in designing its welfare programmes, and to changing needs (*e.g.* a rise in autism and Alzheimer's cases in allocating its health budget).

One hope is that past neglect of fiscal democracy was accompanied by a legislative process that largely resembled "first feeding at the trough"; that is, when spending increases and tax cuts were being enacted, they often went in relatively unprincipled ways to those who first got to their legislators. Others were pacified by their additional filling, however unfair the distribution of the larger pie. When addressing how to ask the public about how to pay for its government, elected officials seem to give principles more attention. They feel more compelled to justify their actions than when they are appearing to hand out money indiscriminately to everyone.

Fiscal democracy

These four economic problems - lack of long-term sustainability, less short-term flexibility to engage in counter-cyclical policy, a fiscal sclerosis that discourages growth, and an aged set of social welfare policies that often do not even meet the needs of the intended population - are made all the more difficult by the related effect on the political economy.

The extraordinary commitment by past legislators, and their attempt to control an indefinite future, puts into imbalance the political rights of different generations. I am not speaking here of simple generational accounting of net taxes or transfers to different generations. My political point is broader.

Future generations essentially are treated as adolescents who cannot make decisions for themselves. Self-styled liberals and self-styled conservatives claim to be in very different camps, but together they assert that they need to maintain growing benefits or low tax rates as a way of ensuring the right type of government for the future, defined as their type of government. But the liberalism and conservatism of any period - like all labelled "isms" - are largely defined by the period and less by any consistent set of principles. Liberalism and conservatism in 1965 had only partial relationships to what they were in 1900, so why should we think that some programme design in 1965 should command ever-increasing shares of the GDP in 2030 or 2065? Will future liberals believe that a priority of government is to grant a typical couple about three decades of retirement support? Will future conservatives think that deficits are free lunches rather than taxes left for future taxpayers?

Disputes over principles are not new. What is new is that they used to play out mainly in battles over *current* spending and taxes, leaving future levels of spending and taxes largely to be determined by what future generations decided to do. Once again, the give or slack to make those decisions was automatically provided by revenues rising faster than any

existing commitments. Larger government relative to the economy was still a choice, but was not required to finance commitments made in the past.

Today, the young are denied this way of making choices. Growing revenues, they are told, are already committed - and, in many countries, more than fully committed. Just to deal with the commitments made by dead or retired legislators, they are told that they must either raise average tax rates ever higher (and even that will not solve the problem) or deny to others (largely older generations) the benefits to which those beneficiaries feel that they have become entitled.

Let me be clear about this. I am not suggesting that legislation should avoid creating greater permanency in some of its legal institutions. I am suggesting that when the fiscal democracy index approaches zero for future years, we have gone way overboard in the growth that becomes attached automatically to such institutions. Furthermore, as long as tax cuts and spending increases can be hidden in future deficits, there are powerful political incentives to operate on the giveaway side of the budget (automatic spending increases and reductions in taxes permanently below spending levels) for the long term.

A classic prisoners' dilemma

This political problem is a classic prisoners' dilemma. Once competition in legislation evolved towards controlling the future and not just the present, it made sense for left and right, acting independently, to control it as best they could - before the other one did. As in any prisoner's dilemma, the solution requires processes that bind both sides of the political spectrum - in this case, to limited control over the future (*e.g.* to limiting to some reasonable degree the extent to which future scheduled revenues can be committed). Roughly speaking, there are limits below which the fiscal democracy index should not fall (although I am not suggesting that budget constraints should be explicitly tied to that metric in legislation).

Some argue reducing taxes below sustainable levels is a strategy to "starve the beast". This may be contrasted with a "feed the beast" strategy, exemplified by ever-rising levels of spending that eventually must be covered by future tax increases.

Bruce Bartlett argues that "starve the beast" did not work for the United States. For instance, he states that, following the Bush Tax Cuts in 2001 and 2003, "[s]pending did not fall in response to the [starve the beast] decimation of federal revenues; in fact, spending rose from 18.2% of GDP in 2001 to 19.6% in 2004, and would continue to rise to 20.7% of GDP in 2008" (Bartlett, 2010). Others might be tempted to argue, similarly, that

"feed the beast" does not work since taxes have not always risen to cover promised levels of spending.

Bartlett is right, but only half right. Lower taxes were not followed in recent decades by lower spending, but that does not mean that higher taxes would not have encouraged higher levels of spending. On the other side, Democrats suggest that the eventual success in reducing spending and deficits temporarily in the 1990s only gave impetus to later tax cuts. Indeed, George W. Bush initially argued for his tax cuts as a way of spending part of a newly available surplus.

Considered in prisoner dilemma terms, when either side makes a concession independently, it pays a cost. Nonetheless, this does not mean that any ex post measurement of one side or the other's independent, non-concessionary actions would show that they turned out to be optimal. In the prisoners' dilemma, it is the cooperation of the prisoners - perhaps agreement in advance to adhere to some set of rules they cannot later overturn - that yields the optimal solution.

Difficulty in "fixing" government

My final political economy point, which is closely related to the decline in fiscal democracy, is the difficulty in fixing government in the absence of give or slack. Voters and their elected officials rightly feel boxed in. They might want to do something new or different - for example, spend more on early childhood education - but to do so, it is no longer sufficient to find that choice superior to some other way of allocating the resources that are made available through the additional revenues that flow from economic growth. Now, they must simultaneously tell some other group that promises to it must be rescinded.

This raises misleading political debates, such as whether one is cutting health care spending to spend on education - when, say, health care is already growing at 6% per year and education is not growing at all. Similarly, in the past, one might have argued for tax increases to pay for even more expansion of spending than economic growth has made possible. However, today, that choice must compete head-on with tax increases simply to pay for what has already been promised (which may look to the public like a tax increase that gains them nothing) or to cut deficits. Looked at from the viewpoint of "scoring" legislative actions, new legislation when deficits are being cut gets caught in the bind of always having to take more away from people (tax increases, spending cuts) than new legislation will give back to them (tax cuts, spending increases). Furthermore, when built-in spending grows

continually at rates that are faster than the economy, no tax increase is ever sufficient to restore long-term fiscal balance.

One consequence of this can be political instability. The demonstrations that stretch from Athens, Greece, to Madison, Wisconsin, would have made no sense to our ancestors. Unlike past fights over shares of current profits or benefits for the currently unemployed, these fights are largely over presumed rights to resources that a future has not yet even produced. Moreover, they will not go away as long as government reforms aim merely to bring deficits back down to more sustainable levels (or in the case of some governments, like the individual states within the United States, Constitutionally-required balanced budgets). As I have tried to indicate throughout this essay, achieving some temporary minimum stability in debt growth relative to GDP still leaves no slack in budgets to meet new demands or emergencies. Many governments must still rescind a significant portion of the built-in growth that has been promised in other programmes.

Conclusion: towards a long-run solution

Many of the issues I have discussed in this paper - sustainability, the consequences of the Great Recession on the ability to conduct future counter-cyclical policy, the impact of an ageing society, declines in investment, etc. - are not new. Nor is it new or surprising that elected officials want to operate on what I call the giveaway side of the budget - tax cuts and spending increases - or that they engage in brinksmanship (especially in a two-party system).

The extent to which these problems have grown, however, has become alarming, and a major common cause that exacerbates all of them - the extraordinary efforts to control the *future* of spending and taxes - is unique in modern history. I have tried to prove this point in part through the very simple device of a fiscal democracy index. My strong view is that attempts to attack these problems without dealing with this fundamental cause are doomed to failure - like treating symptoms but not the underlying disease, or to use another analogy, like trying to fix a wagon that is breaking apart while rolling headlong downhill. Such efforts are fine in their own right, but the wagon simply cannot be kept together long through such fixes.

If one wants to attain sustainable budgets, leave room for emergencies and shorter-run counter-cyclical policy, remove the fiscal sclerosis that derives from a budget that is devoted ever more to consumption, and modernise aged social welfare structures that do not even protect those they claim to protect, then one must simultaneously engage in political reforms that restore fiscal democracy to all generations, tackle the prisoners' dilemma

that deters cooperation from the political left to the political right, and remove a dangerous decision-making process that continually requires policymakers to renege on past agreements to do anything new.

Only large-scale system reform can do the trick and it involves far more than narrow attention to deficits and debt-to-GDP targets.

At its heart, I believe that these are constitutional (not necessarily Constitutional) issues. We must put in place the structures that constrain the extent to which current policymakers make promises for the future for which they are not willing to pay. At the same time, we must place further strictures on the ability to enact even more new laws that attempt to restrain the future. Many, but not all, of these constitutional changes can be achieved simply by restricting or eliminating built-in growth in programmes and promises that people have come to expect, as well as extraordinary constraints on tax increases. That does not mean that programmes cannot grow, only that those decisions generally must be left to the future democratic choices of voters and their elected officials.

When I say that the limits must be constitutional (not necessarily Constitutional) in nature, I am cautious. The past notion that budgets must be balanced was a constitutional practice that was reinforced mainly by a fiscal ethic that we should limit the level of debt that we pass to future generations. It was an imperfect practice, especially when it discouraged counter-cyclical policy, either automatic or legislative, to operate. As much as new budgetary strictures and rules are required, they, too, almost assuredly will have defects. Thus, I am hesitant to give them fairly permanent Constitutional basis. Realistic enforcement mechanisms can involve everything from requirements on the chief executive or prime minister only to offer budgets that are balanced over the economic cycle, to fiscal councils that can "shame" elected officials from violating sound budget practices, to legislative rules on how much can be promised for the future when it is not supplemented by tax rates that are high enough today to support such structures.

For middle- and lesser-developed nations, I have tried to make distinctions, especially where any current index of fiscal democracy may not yield a low score that appears immediately troublesome. This does not mean that they still do not face the older, more traditional, budgetary threat of continual annual profligacy. Such fiscal habits can cause problems as bad as or worse than those created by the newer fiscal democracy problem that we have addressed here, where fiscal binds are built into the future. Then, too, developing nations must also ask how far they should go in parodying the developed nations that have tried to lock in most, all, or more than all of their future revenues for the priorities of today, not tomorrow. A balanced approach to these issues involves reinforcing the rule of law: meeting

reasonable expectations for fulfilling worthwhile longer-term commitments, while avoiding locking in *growth rates* and eternal *permanency* into programmes in such a way that both expectations and the law must eventually be overturned.

Notes

1. The one exception to this almost parallel treatment is for a subset of tax subsidies - generally of lesser magnitude - that are temporary, rather than permanent, in nature.
2. Occasionally there have been attempts to fund some new commitments up front - or at least use present value accounting so that some future costs are reflected as current, not future, expenditures.

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Chapter 6

Sequencing public interventions to support techno-entrepreneurship

Morris Teubal and Yevgeny Kuznetsov*

While the area of innovation studies is extensive and rapidly expanding, analysis of innovation policy is much less developed. A view that policy applications can be inferred linearly as an afterthought of positive analysis parallels the logic of a linear innovation model, whereby innovation is almost a straightforward outcome of either university research or company R&D. Taking as an example Israel's cluster of technology start-ups and venture capital industry, the paper develops a theory of innovation policy as an endogenous variable. A three-phase model of innovation policy evolution is introduced, as well as directions for the adaptation of the model for middle-income economies.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

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Introduction

While the area of innovation studies is extensive and rapidly expanding, the task of extracting usable policy implications has only developed in a rudimentary way. In an extensive review of evolutionary economics, Fagerberg (2002) concludes that, based on an evolutionary perspective, "one cannot draw very firm conclusions on policy matters". A similar point is made by senior policymakers and practitioners involved in developing innovation clusters and techno-entrepreneurship, particularly in the middle-income economies of post-socialist countries, Latin America and Asia. These policymakers are very well aware of what to do in terms of the "wish list" of required actions to overcome constraints. Put another way, while the list of the constraints to be overcome might be largely understood, there is as yet no systematic knowledge about the evolutionary processes leading to (eventual) endogenous growth, *i.e.* a process by which, at any moment of time, the remaining constraints are overcome within the national system, with policy (itself already being largely endogenous) playing only minor roles in the process.

A view that policy application can be inferred linearly and in an almost "trivial" fashion as an afterthought of positive analysis parallels the logic of a linear innovation model, whereby innovation is almost a straightforward outcome of either university research or company R&D. In contrast to this view, we suggest that positive analysis is only one input in our understanding of policy issues, and policy design and implementation; other issues include those related to context, to the policy system itself and to the policy process.

In this paper, an endogenous policy process is viewed as:

- Trial-error search and experimentation by policymakers into new approaches and institutional solutions, which respond among other things to stakeholder needs, with the objective of overcoming critical market/system failures and/or government failure,

- Anticipatory thinking that links current policies and possible future policies in response to learning, and new opportunities and threats, and

- Readiness and disposition to adapt or complement and/or replace policies ("policy selection") in response to actual or expected performance (due consideration being given to possible costs to stakeholders of too frequent changes of policies).

To stay focused, the object of our analysis is limited in a number of ways. First, we confine ourselves to the process of creation of entrepreneurial

systems, including the institutional infrastructure that supports them, for example, the incubation cycle of technology start-ups (SUs) and spin-offs. While this is a narrow segment of innovation policy, which is of little relevance in low-income economies (where a broader approach to innovation is usually adopted, see for instance, World Bank, 2010), we consider some implications for mid to low-tech entrepreneurship in middle-income countries. Second, we break the policy process into evolutionary phases, rather than view it as a continuous, open-ended activity of adjustment and change (Avnimelech and Teubal, 2008a). Other approaches view policymaking as bootstrapping; as a continuous search for possibilities; and as follow-up in terms of implementation, and of detection and correction of inevitable errors and mistakes (Sabel, various years). Third, in terms of methodology, the paper relies significantly on the judgment, experience and observations of a seasoned practitioner. Thus, we cannot document every statement with a reference to the literature, as is customary in academic publications.

The argument is developed in four steps. We start with key definitions (such as institutional infrastructure for techno-entrepreneurship), the analytical framework (the three-stage evolutionary model leading to the endogenous emergence of techno-entrepreneurship in the sense of an entrepreneurial cluster/system) and the problem of critical mass of innovative, entrepreneurial companies (high-tech SUs or innovative SMEs)

We then discuss in detail the "three-phase model" as applied to Israel during 1969-2000 and extend the model to cover middle-income economies that have relatively developed R&D and human capital capabilities but a highly fragmented innovation infrastructure.

We also introduce the notion of *Framework Programmes*, which lie at the Phase II-III interface of the three-phase model. Finally, we note that every success is relative. While Israel was very successful in terms of high-tech development, it was much less so in terms of impact on inclusiveness and even on aggregate growth. We then conclude.

A key issue in the emergence of institutional infrastructure for techno-entrepreneurship: the problem of critical mass

In middle-income economies, the search for and incubation of new entrepreneurial niches often occurs in a rigid institutional environment that is full of vested interests. However, while the public sector may be dysfunctional, it can also be characterised by a large internal diversity, with pockets of excellence within individual ministries or implementation agencies. By supporting the emerging entrepreneurial segments, a virtuous

dynamic of continued entrepreneurial growth and public-private co-evolution may be ignited. Thus, public-sector talent and entrepreneurship that leads to new policy initiatives and Schumpeterian private-sector entrepreneurs are two indispensable and complementary facets of self-discovery; indeed, two sides of the same collaborative process.

One can think of such a collaborative process evolving in the following four-dimensional way, with the first dimension reflecting innovation entrepreneurship and the other three reflecting the institutional infrastructure to support it:

1. number and sectoral composition of firms,

2. specialised infrastructure - *e.g.* science parks, incubators, innovation centres, etc.,

3. professional business services firms - *e.g.* offering tailored services in accounting, tax, marketing and product design and development, and

4. venture capital firms.

A three-phase evolutionary model of emergence of entrepreneurial systems

We propose a three-phase model of evolution of entrepreneurial systems and support structures (techno-entrepreneurship). Its roots lie in an innovation and structural change-led perspective to economic growth and development with roots in Schumpeter; in the industry life cycle "model" (*e.g.* Abernathy and Utterback, 1969); in evolutionary economics (e.g. Potts, 2000); and in the context of the recent literature on venture capital and entrepreneurship (e.g. Lerner, 2008) and venture capital policy (Avnimelech *et al.*, 2010, Rosiello *et al.*, 2010).

Phase I is a set of preliminary, *background conditions,* which define whether or not countries may be able to develop an entrepreneurial system *in the medium term*, the materialisation of which would involve a number of other factors, both endogenous and exogenous. Background conditions are early, very basic, *necessary* conditions. They include both the usual "framework conditions" and others, such as the quantity and quality of Science, Technology and Higher Education (STE) institutions. Not every country could reasonably aspire to develop high-impact entrepreneurial systems. The conditions of Phase I would differentiate between those countries that could in principle do so from those which could not.

Phase II defines a set of immediate *pre-emergence conditions* for the subsequent emergence of entrepreneurial systems during Phase III. Pre-emergence conditions involve two sets of factors, one related to entrepreneurship and their support structures and another related to the broader national innovation system. The first set of factors relate to the scope, variety and mutual adaptation (jointly with entrepreneurial organisations like innovative SMEs or high-tech start-ups) of *both* venture capital and other financial institutions which provide financial services *and* "added value", as well as institutions and other agents providing technical and other services to such organisations. A critical pre-emergence condition which will be the focus of this chapter is *a critical mass of high-tech start-ups or innovative SMEs* required for the emergence of a domestic venture capital industry and/or market. Factors related to the broader national innovation system include the quality and scope of STE infrastructure; the institutional framework (*e.g.* bankruptcy laws); possibilities of creating distinctive types of financial organisations, such as Limited Partnerships; whether it is legitimate or not for the government to support or subsidise private organisations; innovation policy capabilities; etc. Pre-emergence conditions are *immediate necessary conditions* for the emergence of entrepreneurial clusters, and they include a large component of idiosyncratic factors.

In Phase III an entrepreneurial system *emerges* as a result of *dynamic increasing returns to scale*, a process that may or may not be triggered by policy. The entrepreneurial system is a Higher Level Organisation or System, which in the context of this chapter refers to a new cluster involving large numbers of innovative organisations (including an important segment of high-tech start-ups and/or innovative SMEs active in mid or low-tech branches/technologies) and associated financial and other support structures. The process of emergence could be very fast, possibly involving numerous variables, not only those representing entrepreneurial organisations and the agents/organisations directly supporting them, but other agents, organisations and institutions as well. A major issue is whether countries in Phase II will make a transition to Phase III, there being no automatic mechanism for this to happen (see *truncation* of the evolutionary process, Avnimelech and Teubal, 2006). Sometimes the triggering and sustaining factor may be completely endogenous (*e.g.* market forces and other processes set in motion during Phase II). In other cases, a trigger of the emergence process may be a favourable change in the external environment and sometimes a combination of both favourable exogenous variables (e.g. the Oslo Peace process and the massive immigration from the former Soviet Union in Israel during the first half of the 1990s) and a *framework programme*, such as Israel's government programme *Yozm*a, which targeted a domestic venture capital industry and market.

Co-evolutionary processes could be critical. The Israeli experience strongly suggests that *innovation-innovation policy co-evolution* may be important for ramping up innovation and growth of innovative, entrepreneurial organisations in phases I and II, thereby mitigating the problem of critical mass. Moreover, co-evolution between *innovative organisations* (high-tech start-ups) and *private finance organisations* (venture capital) represented a key element in the country's Phase III emergence of a domestic venture capital market and industry and its embeddedness into a broader high-tech entrepreneurial cluster (Avnimelech and Teubal, 2009; Teubal, 2011).

The three-phase model is a framework for generating an *endogenous process*; namely a set of favourable pre-emergence conditions (Phase II) which could trigger, with or without the help of government, the successful emergence of fully fledged techno-entrepreneurship (Phase III). *Endogeneity* refers both to the process - which, once triggered, is largely independent of government policy - and its consequences; namely, that the entrepreneurial system or cluster that emerged will transform a start-up-oriented innovation process from government-led to private sector-led. The key role of co-evolution is illustrated by the Israeli experience starting in 1969 with implementation, by the OCS (Office of the Chief Scientist), of its initial and main programme, the *Grants to company R&D* programme. This programme generated a chronic "excess demand" for grants, continued expansion of budgets, new BERD (Business Expenditure on R&D) support programmes and the search for new private sources of finance for company R&D. These efforts led to the launch of the "Projects of National Importance" *programme* which was implemented in the second half of the 1970s; the BIRD-F (Israel-US Binational Industrial R&D Foundation) programme, which started in the early 1980s; and the US-oriented "angel investor" support of individual projects or companies (an early form of venture capital) in the early 1980s. The outcome of all of these changes in policy was a further surge in innovation. Subsequent co-evolution involving the original *Grants to company R&D* and other programmes were instrumental in generating a critical mass and the launch of the Yozma programme in 1992 directed to domestic venture capital and the eventual emergence of Israel's entrepreneurial cluster in the 1990s.

Key challenge: incubating the incubation cycle

The incubation cycle of a technology start-up can be conceived as consisting of four stages (Figure 6.1):

- Pre-incubation (tiers 0 and 1): this consists of tier 0, which is the proof-of-concept stage and is usually funded by grants, and tier 1, which

is the first informal but external funding stage from the three Fs (friends, family and fools) or, more appropriately named, business angels,

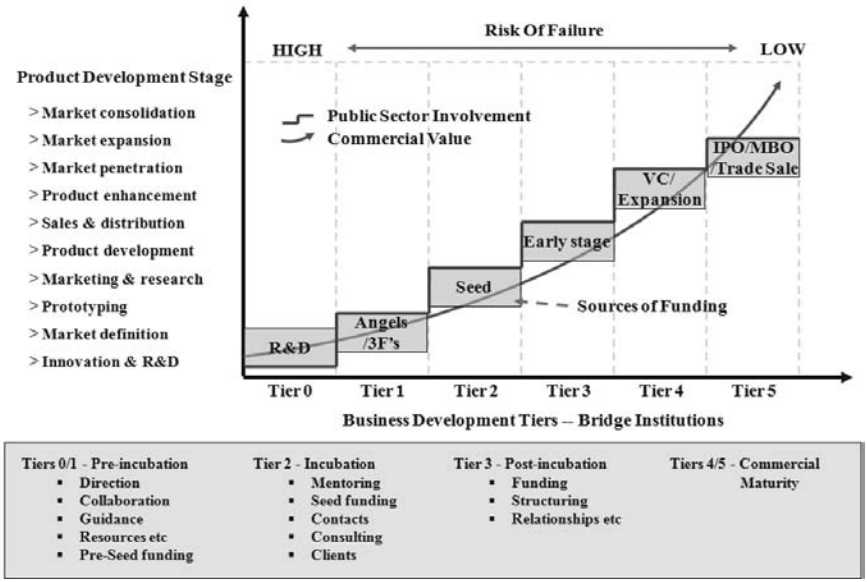
- Incubation (tier 2): the company develops a prototype and grows to establish a client base and receive seed money from institutional seed venture capital, represented mainly by large companies and other commercial sponsors. Funding is small (seed funds' investments usually do not exceed half a million dollars), whereas hand-holding of management is intensive and very time consuming,

- Post-incubation (tier 3): this is where early stage venture capital begins to play its role for those businesses that have already introduced their product to the market and have achieved a positive trading position that, through an injection of new capital, can be taken quickly to a higher level of success, and

- Commercial maturity (tiers 4 and 5): this is where larger development capital investments are made to accelerate the company growth and realise its full potential (tier 4) and its initial public offering (IPO) on a formal stock exchange, so enabling the company to raise capital in line with its expansion needs (tier 5).

At each stage of the injection of new capital, there are associated business service needs, which are also outlined in the diagram below. The provision of such services assists the enterprises to maintain their growth momentum and helps ensure a good return from the venture-funding activity by mitigating some of the risks that are inherent in setting up and growing a new business.

Figure 6.1. The incubation process



Source: Hodgson, 2006.

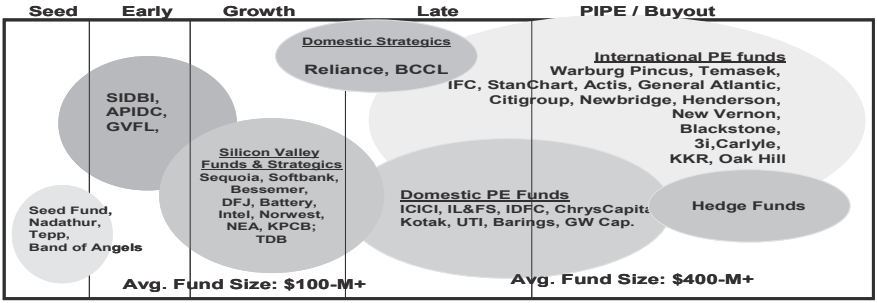
The traditional approach to supporting institutional infrastructure has involved a straightforward commercialisation function: each technology support agency focuses on and funds a specific stage of the incubation cycle. However, this approach has been facing a number of problems. *First*, the challenge of picking a winner. A SBIR grant to develop a pilot prototype can be as large as $1 million. Yet statistically, out of 1 000 ideas, early stage venture capital or a corporate sponsor will only finance 10 of them; and out of the 10 firms receiving finance, only one will be ultimately successful ("home run"), two to three will barely cover their costs ("living dead") and the rest will fail. If out of 1 000 ideas considered at the pre-incubation stage, there will only be one "home-run", then it is not surprising that everyone (*e.g.* state technology corporations, multinationals and equity investors) chases already-existing firms that may become successful in the future. So the first problem is a "doomed to choose" problem: one must make a choice (financing all promising ideas is plainly impossible), yet picking winners is plainly impossible too. Clear winners do not exist until very late: they are not picked; rather, they are generated (helped to emerge) within the incubation process. For instance, new industrial policy (Kuznetsov and Sabel, 2011) has recently emerged as a process for managing the incubation stage: a process with clearly defined cut-off points and performance benchmarks.

A second problem with the traditional approach is governance. Clearly defined accountability rules and transparent management structures exist only at the initial and final stages of the incubation; at the intermediate stages, they are quite fuzzy. To be more explicit: the logic of the initial stage is the logic of public sector grants for research and technology commercialisation. In contrast, the logic of the final stage - when a commercially successful company already exists - is decidedly private. Venture capital funds and multinational corporations would be by then the key managing agents. Yet there is no clear agent responsible for managing the commercialisation process in stages 2 and 3 (between the initial and the final stages). So-called search networks - bringing together and integrating relevant expertise of early-stage venture capital investors, researchers in universities and R&D institutes with technological expertise, consulting companies with marketing expertise, legal and investment banking specialists and the financial intermediaries - appear to be the key. Such expertise is required to identify the proposal as a promising idea and to decide what needs to be done to move it further along the commercialisation/ incubation cycle of Figure 6.1, and yet this knowledge does not reside in any one organisation. Organisations such as technology incubators, venture capital funds, national bio- or nano-technology corporations are only useful to the extent they can rely upon and tap into the increasingly globalised private-public search networks, which jointly have a capability to transform promising ideas into progressively more articulated deals.

So the policy issue is not the creation of efficient incubation organisations (incubators, science parks, innovation centres, etc.) but the creation of private-sector-led institutions that support the incubation cycle as a whole. For the reasons outlined above, there is gap between stage 1 of the incubation cycle (which tends to be grant-based and public) and stage 4 (private) - the problem that is also known as the "missing middle".

Figure 6.2 illustrates the phenomenon of the "missing middle" empirically for India (Dutz, 2007). It shows an abundance of later-stage and buy-out funding and a dearth of seed and early-stage venture capital.

Figure 6.2. India's venture capital and private equity landscape: skewed toward large and later-stage investment deals



Note: Those companies not listed here are known exclusively by their acronyms. APIDC = Andhra Pradesh Industrial Development Corporation; BCCL = Bennett Coleman & Co.; DFJ = Draper Fisher Jurvetson; GVFL = Gujarat Venture Finance Ltd.; IFC = International Finance Corporation; IL & FS = Infrastructure Leasing & Financial Services; PIPE = Private investment in public equity; SIDBI = Small Industries Development Bank of India; TDB = Technology Development Board; TePP = Techno-entrepreneurs Promotion Program; UTI = UTI Ventures.

Source: Venture Intelligence, World Bank.

The problem of critical mass

To understand the reasons for the "missing middle" problem in institutional infrastructure, let us examine the following dilemma of private venture capital. As a rule, the principal returns from investment in technology companies are realised after the early-stage financing, when the company is already sufficiently large to generate profits. Although no universal definition exists, we view early-stage deals as the first and second rounds of institutional funding for companies that are less than five years old and are not part of a larger business group. The companies are typically small, rarely exceeding $200 000, and thus generate disproportionately large transaction costs. Growth-stage deals are third and fourth rounds of funding, or first and second rounds of institutional investments for companies that are more than five years old or floated by large business groups and less than 10 years old. Late-stage deals are for companies that are more than 10 years old or pre-IPO (initial public offering) deals. Private investment in public-equity deals are investments in listed companies.

Consequently, there is a shortage of purely private, early-stage financing (illustrated by Figure 6.2 in relation to India) and provision of such financing has "public good" dimensions: while it is crucial for later-stage investments, it does not, in itself, generate sufficient commercial returns. Until both the

number and diversity of innovation start-ups and spin-offs reach a certain critical mass, the availability of purely private, early-stage finance will remain problematic. Advanced venture-capital industries (in the United States, the United Kingdom, Israel and Chinese Taipei) overcome this dilemma over a long period of time by developing a family of funds - seed funds, early-stage funds, later-stage and equity funds, where there is an implicit cross-subsidisation within one family of funds: from later-stage transactions (which generate higher returns) to early-stage transactions (which generate lower returns but which are necessary for the later-stage transactions to occur). However, in most countries, including many European economies, the number of start-ups has not yet reached the necessary critical mass, so public subsidy is widely used to address the "public good" nature of early-stage financing for new firms in high technology.

More generally, the key reason for the "missing middle" problem is that private support structures (*e.g.* specialised service providers, specialised infrastructure, venture capital, etc.) for technology entrepreneurship respond to, rather than create, commercial opportunities: they want a "piece of the action" but they do not create the "action" (*i.e.,* a cluster of innovation start-ups). This problem is the size of the market.

The synergy and co-evolution of public and private support structures is crucial to techno-entrepreneurship. Our hypothesis is that such co-evolution proceeds in three stages: during the first stage - let's call it the generation-of-diversity phase - support structures are idiosyncratic and, for instance, in middle-income economies, large conglomerates may play an important role at this time. During the second stage, pre-emergence and intense private-public institutional experimentation occurs: commercial and private actors develop a portfolio of institutions and programmes to address the critical mass problem. Finally, in the third stage, the critical mass is achieved and a fully-fledged private venture capital industry, including its seed and early-stage segments, as well as private, specialised service providers and infrastructure emerge.

Table 6.1. Israel's high-tech cluster: selected structural elements

	1969-1984	1985-1992	1993-2000
Number of high-tech start-ups created (venture capital-backed[1])[2]	136 (0)	349 (23)	2 436 (855)
Israeli venture capital fundraised/venture capital invested in Israeli start-ups (in USD million)[2]	0 / 0	~85 / ~50	7 480 / ~5 600
Number of IPOs at US (at EU and TASE) (in USD billion)[2]	14 (7)	19 (15)	101 (75)
Number of significant trade sales (M&As)[2]	0	2	91
Amount raised: public markets and Number of significant trade sales (M&As) (in USD billion)[2]	0.3	0.8	36.7
	1984	**1992**	**2000**
Share of ICT in manufacturing exports[3]	14%	28%	53%
ICT exports (in USD million) (in % of ICT sales)	~900 (50%)	2 711 (50%)	12 893 (59%)
Software development exports (in USD million) (in % of software sales)[3]	5 (4%)	135 (23%)	2 600 (70%)
ICT professional employees (thousands)[3]	~42.9	61.7	152.4
Patents issued in the U.S. (ICT patents issued)[4]	193 (44)	355 (89)	969 (417)
R&D in % of GDP (OCS R&D grants) (in USD million)[5]	2.4% (97)	2.6% (199)	4.5% (440)

2. By investment year.
3. IVC (2008).
4. CBS (2008) and estimates from IAEI.
5. USPTO (2008).
6. OCS (2008).

Source: Avnimelech and Teubal (2008a).

A three-phase policy model: Israel

As a summary, Table 6.1 indicates the central features of the emergence of Israel's entrepreneurial high-tech cluster (see also Avnimelech and Teubal, 2008a). The processes that took place in the emergence phase (Phase III) of this venture capital and high-tech cluster are much faster than those that took place in the previous eight years (*i.e.* Phase II, see the middle

column of Table 6.1) and much more so relative to the processes that took place during 1969-84 (Phase I). It is consistent with the view that the (accelerated) emergence of these new higher-level organisations was a market-dominated endogenous process; one that was fuelled by, among other things, innovation (and other) policies, throughout the whole 1969-2000 period.

Box 6.1 outlines the three-phase innovation policy model as applied to Israel, which culminated in the emergence of a domestic venture capital industry during 1993-2000. The three phases represent the innovation policy component of the corresponding first three phases of venture capital's industry life cycle (Avnimelech and Teubal, 2006). Thus, the first innovation policy phase took place during the venture capital's "background conditions phase"; the second policy phase was during venture capital's "pre-emergence phase"; and the third was during the venture capital's emergence phase (Avnimelech and Teubal, 2006). For each phase, we can find (i) a summary of the innovation policy programmes; (ii) the direction of their direct impacts; and (iii) some of the more "dynamic" impacts, particularly those favouring transitions to the subsequent phase.

Box 6.1. Israel's innovation policy cycle: policy and impacts

Phase I: Diffusion of R&D and generation of innovation capabilities (1969-84)

- Horizontal grants to business sector R&D: creation of R&D performing companies, of R&D/innovation capabilities, and of civilian high-tech industry and first start-up companies.

Phase II: Strengthening of business sector R&D and start-up/venture capital experiments (1985-92)

- Business experiments and informal venture capital activity: new model of start-up ("born global" with links to global capital/product markets).

- Restructuring of defence industries, including defence R&D, which also focused on civilian-relevant areas like communications, etc.

- Sharp increase in business sector R&D grants. Also, incubator and Magnet Program (which supports cooperative, generic R&D).

- A failed venture capital support programme (Inbal).

- Increased rate of start-up formation. While no private and professional venture capital market existed, there were a variety of start-up support mechanisms in operation or in experimentation, including angels, OCS subsidies, a few private venture capital funds, tax concessions to company R&D, a special form of venture capital that was oriented to finance groups of projects rather than firms, etc.

- Also, learning from Inbal's failure and from other business experiments: identification of system failures (absence of significant venture capital) and selection of limited partnership form of venture capital organisation.

- A critical mass of about 300 start-ups became available by 1992, some of them of high quality (a few having IPOs on NASDAQ): increased demand for venture capital services. Once venture capital funding became available, it was able trigger a market-driven, virtuous venture capital/start-up co-evolutionary process.

- Background factors: liberalisation of trade, capital markets, foreign exchange market, etc.

- Very favourable exogenous conditions: liberalisation of global communications markets, new possibilities of immigration from the former Soviet Union, the beginnings of the software industry, etc.

Phase III: Targeting venture capital and an ICT-oriented, high-tech entrepreneurial cluster, together with accelerated growth of R&D and high-tech (1993-2000)

- Targeted support of venture capital (Yozma Programme), continuation of all innovation policy programmes, R&D Grants peaked in 2000: emergence of a venture capital industry and entrepreneurial cluster. Accelerated growth of start-up segment and high-tech, large numbers of IPOs and M&As, etc.

Phase I background conditions: diffusion of R&D and generation of innovation capabilities (1969-84)

The Horizontal Grants to Business Sector R&D programme began in 1969 with the creation at the Ministry of Industry and Trade of a specialised agency, the OCS. This programme was and continues to be the backbone of the country's R&D/innovation strategy. Until the early 1990s, more than 90% of OCS disbursements to civilian R&D came from this programme, which

supports the R&D activity of individual companies that are oriented to new/improved products and processes, and directed to the export market. In contrast to a targeted programme that is applicable to a specific industry or technology, a horizontal programme is open, in principle, to all firms whatever their sector, and to all R&D projects whatever their product class or technology. Horizontal programmes of this kind are market-friendly R&D support programmes, which give primacy to the bottom-up identification and generation of projects. In Israel, it extended a 50% subsidy to every R&D project that was accepted by the OCS, regardless of the firms' industry, product class and technology (Teubal, 1983).

Box 6.2. Phase I: Learning process

Intra-firm learning during horizontal programme implementation: early sub-period:

(i) Learning how to search for market and technological information,

(ii) Learning how to identify, screen, evaluate, choose and configure new projects,

(iii) Learning how to generate new projects, including more complex ones, and

(iv) Learning how to manage the innovation process (linking design to production and marketing, selection of personnel, budgeting, management of human resources, etc.).

Collective learning:

(i) Firms learn about the importance of marketing,

(ii) Firms learn how to establish and manage strategic alliances, both with domestic and foreign companies; and how to generate links to global markets, and

(iii) The OCS and the firms learn how to assess the quality and economic potential of various types of projects, and they also learn about R&D-related areas with potential sustainable competitive advantage.

The major objectives of the Horizontal R&D Grants Programme during early implementation were: (i) to promote collective learning about R&D/innovation; in order to encourage technological entrepreneurship, and (ii) to generate knowledge about potential areas where the country concerned might have or could develop a sustainable competitive advantage. R&D-performing firms mutually learn from each other and a lot of this learning relates not directly to technology or R&D proper, but rather to organisational and managerial factors. Box 6.2 provides a categorisation of

intra-firm learning processes, 238as well as instances of collective learning. Both are based on the Israeli experience for the 1969-84 period.

Phase II pre-emergence: strengthening of business sector R&D and start-up/venture capital experiments (1985-92)

The 1984 R&D Law further consolidated Israel's support of business sector R&D. The objective was to support knowledge-intensive industries, through expansion of the science and technology infrastructure and exploitation of existing human resources; and creation of employment, including absorption of immigrant scientists and engineers, etc. The outcome was a significant increase in R&D awards to industry and the emergence of software as an industry, which was a very significant event indeed. Box 6.3 and Table 6.2 present data on the new policies initiated in Israel during Phase II (policies that continued during Phase III). The table also shows data on the backbone, business sector R&D support programme, which was implemented throughout the three phases.

Box 6.3. Phase II: new innovation and technology policy programmes

1. Inbal (1991): a government-owned insurance company, which gave partial (70%) guarantees to traded venture capital funds. Four venture capital companies were established under Inbal regulations. This early venture capital support programme failed to create a venture capital industry or market.

2. Magnet Program (since 1992): a $60M a year horizontal programme supporting cooperative, generic R&D, involving two or more firms and at least one university.

3. Technological Incubators (since 1992): a programme supporting entrepreneurs during the seed phase, for a period of 2 years. The incubators are privately owned and managed. Both they and the projects themselves receive financial support from the government.

Table 6.2. Office of Chief Scientist (OCS) grants 1985-2003

In USD million

Year	Total grants (growth)	Grants to BERD (individual firms)	MAGNET budget	Technology incubators	Royalties	BIRD-F[1] awards
1985	106 (2.5%)	106	0	0	6 (33.3%)	n.a.
1986	110 (3.8%)	109	0	0	7 (16.7%)	n.a.
1987	113 (2.7%)	112	0	0	8 (14.3%)	n.a.
1988	120 (6.2%)	118	0	0	9 (12.5%)	n.a.
1989	125 (4.2%)	122	0	0	10 (11.1%)	n.a.
1990	136 (8.8%)	133	0	0	14 (40.0%)	n.a.
1991	179 (31.6%)	171	0	4	20 (42.9%)	12
1992	199 (11.2%)	177	1	16	25 (25.0%)	10
1993	231 (16.1%)	199	40	24	33 (32.0%)	12
1994	317 (32.2%)	172	10	27	42 (27.3%)	10
1995	346 (9.1%)	294	16	31	56 (33.3%)	12
1996	351 (1.4%)	279	36	30	79 (41.1%)	13
1997	397 (13.1%)	309	53	30	103 (30.4%)	12
1998	400 (0.8%)	305	61	30	117 (13.6%)	14
1999	428 (7.0%)	331	59	30	139 (18.8%)	9
2000	440 (2.8%)	337	67	32	135 (10.8%)	8
2001	431 (-2.0%)	328	64	32	145 (5.2%)	11
2002	383 (-11%)	291	58	27	153 (1.4%)	10
2003	369 (-3.4%)	283	53	26	133 (-5.4%)	11

1. A programme supporting cooperative R&D involving a US and an Israeli company.

Source: Avnimelech (2004).

Phase III emergence phase: the Yozma programme (1993-2000)

New national priorities emerged in Israel with the beginnings of the massive immigration from the former Soviet Union during the early 1990s. The government began searching for the means to employ the thousands of engineers who arrived in the country. Simultaneously, the military industries laid off hundreds of engineers and many start-up companies were created only to subsequently fail. In fact, an official report of the Jerusalem Institute of Management (1987) mentions that 60% of the technologically successful OCS-approved projects failed to raise additional capital for marketing and had to close their business.[1]

Officials in the Treasury and the OCS concluded that despite massive government support for R&D, there were clear "market and system failures", which blocked the successful creation and development of start-up companies. As a result, a shift in policy objectives gradually took place - from promotion of R&D to enhancement of start-up formation, survival and

growth. System failures related not only to insufficient sources of R&D follow-up finance, but also to weak management abilities, business know-how and non-market-directed developments. Eventually, policymakers believed that the way to overcome these deficiencies was to foster a domestic venture capital industry, which then became a strategic priority of the Government of Israel.

The first venture capital-targeted programme was Inbal (a failed programme supporting *public venture capital funds*, raising capital on the Tel Aviv Stock Exchange, TASE), whose implementation started in 1992. The second was Yozma, a successful programme implemented during 1993-97. As mentioned, this programme was credited with triggering the creation of a domestic venture capital industry and market. Tables 6.3, 6.4 and 6.5 show the strong acceleration of venture capital and ICT activity during the 1990s.[2]

Table 6.3. Venture capital raised and invested

Year	Venture capital raised (USD million)	Venture capital under management (USD million)	Venture capital invested (% of foreign)	Venture capital investment (% of GDP)
1991	58	80	n.a.	n.a.
1992	160	240	n.a.	n.a.
1993	372	612	n.a.	n.a.
1994	374	986	n.a.	n.a.
1995	156	1 142	n.a.	n.a.
1996	397	1 539	n.a.	n.a.
1997	729	2 268	440	0.41
1998	706	2 974	589 (36%)	0.54
1999	1 851	4 825	1 011 (43%)	0.9
2000	3 701	8 504	3 092 (59%)	2.6
2001	1 100	9 546	1 985 (59%)	1.65
2002	63	9 609	1 140 (58%)	0.96
2003	300	9 600	1 000 (61%)	0.84

Source: Avnimelech (2004).

Table 6.4. Capital raised by private equity/venture capital organisations in Israel, 1990-2000

In USD million

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Private venture capital	40	49	27	33	82	93	287	595	653	1 160	2 712
Yozma venture capital	0	0	0	149	40	15	30	19	0	0	0
Inbal venture capital	0	0	54	22	0	0	0	0	0	0	0
Other private equity	5	9	79	168	262	25	620	134	33	258	66
Total	45	58	160	372	384	133	937	777	686	1 418	2 778

Source: Avnimelech and Teubal (2006).

Table 6.5. ICT and software manufacturing: sales, exports and employees, 1990-2002

In USD thousands, unless indicated

Year	ICT sales	ICT exports	ICT employees (workers)	Sales per employee	Software sales	Software export	Software employees (workers)	Sales per employee
1990	3 300	2 100	32 000	103	400	75	5 000	80
1991	3 600	2 280	33 000	109	540	110	5 000	108
1992	4 000	2 660	34 200	117	600	135	5 500	109
1993	4 600	3 200	36 400	126	700	175	6 200	113
1994	5 200	3 750	37 600	138	800	220	7 000	114
1995	5 900	4 300	39 200	151	950	300	7 700	123
1996	6 500	4 880	42 000	155	1 300	600	8 500	153
1997	7 200	5 700	43 700	165	1 780	1 000	10 000	178
1998	8 000	6 550	45 600	175	2 350	1 500	11 500	204
1999	8 600	7 130	48 000	179	2 950	2 000	13 000	227
2000	12 500	11 000	54 800	228	3 700	2 600	14 500	255
2001	11 250	9 750	47 000	239	4 100	3 000	15 000	273
2002	10 000	8 800	43 200	231	2 800	1 900	13 200	212

Source:. Avnimelech and Teubal (2006).

This has been extensively analysed in previous work, including Avnimelech and Teubal (2005) and (2008b); and Teubal (2010b). Box 6.4 reproduces some of the main features.

Box 6.4. Design of the Yozma programme

- Fund of funds and direct investments in start-ups; a limited partnership-type of venture capital company favoured.
- A focus on early-phase investments in Israeli high-tech start-up companies.
- Targeted level of capital is 250M$ (government support - 100M$).This was the "critical mass" of venture capital supply deemed required for venture capital industry "emergence".
- Ten privately owned Israeli venture capital funds, each managed by a local management company (formal institution) and involving a reputable foreign financial institution.
- Government participation in each fund - $8 million (up to 40% of fund's capital).
- Strong incentive to the "upside" - a five-year option to buy the government's share at cost.
- Planned "privatisation" of Yozma fund and programme - privatisation was completed in 1998. Yozma became a catalytic programme.
- The Yozma programme attracted or induced the creation of a wide variety of agents, such as MNEs, foreign investment banks, a range of service providers, and eventually top-tier foreign venture capitalists. They triggered a strong process of collective learning, which together with other dynamic processes led to the emergence of an entrepreneurial ICT-oriented, high-tech cluster, and to a venture capital industry and market embedded in it.
- As part of this emergence, we observe a strong process of venture capital/start-up co-evolution during the 1993-96/7/8 period.

The three-phase model in the context of the recent literature

The three-phase model informed by Israel's experience could be interpreted in terms of Lerner's *fast growing entrepreneurship* (Lerner, 2009) or our techno-entrepreneurship concept.

Lerner states that "the first rationale for government intervention lies in the fact that there is a virtuous cycle in entrepreneurship and venture capital. Activities by pioneering entrepreneurs and venture capitalists pave the way for subsequent generations. There are many examples of pioneering firms that served as "pioneering academies" from which other entrepreneurs sprung". The classical example is Fairchild Semiconductor, whose alumni were Advanced Micro Devices, Computer Micro Technology, Cirrus Logic, Intel, LSI, and National Semiconductor - all key players in the industry during the decades to come.

Lerner points out to a number of reasons for this phenomenon (see Box 6.5).

Box 6.5. Virtuous cycles in entrepreneurship and venture capital

- Employees of large firms may be initially reluctant to join or create a start-up,
- Much of the entrepreneurial process is an art rather than a science. This would imply a learning-by-doing (and even a collective learning-by-others-doing) process,
- Entrepreneurs learn about the trade-offs associated with the involvement of seasoned venture capitalists in their ventures (*e.g.* balance between terms and conditions for the investment and an appreciation of the type of gains that are possible),
- Lawyers and accountants become familiar with the venture process and can better advise entrepreneurs and financiers alike,
- Institutional investors gain confidence, and
- Venture capitalists can more readily find peers with whom they can share transactions (syndication is very important).

Explaining why entrepreneurship promotion policies often failed, Lerner points out that building a venture capital industry is a long–term process, taking many years to yield tangible results. In the US about 20 years elapsed between the enactment of the SBIC programme and 1978, which is the date

recognised by historians as the birth of the modern venture capital industry in the United States. This implies that effective policy requires long-term commitment, indeed a commitment that is undaunted by initial failure. Conversely, policies may fail because of the short-term perspective of governments. Thus, in the case of the building of science parks in Malaysia, policymakers assumed that once completed, these parks would solve all problems immediately.

A major cause of failure is the way programmes are structured. Let us take, for example, Finland's programmes operated by FII (Finnish Industry Investment) and Sitra (the Finnish Innovation Fund). The ground rules of FII were that investments should be profitable in terms of a return above the inflation rate, while those of Sitra determined that the pace of investment be limited to whatever the fund received from selling or liquidating its earlier investments. These rules compromised the emergence of an early-stage venture capital market because you cannot expect a steady flow of profits in a cyclical market, especially for early-stage investments. FII shifted therefore to emphasise later-stage investments. Sitra, on the other hand, had ample funds during the upside but was dry of funds in the downside (2001-2) so that it was not able to fund anyone during the most critical period.

Other causes of failure mentioned by Lerner relate to programme size, in particular that of the government capital component of the overall promotion packet. Too large is bad and too small is also bad. If the government component is only a few million dollars, few venture capitalists or other investors will learn about the programme and, as a result, the possibility that such funding will serve as a stamp of approval to others will be remote. Furthermore, the companies receiving the funds are unlikely to have enough capital to move to the next stage. The minimum size for a venture fund is USD 60-70 million. There have been many times when the capital contribution of government when investing directly in a start-up or sponsoring a hybrid fund has been smaller than this amount.

Lerner's analysis does not point out explicitly that building a critical mass of start-ups and associated deal flow is necessary for sparking and sustaining an endogenous entrepreneurial process. Moreover, there would seem to be no distinction between Phase II policies, which prepare the ground and build the institutional and other infrastructure (including a critical mass of start-ups) for an *Entrepreneurial System* or cluster, and Phase II-III policies, which are directed to induce an endogenous process of emergence of such a system/cluster.

Adapting the three-phase model

A policy-relevant adaptation of the Israel-informed three-phase model to economies with a relatively sophisticated innovation infrastructure - Argentina, Brazil, Chile, India, Mexico and Russia – has run into the following problem. One could say that, according to the model, they all are at Phase II – i.e. they have developed a variety of proto-clusters, as well as reasonably efficient and diverse public programmes to support these proto-clusters of techno-entrepreneurship and innovation. Yet, as one policy maker put it, they seem to "be stuck at this stage forever". One should note, however, that having made a transition to Phase II does not mean that an endogenous process leading to a transition to Phase III will emerge. The issue in Phase II is to achieve a minimum set of venture capital emergence conditions that, when achieved, could automatically, or with the help of policy, induce a successful transition to Phase III while triggering an endogenous growth process.

The central point is recognising that a successful outcome of the three-phase evolutionary Innovation Policy Model for such economies could be an *Entrepreneurial System* that comprises a *number* of (rather than a single) innovative and entrepreneurial clusters, of which one or more are in mid and/or low-tech and possibly one in high-tech. The main issues in this adaptation of the model are the following:

1. A successful outcome of a successful evolutionary process could be a multi-cluster innovation/entrepreneurial system.

   A new central component of this system - one which may or may not co-exist with the original model's high-tech innovation cluster/system - is one or more mid-tech innovative/entrepreneurial clusters. The sources of such clusters are:

   - Domestic SMEs supplying foreign MNEs that are located in the country (cases of Ireland, Singapore, etc) or large domestic companies. These could gradually become more innovative and entrepreneurial.

   - Similarly, innovative SMEs that result from capabilities acquired by supplying large foreign-based MNEs or global marketing chains who outsource in the country.

   - Networking and cooperation among pre-existing innovative SMEs, which operated either in a stand-alone or proto-cluster configuration (including previously extant clusters that have undergone or could undergo significant upgrading).

By and large the multi-cluster entrepreneurial system is a (adapted model) Phase III phenomenon, with Phase II and Phase II-III interface (framework) policies playing important roles in its emergence.

2. A broader view of innovation to include non-R&D-based innovation, technology adoption and diffusion, user innovations and changes in institutions.

3. A wider range of agents in the business sector. These might include ICT-oriented and high-tech start-ups (probably growing from a low base, as in Argentina, faster in routine software areas and slower in more innovative branded software and/or hardware areas); innovative SMEs in mid-tech areas, *e.g.* agricultural machinery; and large companies, such as TENARIS and INVAP in Argentina (while a special category would go to foreign MNEs operating in the country *e.g.* Intel in Israel).

4. Institutional changes, for example, to permit the operation of various types of innovation finance organisations (*e.g.* Limited Partnerships in Argentina); making bankruptcy laws more consistent with the requirements of start-ups and innovative SMEs; allowing governments to provide direct financial support to private companies, etc.

5. Experimentation with different types of innovation finance organisations (*e.g.* venture capital and private equity, and other types of financial institutions) and identification of those organisations that are well adapted to the local context and to the needs of domestic innovative SMEs. *Idem* with respect to the provision of technical services' support, including training, technology absorption and transfer, and R&D services delivered by technology centres, consultants, etc.

   Some of these services would be present during Phase II, with a strong government-owned/government-supported component of the relevant organisations. During Phase III, the public component (especially those becoming routine) would be gradually phased out and replaced by privately owned and managed agents who are operating in recently emerged venture capital/private equity/angels, etc., and technical services markets.

6. Dynamics of co-evolutionary process: This has not been investigated in depth in the standard three-phase model. They refer first and foremost to innovation-innovation finance co-evolution (including start-up/venture capital co-evolution) and possibly to co-evolutionary processes that involve innovative SME/start-up and technical services. These co-evolutionary processes would take place for each one (or for individual

subsets) of the innovative/entrepreneurial clusters that policy makers are striving to create in Phase III, as part of the expected multi-dimensional innovative/entrepreneurial system.

To illustrate, co-evolution between innovation (including innovating organisations) and innovation finance (including relevant organisations) involves two phases:

- A *qualitative* mutual adaptation component in which alternative types of venture capital/private equity/other financial mechanisms and types of innovative SMEs/start-ups mutually adjust to each other in terms of strategy/organisation/capabilities (with adaptations of the institutional framework also taking place). This would largely take place in Phase II, being one of the pre-emergence conditions of the standard three-phase model.[3]

- A quantitative scaling up process that is epitomised by start-up + venture capital + co-evolution in Phase III of the Israeli case.

7. Assuring an adequate flow of graduates and knowledge from the STE (Science, Technology and Economy) infrastructure and from abroad for Phase III. This may have important implications for Phase II STE policies.

8. Characterising framework programmes and their role in Phase II and in the Phases II-III interface (see next section).

9. Post Phase III "inclusive growth" considerations: A major point is that the range of dynamic agents that gives rise to innovative/entrepreneurial clusters (a Phase III outcome) is much broader than start-ups. For instance in Bariloche (Argentina), high-tech start-ups are now emerging around INVAP, a company that emerged from the large national laboratories and the university, which operate in the area; and in Brazil around Embraer (a Brazilian MNE). Also in Argentina, almost all applications for nano-tech funds come from researchers associated with INVAP or TENARIS (an Argentinian MNE in the seamless tubes area). This means that we need to take into account three types of agents in the business sector: high-tech start-ups, such as those underlying the analysis of the standard three-phase model); big R&D intensive export-oriented domestic firms like INVAP, which start to produce backward linkages (to which we may add those supplying inputs to MNEs operating in the country); and innovative SMEs in mid tech and traditional areas, such as those comprising the *agricultural machinery* mid-tech cluster in Argentina. These firms do not export, yet

they are highly dynamic firms that are expected to export. Some may also spearhead the emergence of new clusters.

Possible Phase II policies that might be considered by middle-income economies are:

1. Stage II venture capital policy.

   Beyond tax relief for investors, there are two main options: creation of a public or public/private early-phase-oriented fund or a public capital component acting as a fund of funds.

2. In general, a mix between horizontal and selective/targeted *direct* promotion of innovative SMEs/start-ups and/or support of technological incubators and science/technology parks.

   Serious attention should be given to subsidies/conditional loans/conditional grants, especially during the *infant phase* of diffusion of R&D/innovation in the business sector. A major objective (to be achieved in sync with other policies, *e.g.* in the regulatory sphere), would be to reach a critical mass or critical masses of innovative SMEs and the possibility of start-ups.

3. General innovation support schemes, possibly based on tax concessions (involving some control of relevant functionalities) for large, established companies.

4. Joint business (including SMEs) - STE sectoral funds/targeted programmes to finance user-driven generic or generic/regular R&D in nanotechnology, biotechnology, IT and mid-tech areas, through large multi-year consortia.

5. Cluster/sector-specific support schemes aimed at *existing* sectors or clusters for technological upgrade and collective generation of sector-specific public goods .

6. General STE reinforcement support, plus a component of policy-targeting of relevant infrastructures for the present and future.

7. Promoting multinational search networks through the activation of diasporas, implementing bi-national innovation support programmes, linking into EU programmes that are open to developing economies, sending students abroad, etc.

8. Promoting and developing international links and partnerships in business innovation and in innovation finance, *e.g.* reducing taxation and institutional constraints for the opening of offices of foreign venture capitalists, private equity funders, or other financial institutions.

9. A few possible Phase II-III interface framework policies:

   - Policy targeting of the emergence of high-tech and/or mid-tech innovative/entrepreneurial clusters. They have to be identified and specified (some capability may be required even for outsourcing this activity). Some of the new sectors/clusters will compete in global markets, while others might serve the local market or be involved in non-traded goods.

   - Policy targeting of relevant private innovation finance markets/sub-markets for innovative start-ups that are operating under radical uncertainty and in a turbulent environment, *e.g.* Israel's Yozma programme, which directly and indirectly induced the emergence of that country's high impact, entrepreneurial high-tech cluster.

   - Policies promoting both the domestic outsourcing by large companies and MNEs operating locally and of clusters based on these organisations, and upgrading of the relevant SMEs (some as a continuation of policies undertaken in Phase II).

   - Support and possible privatisation of some technical services markets, particularly those oriented to innovative SMEs. It would be expected that the growth of innovative clusters, through increases in the demand for technical services, would enhance the possibility of creating at least some private technical services markets. In these cases, it would also be possible to privatise all or part of the pre-existing Phase II technical services institutions.

Framework programmes as defining the transition from Phase II to Phase III

This section puts forward the hypothesis that the fragmentation of the institutional infrastructure for innovation represents a real constraint to endogenous growth and development. To put it another way, a key issue is the scaling of diverse yet fragile proto-clusters into globally robust, competitive innovation clusters. This section introduces the notion of framework

programmes, which provide an environment for micro-level changes to link up and scale up clusters.

Israel's Yozma programme (section on "A three-phase policy model: Israel") is a paragon framework programme. Other framework programmes have been implemented by successful catch-up economies, such as Chinese Taipei and Ireland (Box 6.6).

By the end of the 1970s, Chinese Taipei had already entered Phase II, with significant R&D capabilities such as the Industrial Technology Research Institute (ITRI) and the Electronic Technology Research Institute (ETRI). Yet transforming technology into actual creation proved difficult. For instance, the large Hinschu Science Park, opened in 1980, was unable to find tenants in spite of aggressive efforts to attract multinationals.

The Chinese Taipei framework programme (Saxenian, 2006) was conceived by the Minister without Portfolio, Kuo-Ting Li, with the aim of forming an alliance with foreign advisors and some members of the diaspora to establish a venture capital industry in Chinese Taipei. Li and his influential allies convinced the Ministry of Finance to introduce legislation to create, develop and regulate venture capital in Chinese Taipei, including comprehensive tax incentives and financial assistance. Institutions, such as a Seed Fund, provided matching capital contributions to private venture capital funds. Two American-style venture funds, H&Q Asia Pacific and Walden International Investment Group, were created and managed by a number of U.S.-educated Chinese living overseas who received invitations to relocate to Chinese Taipei. Once the first venture funds proved successful, domestic banks and large companies created their own venture capital funds; and once these started to pay off, even the conservative family groups decided to invest in such funds and information technology businesses. By the late 1980s when companies like Acer and the returnee company Microtek were publicly listed at the Chinese Taipei Stock Exchange, Chinese Taipei's venture capital industry took off.

A search network (*i.e.* a network to identify successive constraints and then the people or institutions that can help mitigate them), which consisted initially of key, dynamic and forward-looking members of the Chinese Taipei government and leading overseas Chinese engineers in Silicon Valley, was central to the emergence of the venture capital industry. This network did not have a blueprint, yet it did have a role model (Silicon Valley) and a clear idea of "what to do next". By defining each step along the road, the network became broader and eventually incorporated both sceptics and opponents.

As the examples of Chinese Taipei, Israel and Ireland illustrate, framework programmes have three distinct features that distinguish them from typical government policies and programmes (Kuznetsov and Sabel, 2011):

1. They start from existing institutions and programmes and reshape them.

   By linking the better performing segments of the private and public sectors, framework programmes contribute to alleviate existing institutional constraints and come with new solutions. They link exceptions from a general rule, which allows them to institutionalise their agendas. Both the Chinese Taipei venture capital programme and the Irish linkage efforts were initially viewed with scepticism; yet drawing on existing organisations and programmes, their champions created sustained dynamics (in backward linkages with venture capital development respectively) and won the sceptics over.

2. They start at the organisational periphery and are therefore less susceptible to rent-seeking.

   Public programmes and policies have three constituencies: users/clients, public sector bureaucrats and politicians. All three rely on government programmes as a source of rent-seeking: visible political pay-offs in the case of politicians, kick-backs in the case of public sector servants, and subsidies to maintain current business practices in the case of users. However by design, framework programmes do not have large budgets of their own: they rely on other programmes. In economic jargon, the motivational effect is the transformation from rents to quasi-rents - *i.e.* rents that are contingent on performance and effort. Framework programmes start small and require small amounts of public money, as well as substantial effort to get them established. As the Chinese Taipei example illustrated, for that reason, these programmes have not been taken seriously by established interests: they were contingent on the articulation of quasi-rents (which, by definition, require creativity and effort), rather than the simple capture of rents (Kuznetsov, 2009).

3. By linking better performing segments of an existing institutional framework and searching for out-of-the-box solutions to familiar problems, the institutional framework too is reshaped.

   There appeared to be no institutional space for a venture capital industry in Chinese Taipei in the 1980s, so tight was the grip of the large established agents (*i.e.* large firms and banks). The institutional framework for a venture capital industry and the venture capital industry itself emerged simultaneously through virtuous cycle dynamics.

As a consequence, the dynamic process that is triggered and sustained by these programmes has a broad impact on a large number of agents and variables, of which only a few are the direct objective of the policy itself. The others are the result of the endogenous processes triggered by the policy. Thus,

in Israel, the result of focusing on venture capital led Yozma to completing even more of the national innovation system by: (i) inducing large numbers of foreign agents, such as MNEs, venture company funds, investment banks, finance organisations, other services suppliers etc. to have a presence in the country; and (ii) building a large number of international linkages.

Framework programmes that are constructed from institutions already in operation, allow public and private actors to respond to the demands of the moment, without having to pretend that their initial choices somehow escape the ambiguity that confounds all others. Moreover - and crucially - they help the actors address the governance questions that their openness creates. And they do this in a way that also allows the actors to acquire the capacities that they need to reach their goals, even as they help them to establish the goals themselves. In this sense, they help create sets of incentives and capabilities that lead to effective action.

Israel and Chinese Taipei are special cases, indeed so unique that it would be pointless for middle-income economies to endeavour to replicate them. While replication may be pointless, the creation of country-specific framework programmes is certainly not (Kuznetsov and Sabel, 2011; World Bank, 2001, 2008).

Box 6.6. Example of a framework programme: Irish linkage promotion programme

In the wake of a highly successful FDI programme, Ireland faced the challenge of how to deepen FDI involvement and how to leverage the technology then in use to develop an indigenous technological capability. As a result, the Industrial Development Authority (IDA) took a calculated risk by bringing together a group of multinational companies and potential suppliers through a systematic search process that came to be known as the National Linkage Promotion Programme (1987-92). The key problem in developing potential suppliers is that one is "doomed to choose": one must choose among potential suppliers simply because developing large numbers of them is wasteful.

The three main groups involved in the programme were:

Government: It provided the political imperative and charged various state agencies with supporting the programme. Budget lines were established and the Department of Industry took a close interest in the programme's operation and effectiveness. Input at this level was essential to maintain political visibility and support for the programme. A total of eight agencies contributed staff and assistance, in part to help SMEs navigate the bureaucracy when seeking the best and most appropriate assistance. Staff members from each agency had to shed familiar bureaucratic routines and act entrepreneurially so as to make it possible to

fast-track the many applications for assistance and to fine-tune the services on offer to meet the specific needs of customers and their suppliers.

Industry, primarily MNCs (through FDI): The principal sector targeted was electronics, since it was the largest and most dynamic, and had the greatest propensity to source locally. Industry cooperation was sought and the MNCs, through the Federation of Electronic Industries, contributed to programme costs in the first two years. Companies were lobbied at high levels by senior agency executives and government ministers. Incoming companies were introduced to executives of the Linkage Promotion Programme so that local sourcing opportunities could be discussed and developed. MNCs were also asked to provide technical assistance, in association with state technical agencies.

SMEs: A rigorous assessment procedure was used to select participating companies. It included an analysis of existing or potential capabilities against perceived supply opportunities, a detailed examination of the financial management, and an assessment of the existing management and of the firm's potential.

An essential part of the programme was the development by the programme's executives of close relationships with key MNCs. Due to the number of agencies involved in the programme, a well-balanced and multi-faceted team of experts in management, business development, technical issues, accounting and banking was the key to success. This array of skills allowed the team to carry out the initial assessment and selection of suppliers (in close cooperation with the MNCs) and also to carry out early-stage development workshops with the SMEs.

Outcomes: Over the five years of the programme's operation, locally sourced materials in electronics increased from 9% to 19% of MNC purchases. While the total population of MNCs in Ireland was about 900, approximately 200 proved to be effective participants in the programme, both through purchases and their willingness to support it.

Source: Kuznetsov and Sabel (2011).

From high-tech to more inclusive growth: example of Israel

During the heyday of Israeli high-tech success, one of us suggested that Israel should adopt a broader R&D strategy to the one that existed at the time, which was focused on promoting high-tech (Teubal, 1999). It was argued that existing R&D support to the business sector was biased. Two alternative innovation policy visions/strategies for Israel were proposed in that paper. In Strategy I, high tech was considered a key, both to assure successful aggregate growth and to provide the solution to societal problems. In Strategy II, the alternative vision/strategy, which was by the author, asserted that while Israel did have a comparative advantage in high-tech, it was important to achieve a

balance between it and the mid- and low-tech sectors where most of the country's employment was located. It was also stated that these sectors had a strong growth potential, especially if, through adequate policies, they became sophisticated users of new technology.

The priorities suggested for mid- and low-tech development (Teubal, 1999) included a focus on learning, training and technology transfer, with the aim of generating world-class manufacturing capabilities in certain areas; and the strengthening of "clusters". A number of specific policies were also suggested, some horizontal and others targeted. These required a shift to a systems and evolutionary policy perspective that emphasised - beyond incentives and market failure - priorities, strategy, learning and institutions (Teubal, 1999).

Some of these and other inclusive growth issues were later taken up by Trajtenberg (2005). His first point is that, following the historical experience of economic growth, innovation in developing countries should be understood as involving much more than innovation in high-tech. His second main point concerns the high-tech bias of Israel's innovation policies and their implications in inclusive growth terms.

Trajtenberg rightly states that the Israeli case "exemplifies both the potential and the limitations of a high-tech strategy as a lever for economic growth".

The benefits from high-tech eluded the rest of the economy, a fact that gave rise to a "dual economy" and slow growth in the rest of the economy. We start with the "outcomes" of Israel's OCS-driven innovation policy, both for high-tech and for non high-tech.

During the last two decades, Israel's innovation policy gradually became an extreme version of high-tech bias with both the grants to company R&D programmes and the venture capital-directed Yozma Programme (which triggered the emergence of the highly successful ICT-oriented entrepreneurial high-tech cluster) being either strongly biased or exclusively oriented to this category of sectors. While the impact of these programmes was positive for the national economy, it and the programmes themselves reinforced the pre-existing bias against non high-tech. It also transformed Israel's growth profile into a less inclusive one.

While Trajtenberg's criticisms of OCS programmes and Yozma are partly correct, his analysis ignores a number of additional points of significance:

1. The OCS successfully addressed a clear market failure in the development of innovation capabilities, some of which were the result of export and global market penetration experiences by companies having received R&D grants.

2. These had a strong impact on domestic agents despite the absence of direct spillovers from using domestically generated innovative products (the latter being the focus of Trajtenberg's analysis and critique).

3. They eventually led during the 1990s and beyond to enormous national/macro benefits, *e.g.* absorption of immigrants, balance of payments and even economic growth impacts.

Our conclusion is that at least part of the biases of the venture capital-led developments of the 1990s should be regarded as the counterpart costs of such social benefits, even in the strong sense that without them the benefits would not have occurred. Moreover, an even greater source of OCS bias against non high-tech derived from the fact that, with minor exceptions, the programmes always supported R&D while ignoring what probably are the major sources of innovation in many traditional sectors, namely, design, engineering, technology transfer, start-up of new process equipment, etc.

Crucially, a consensus seems to have emerged during the last decade that Israel should also stimulate companies that produce locally on a competitive basis - whether for exports or the local market - thereby generating employment and enhancing the overall scope or base of economic growth (Hurvitz and Brodet, 2007). This view is not incompatible with a high-tech focus in innovation policy since there are variants to such a policy. Structuring a more inclusive growth-oriented innovation policy that considers both Israel's comparative advantage in high-tech and the requirements of inclusive growth, requires not only a restructuring of OCS programmes in the sense of moderating their extreme high-tech bias (some of this is already in process), but also considering in sync other policies pertaining to the wider economic and social system.

OCS-based policy has adapted, albeit with a significant delay, with a special programme that supports traditional industry, which started in 2005. Despite some growth in the programme, especially over last year, it still remains to be seen how effective it will be in counteracting the biases of the system. On the wider systemic front, a number of initiatives have been voiced, some of which may have been or are in the process of implementation. For example, towards end of the late 1990s, antitrust regulation became more realistic, in the sense that a situation of monopoly would henceforth be defined with reference to the global market, rather than the domestic market. This helped domestic companies grow. Other policies or suggested policies include: providing tax advantages to domestic M&As; promoting the establishment of "production companies" operating in the global input outsourcing market; promoting the development of suppliers to the MNEs active in the economy, and not only those involved in production like Intel; reversing the downward

trend in professional training and government support of this activity in mid to low-tech areas; and proposing a second phase of the existing Magnet Programme support, which is entitled Magnet B (Hurwitz and Brodet, 2007).

It remains to be seen whether or not Israel will manage to sustain aggregate growth while making it more inclusive. What is clear to us is that the complexity of the challenge is such that no significant change in policies will result without a rather fundamental change in the policy process. In the path leading to continued relevance in the face of the new challenges facing the country and economy, Israel's innovation policy (broadly conceived) should become more systemic and more evolutionary in its outlook, and should also benefit from a larger, more systematic and rapidly increasing body of policy-relevant knowledge.

Conclusions: towards diagnostic monitoring of innovation policy

Although clearly a special case, the Israeli experience with entrepreneurial systems analysed in this paper is important not only because it "succeeded" (in a direct sense, yet not in an inclusive growth sense), but also because it involves a relatively new perspective on innovation policy broadly defined and on what could be considered one of its central components - venture capital policies. Following a number of papers (Avnimelech *et al*., 2010; Rosiello *et al*., 2010) and the wisdom from Lerner's book on entrepreneurship (Lerner, 2009), we present two dynamic sequences below: the *conventional* view and the "*policy is endogenous or systems/evolutionary*" view:

- Conventional view: venture capital →start-up →emergence of a private *venture capital market*.

- Evolutionary view:

  - Phase II: various policies →critical mass of start-ups,

  - Phase II-III interface: framework policy (*e.g.* Israel's venture capital-directed "Yozma") →, and

  - Phase III: venture capital/start-up co-evolution →endogenous process of emergence of new *private venture capital market* embedded in new *entrepreneurial high-tech cluster*.

The cases of Israel and Chinese Taipei illustrate how private techno-entrepreneurship and the institutional infrastructure that supports it emerge together, as two sides of the same collaborative process. Diagnostic

monitoring and the generation of relevant micro-economic data to discern heterogeneity are part of this collaborative process. This paper is one input to a new generation of innovation projects by international organisations (see World Bank, 2008 for an example of Argentina's innovation project) that are explicitly designed around this collaborative process of co-emergence between private techno-entrepreneurship and the institutional infrastructure that supports it.

Given that Israel's policy was strongly biased towards high-tech, its inclusive growth issues should be considered as post-Phase III policies. For other middle-income economies that aspire to develop innovative entrepreneurial clusters in mid- and high-tech, inclusive growth considerations should be part of their overall strategy of innovation, either in Phase II or even before.

From a "policy as an endogenous variable" perspective, the paper emphasises both policy learning in a very broad sense to include understanding the "needs" of stakeholders as well as anticipatory thinking and analysis of possible public policy implications, and a willingness to adapt policies to what was learned. Some or most of it involves co-evolutionary processes between innovation policy on the one hand and innovation (including innovative organisations) and private innovation finance on the other. A major impact is the high ramping up of business innovation during phases I and II *i.e.* even before the substitution of public support of business innovation with private support by venture capital. Its impact is to contribute significantly to the creation of critical mass. To put it another way, the policy making process in Israel (also in the case in Chinese Taipei) was an open-ended one, in the sense that each subsequent step relaxed constraints, forged new alliances and presented opportunities and challenges not contemplated at the previous steps.

How to learn from surprises, good and bad? A key emerging procedure is *diagnostic monitoring*: the systematic evaluation of a portfolio of projects, programmes and policies to detect errors as each of the projects evolves, and to correct the problems, including weeding out the projects that are proving inefficient, in light of the implementation experience and other new information (Kuznetsov and Sabel, 2011). Diagnostic monitoring requires specialised data. The paper reveals, once again, the lack of systematic evidence about the processes that lead to the generation of endogenous momentum and entrepreneurship in middle-income economies. The partial adaptation of the three-phase model (section on "A three-phase policy model: Israel") to such areas is based on circumstantial evidence rather than on the *structured and integrated* evidence that underpinned the Israeli case. The key issue to be analysed and monitored is heterogeneity: of firms, of public sector organisations and of the institutions in the institutional infrastructure for techno-entrepreneurship. Venture capital itself is a highly heterogeneous

whole, just as the projects and capabilities required at different phases of the incubation cycle are themselves highly differentiated. However, macro-level indicators and league tables, such as the competitiveness rankings of countries or knowledge assessment methodology (KAM, 2011) portray developing economies precisely as what they are not: homogenous wholes.

Notes

1. The reportedly weak impact of OCS support was probably also due to "technology biases" in the approval process of OCS R&D grants.
2. Within an updated and adapted conceptual framework, Yozma is a framework programme (see section on "Adapting the three-phase model") whose implementation defines the initiation of Phase III. In this sense, Yozma should be regarded as a Phase II-III interface programme, with its design having been undertaken in Phase II and its implementation in Phase III.
3. This condition pertains to identifying the "new financial intermediary that solves the market failure in innovative finance of SUs" which appears in the literature (see e.g. various Gompers and Lerner papers, among others).

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Chapter 7

Competition and innovation-driven inclusive growth

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We investigate the strength of innovation-driven employment growth, the role of competition in stimulating and facilitating it, and whether it is inclusive. In a sample of over 26 000 manufacturing establishments across 71 countries (both OECD and developing), we find that firms that innovate in products or processes, or that have attained higher total factor productivity, exhibit higher employment growth than non-innovative firms. The strength of firms' innovation-driven employment growth is significantly positively associated with the share of the firms' workforce that is unskilled, debunking the conventional wisdom that innovation-driven growth is not inclusive in that it is focused on jobs characterized by higher levels of qualification. We also find that young firms have higher propensities for product or process innovation in countries with better Doing Business *ranks (both overall and ranks for constituent components focused on credit availability and property registration). Firms generally innovate more and show greater employment growth if they are exposed to more information (through Internet use and membership in business organisations) and are exporters. The empirical results support the policy propositions that innovation is a powerful driver of employment growth, that innovation-driven growth is inclusive in its creation of unskilled jobs, and that the underlying innovations are fostered by a pro-competitive business environment providing ready access to information, financing, export opportunities, and other essential business services that facilitate the entry and expansion of young firms.*

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Introduction

This paper brings enterprise-level empirical evidence to bear on the important policy debate regarding whether innovation-driven growth is inclusive.[1] The conventional view is that the force of economic innovation mainly creates and commercialises sophisticated new-to-the-world frontier products. As such, the benefits of innovation are traditionally perceived to flow disproportionately to the investors in and managers of larger, technically sophisticated corporations; highly skilled workers; stakeholders with control over channels of distribution of inputs and outputs that are needed by technically sophisticated enterprises; and ultimately higher-income households as consumers of innovative products. From this perspective, innovation-driven growth is not inclusive, at least not until that growth generalises to portions of the economy beyond the sectors involved directly in innovation.

We empirically explore an alternative view that innovation, especially in the context of development, should be recognised as applying to a broader range of non-replicative entrepreneurial accomplishments. Value and productivity-enhancing activities that commercialise ideas embedded in product, process, and organisational and marketing technologies that are new-to-the-firm and possibly new to the local economy, are apt to drive enterprise growth, even if they are not new-to-the-world. Such innovation-driven growth is indeed far more likely to be inclusive, in the sense of providing new employment and consumption opportunities for the segments of the population that are without secure prior participation in the organised developing economy. Local innovation and its consequent inclusive growth are apt to be enabled and spurred by the type of market competition that ensures opportunities for grass-roots entrepreneurs to access essential business services, as well as other required local inputs and distribution outlets. A secure, competitive market environment is especially important for vulnerable young firms, which may well have the most powerful collective potential for fast growth and job creation that is genuinely inclusive.

This paper analyses key linkages between competition, innovation, productivity and inclusive growth, both conceptually and empirically, using firm-level data across OECD and developing countries. The paper's principal empirical finding is that innovation and the resulting increases in productivity do lead, when spurred by a competitive business environment, to more inclusive growth. While much of our policy focus here is on the ramifications for vulnerable young firms of a competitive business environment, we also find empirical indications of the efficacy of the policy agenda in support of innovation that includes encouragement of skills and capacity development, knowledge access and networking, and risk finance. In addition, but

unexplored here, may be the complementary importance of demand-side policies such as standards setting and pro-innovation public procurement.[2]

A first empirical finding of ours, over all countries, or just over developing countries, is that enterprise employment growth is substantially greater for innovating than for non-innovating firms, after controlling for many other characteristics of the firms including their sector and country of activity. There is no indication in the data of offsetting negative externalities on the employment growth of other firms in the same sector and country. These findings are certainly confirming of policy support for enterprise-level innovation as a force for overall growth, but they leave open the controversial question of whether that growth would be inclusive.

Our empirical results proceed to show that innovation-driven growth is inclusive in that its job creation is as powerful and generally more powerful for enterprises with larger proportions of unskilled jobs. These findings are evidence against the hypothesis that innovation or knowledge-based growth does little for poorer segments of society, while generally aggrandising the already established and prosperous.

The chain of causality that we study begins with R&D investment and other sources of knowledge, which contribute to process and product innovations and other forms of within-firm productivity upgrading that are reflected in higher levels of enterprise total factor productivity (TFP). When enterprises experience the positive spur that comes from the ability to expand by accessing competitive markets and winning through market rivalry, product and process innovation and increased TFP make expansion profitable and practical. It is dramatically striking that the ensuing output expansion creates job growth that is not biased away, but rather is generally tilted towards inclusion of the unskilled. Across all countries, unskilled workers constitute a larger share of the employees of innovative firms than of non-innovative firms. We estimate that where the share of unskilled workers is greater by 10 percentage points, the employment annual growth rate of innovating firms is one percentage point greater, while the corresponding increase for non-innovating firms is only six-tenths of a percentage point. This difference between innovating and non-innovating firms is statistically significant and quantitatively important over time. Moreover, this finding, coupled with the increasing empirical support in the literature for the view that low-wage jobs are a stepping stone for the integration of the jobless into employment and better-paid work in the future, provides a key underpinning to innovation-driven inclusive growth.[3]

A complementary connective between innovation and inclusive growth is that innovation-driven growth is also inclusive in its impact on the employment of women. Across all countries, innovative firms' employment

growth is significantly more responsive to the fraction of female workers than that of non-innovative firms. We estimate that for innovating firms, a 10 percentage point increase in the share of their female workers is associated with an increase of two-tenths of a percentage point in the employment growth rate. This is contrasted with no statistically significant relationship between employment growth and the gender balance of the work force for non-innovating firms in our sample.

Our system of equations highlights and confirms some meaningful additional foundations. Among them, export competition and international exposure are powerful correlates of the progressive forces that promote inclusive growth. Use of the Internet is a dramatically important enterprise characteristic at every stage of the flow from ideas to employment growth. Participation in business associations, job training programmes and management certification are also shown in the data to make significant contributions along the entire chain leading to inclusive growth.

Finally, we have found some stimulating econometric results on the subject of the roles played by competition in innovation-driven inclusive growth. We find for our sample of non-OECD countries that national policies that further the competitive flexibility and fluidity of the business environment are, in a composite aggregate (as well as in key components reflecting access to essential business services such as getting credit and registering property), positively correlated with the proclivity of the country's young enterprises to innovate and thereby foster inclusive growth. Young enterprises are particularly important in their higher general levels of employment growth, and it is they whose ability to grow in response to innovation is particularly sensitive to the openness to competition of their business environment. On the other hand, at the level of the enterprise, neither employment growth nor the proclivity to innovate is positively correlated, given the controls in our framework, with the self-reported number of competing firms or presence of a foreign competitor. Evidently, while more actively-competing firms may mean that there are more sales in the market that the enterprise may aspire to divert through innovation-driven growth, the fact that these firms are identified as competitors signifies that there is active resistance to such diversion, and the result is on net no stimulus to the incentives for innovation.

Conceptual framework

In recent years, a large number of countries have actively sought to promote innovation policies to enhance long-run productivity, international competitiveness and economic growth.[4] Although innovation is considered vital for firm survival and a nation's economic well-being, especially in the

context of the globalised economy, careful and persuasive empirical evaluation of the actual impacts of innovation policies is still largely lacking. One area in particular that has not received sufficient empirical attention is the potential link between innovation and employment, especially in developing countries. Vital empirical questions arise here because of the revolutionary technological changes in several sectors of the global economy and the persistently high rates of unemployment that have plagued advanced industrial and developing countries alike.

It has long been recognised that innovation impacts employment through multiple channels of varying time scales and complexity, and that the overall effect is sensitive to the character of innovation (process versus product, radical versus incremental, etc.) and its setting. While economic theory does not generate unambiguous predictions for this relationship, many particular effects and insights can be articulated.

Process innovation can lead to productivity gains which enable firms to produce the same level of output with fewer inputs, or more output with the same inputs. Thus, process innovation can have direct labour-saving impacts ("displacement effects"). These negative effects of process innovation on employment can be counterbalanced by indirect expansion impacts when the cost reductions from the innovation spur price reductions to drive higher demand and greater output ("compensation effects"). The employment effects of product innovation, on the other hand, are somewhat less ambiguous. Product innovation generally stimulates demand (both domestic and foreign) for the firm's outputs and can lead to market expansion. At the same time, like process innovation, product innovation can cause demand diversion from substitute products of other firms (cannibalisation or business-stealing effect). Thus, while product innovation will likely enhance the labour demand of the innovating firm, its impact on aggregate employment is less clear, depending on the relative strengths of the market expansion and business-stealing effects. How these countervailing influences of innovation on employment balance in practice is an empirical question whose answer logically depends on the nature of the technology employed and the substitutability of input factors, the own and cross-price elasticities of demand, the degree of competition in the relevant product market, the nature of the business environment, the type of process innovation, the degree of novelty of the new product, and a host of other factors.[5]

Competition and innovation

It is fundamental economic theory that idealised competition impels productivity for enterprise survival (Syverson, 2011). In a dynamic setting, market-leading levels of productivity are set by innovation. By offering to

successful suppliers the full necessary rewards from investment and marketing initiatives and from relative efficiency, competitive markets provide full incentives for these elements of desirable dynamic behaviour. By presenting no impediments to firms following their incentives to vie with each other to meet customers' needs and thereby create business, undistorted competitive markets assure that customers will be served by the suppliers best able to innovate and to satisfy demands at the lowest possible cost. It is therefore widely recognised that idealised competition weeds out inefficiency, encourages productivity and technological progress, and generally benefits society by providing a combination of goods and services whose qualities and attributes are adapted to the demands of consumers using up as small a quantity of resources as possible in the supply of these products. Competition also makes enterprise expansion profitable due to the productivity gains that it stimulates.

Although many markets in reality are not entirely characterised by such idealised competition, they may well share at least some of its attributes that are critical for dynamic efficiency and innovation. Markets that enable their enterprise participants to expand their outputs with flexibility and fluidity, that is, without magnified costs or compressed revenues, when they have gained a competitive advantage, are conducive to incentives and ability for innovation, enhanced productivity, and consequent growth.

In such a competitive market, innovation that raises TFP likely lowers the marginal cost to a new level that creates or increases profit margins, thereby stimulating more output. Similarly, innovation that results in new or enhanced products may raise the value of firm output due to higher margins or more demand, and thereby induce expansion. The higher margins expected to result from successful innovation and elevated TFP alone provide incentive for business activities that are anticipated to promote dynamic progress, but especially high-powered incentives arise where the innovation is also expected to lead to significant growth of sales at the enlarged margins, and thus to substantially enlarged profits. Hence, markets that permit firms to expand with efficiency and flexibility foster heightened incentives for expenditure of efforts and investment to innovate and raise TFP, as well as fostering enterprise growth in response to their successful innovations.

For development to occur, innovation does not need to be focused on new-to-the-world technologies. In addition to the creation of new technologies, entrepreneurship facilitation can spur diffusion and adaptation of existing product, process, organisation and marketing technologies. In general, innovation can be profitable without the growth of tangible outputs and inputs, including by higher-value design products, and by lowered fixed production costs that raise profit but not output.

There are many ways that different imperfectly competitive markets in different settings can fail to accord enterprises access to the resources and market opportunities needed for their expansion in response to innovation. The general business environment can lack competitiveness, namely sufficient responsiveness on the part of the existing physical and other business infrastructure, legal system and governmental support that would yield to young or otherwise vulnerable enterprises access to essential local business services such as banking and related financial services, communications, transport and required energy services, gateways to export markets, open real estate markets, and professional and administrative support services providing needed business information and training.[6] Access to financial investment and credit may well be the most problematic among essential business inputs for vulnerable enterprises in developing economies.[7]

Government regulations can be sources of entry barriers, mobility barriers, excessive business costs, heightened entrepreneurial risks and distortionary incentives that impede innovation and the opportunities for enterprise expansion that would motivate innovation. Even seemingly well-intended regulations can have powerfully negative unintended consequences, like a legal rule that protects workers by requiring employers to pay a year's salary upon severance. Such a rule would much discourage an enterprise from hiring in order to launch a new uncertain line of business. Other regulatory rules in many countries require large numbers of permits and licenses and bureaucratic approvals for a business launch or expansion, and the resulting inordinate costs and delays are daunting to growth and stifling of incentives to invest in expansion and entrepreneurship. Recent empirical work suggests that the most important negative impacts of regulation on economic performance are through its negative effects on the incentives of firms to invest and innovate (Crafts, 2006).

Another source of limitations on the ability of an innovator to grow is lack of output market opportunity. There may be few distribution channels available to or even known by a local enterprise, powerful interests may block market access, or the country may not have organised the institutions necessary for an efficient portal to international trade.[8] Within the limitations of an enterprise's market access there may be no other rival suppliers. As a result, the enterprise may have market power, but also may find that it cannot expand output without significantly dropping price. While even monopolists have incentives to expand output when they innovate, these incentives are systematically less than those experienced in a highly competitive market inasmuch as price need not necessarily fall very far for an innovator to divert sales from rivals. However, it must be recognised that if the rivals are oligopolists rather than price-takers, then their resistance to diversion of their sales may make the innovator's expansion less profitable than if it were a

monopolist in the local relevant market. As such, there is no clear and general prediction from economic theory on whether the existence of a few rivals in such a relevant market is stimulating or repressing of innovation.

Finally, the competitiveness of the business environment is likely to have ambiguous impacts on innovation too. Above, we articulated why incentives to innovate are heightened by opportunities to expand in response to progressive success, and how these opportunities are affected for vulnerable firms by the business environment. However, for firms that are not vulnerable, the business environment may have far less of a direct impact on their ability to expand. For such firms, a difficult or repressive business environment may be, at least in part, an encouragement to invest in innovation and expansion due to the entry barriers that the environment creates. The protection from entry that the difficult business environment creates can raise the expected profitability of innovation and expansion. Of course, from the perspective of social welfare, this spur to investment no doubt comes at too high a social cost from the repressed activities of would-be entrepreneurship, and the monopoly power exercised by the less vulnerable firms with or without their innovations. Nevertheless, with this in mind, there is no expected general relationship predicting more innovation from firms in markets with a competitive business environment.

It is worthwhile to dig deeper into the characteristics that may make a firm vulnerable to a repressive business environment. We hypothesise that young firms are more likely to be vulnerable, and that mature firms are less likely to be vulnerable. The first reason is survivorship selection. By definition, mature firms have shown by their age that they have adapted to the business environment and survived inevitable vicissitudes of performance, so they are likely to have found ways to attain their needed financing, market access and governmental permissions. It is not much of a reach to extend that inference to their ability to move forward, even if that were to involve expansion or a new line of business. Obversely, young firms have shown much less such success at adaptation, given their shorter time in the market. Second, many of the barriers posed by difficult market environments are particularly applicable to newer entrants. Frequently-observed regulatory requirements are particularly onerous for start-ups and businesses that have not yet formed convenient relationships with government regulators nor learned how to navigate the regulatory process. Third, mature firms are more likely to be able to self-finance, or to get financing from outsiders who have seen their track record, while young firms are less likely to have a cash flow for investment purposes and less likely to secure outside funding in an environment without effective financial institutions.

With this said, our hypothesis is that, as the more likely vulnerable firms, it is the young enterprises whose proclivity for successful innovation will be

most sensitive to the competitiveness of their business environments. The entry barrier factor discussed above leaves us with ambiguous expectations about the impact of the business environment on innovation by the less vulnerable mature firms. And we have no foundation for a prediction on the impact of the number of active rivals (given our controls) on the proclivity of an enterprise of any age to innovate.

Competition, innovation and inclusive growth

The enterprise output growth that arises from innovation and high TFP is inclusive if it provides employment and consumption opportunities for large segments of the population, rather than having the opportunities to participate in the growth process and its benefits less widely shared.[9] In the empirical analyses reported in this paper, innovation is defined as inclusive if it raises employment for less skilled workers, rather than just for higher-skilled workers, professionals and executives. The interpretation of formal low-skilled jobs as a gateway to inclusiveness is premised on the maintained hypothesis that low-wage jobs are a stepping stone for the integration of jobless people into employment, and possibly even to better-paid work in the future, rather than a poverty trap that leads to a re-exit to unemployment and a no-pay low-pay cycle. That low-wage jobs are indeed a means for employment integration of the unemployed over time, and are on average good for an individual's or household's economic progress has been receiving increased empirical support (Gruen, Mahringer and Rhein, 2011; Knabe and Plum, 2010).

Economic theory provides some insight into the role that competition plays in the distinction between impacts of innovation that are inclusive in this sense, versus impacts of innovation that are positive for aggregate social welfare without additional benefits of providing uplift for those in greatest need. In a market environment where enterprise expansion is stultified and repressed by the absence or distortions of needed business inputs, by limitations on access to pertinent output market opportunities, or by regulatory limitations on business flexibility and returns, a firm can profit from lower costs or higher value products, but not nearly as much as it could in a more competitive business environment. Without the practical ability to expand, a firm that has attained lower costs or higher value products through innovation and heightened TFP can gain by maintaining output and (quality-adjusted) price and adapting its production technology to its cost-saving or value-enhancing opportunities. The result is likely more and better-paying jobs for those with skills appropriate to the technological advance, fewer jobs for those without, and greater returns for the managers and investors. Such a result is perhaps consistent with growth, but not directly consistent with inclusive growth.

In contrast, a firm that operates in a competitive business environment is strongly motivated by higher returns to expand aggressively when it has attained lower costs or higher value products from innovation and heightened TFP. Not only does the innovative firm profit by adapting its production technology, but it profits all the more by selling more intensively and more widely through the lower prices or better marketing and distribution that its lower costs and better products make commercially possible. This innovation-driven growth is likely inclusive in that the expansion of the firm's production needs unskilled labour as well as labour with advanced skills, and the firm's enhanced market opportunities provide the needed financial impetus for more and better jobs across the spectrum.

Firms with the ability to expand in reaction to their advances in TFP and process and product innovation are more able to profit from their technological progress, and hence are more likely to make the effort and to commit the funding needed to succeed with innovation. And economic logic indicates that firms with that ability to expand are more likely to grow inclusively as a result of innovations or gains in TFP they may accomplish. Thus, we hypothesise that, on average, there is a selection bias that favours inclusive growth from innovation. Our empirical analyses below seem to confirm that hypothesis, along with the more direct logic that innovation tends to be expansionary at the level of the enterprise.

In all market environments, and particularly in developing economies, management upgrading is now appropriately perceived as a crucial innovative technology, and one with additional connections to inclusive growth. It was only with the recent quantification of specific improvements in management practices, such as better ways to monitor production information, to set binding operations, inventory and quality control targets, and to incentivise workers with merit-based pay and promotion, that it has become possible for economists to rigorously compare management technologies across firms. Based on data across 17 countries, Bloom and Van Reenen (2010) rank average Indian, Chinese and Brazilian management practices of domestic firms (the only developing countries in the sample) as significantly below those of OECD countries, with a large lower tail of very badly-managed firms; foreign multinationals residing in these countries, on the other hand, are well managed across all countries. Robust positive associations are found between the average firm management score and labour productivity (sales per employee), profitability, Tobin's q, sales growth and survival, controlling for country and industry fixed effects and general firm-level controls. And in a follow-on randomised experiment on large multi-plant Indian textile firms, Bloom *et al.* (2011a) show the causal impact of adopting better management technologies: five months of extensive consulting to upgrade management practices raised average TFP by 11% in the first year, increased the use of

computers, and increased decentralisation of decision-making. One consequence of such decentralisation is the spread of better paid employment opportunities and less inequality of compensation through a production hierarchy, that is, more inclusion in the gains from productive expansion.

In related work on the implications of innovation in management technologies, Bloom *et al*. (2011b) highlight a subtle but important difference between advances in information and communications components. Better information technologies that empower and spur learning by workers such as ERP (Enterprise Resource Planning) for plant managers and CAD/CAM (Computer Aided Design and Manufacturing) for production workers are associated with more autonomy and wider span of control. One key implication is more inclusive growth opportunities by the elevation of local labour productivity and reduction in wage inequality. In contrast, communication technologies like data networks are apt to decrease autonomy for plant managers and workers, substituting away from local knowledge in favour of directives from centralised headquarters, and leading to less inclusive growth by stifling learning and accentuating wage inequality. Despite these differences in types, innovation in management is highly associated with gains in productivity and output-growth opportunities. As such, we hypothesise that these forms of innovation are also, like product and process innovation, likely on average to be inclusive in their overall impacts on enterprise employment.

Data and empirical specification

We use establishment-level, cross-section data that are based on the World Bank Enterprise Surveys (ES) collected between 2002 and 2006. We have information on 26 108 manufacturing establishments from 71 countries.[10] Most of the establishments represented in the data are registered in the formal/organised sector, and are urban. Sampling is typically stratified by size, sector and location. Any accounts collected in local currency units are converted to constant 2005 US dollars at purchasing-power-parity. Rates of growth are scaled to an annual basis. Table 7.1a reports sample counts by country and Table 7.1b reports the means and standard deviations of our main variables of interest for two separate country samples based on OECD membership. Table 7.1c contains a detailed listing of the Enterprise Survey questions underlying the establishment-level business environment indicators used in this study.

Country-level data on the competitiveness of the business environment are taken from the IFC/World Bank Doing Business (DB) reports. Strongly positive correlations among the major DB variables and among their categorised aggregated indicators suggest that national regulation policies

come in "packages." In line with recent work by Loayza, Oviedo and Serven (2010) and Djankov, McLiesh and Ramalho (2006), we examine the effects of business regulations on economic growth by using synthetic summary indices of a relevant range of regulation areas, and the aggregate national ranks of the corresponding Doing Business indicators.

It should be noted that many of the DB variables are indicative of competition-related entry barriers and hurdles, so that their impacts are apt to be different over subsamples of firms sorted by size and age. Hoped-for new business expansions that may result from opportunities created by R&D and by product, process, organisational and marketing innovations might also be vulnerable to the same barriers and hurdles that afflict new and small firms. On the other hand, well-established firms may benefit from an environment with more entry barriers. Increased difficulty and riskiness in getting started, and impediments to access to credit and skilled employees could be advantageous for well-established firms, so DB variables reflecting the lack of competitiveness of the business environment can also be interpreted as correlates of entry barriers that protect them, inasmuch as well-established firms are over the hurdles that these variables also indicate.

Our conceptual theory of inclusive growth from entrepreneurial innovation and competition is tested to explore whether it is consistent with available data through a triangular (or trapezoidal, to be more precise) system of four equations, recognising possible roles of both enterprise and sector level influences over the key dependent variables. To focus on enterprise-level correlates, we include fixed effects for country of establishment and for the sector of the establishment's main product. To explore the impacts of the competitiveness of the business environment (including the elements reflecting the ease of administrative regulations), we assess the rank-order correlations among the estimated country-level fixed effects of key outcome variables and aggregate rankings of countries' DB indicators.

Table 7.1a. Descriptive statistics on Enterprise Survey dataset

	2002	2003	2004	2005	2006	Number of observations (establishments)	Mean employment (persons)	Standard deviation, employment
OECD member countries								
Chile			x			675	137	262
Czech				x		123	169	683
Estonia				x		66	166	559
Germany				x		448	111	433
Greece				x		141	135	312
Hungary				x		326	104	255
Ireland				x		216	107	334
Mexico					x	2118	105	344
Poland				x		473	47	113
Portugal				x		164	232	665
Slovakia				x		46	307	1394
Slovenia				x		80	179	296
Korea				x		267	178	478
Spain				x		206	115	354
Turkey				x		870	138	244
OECD accession country								
Russian Federation				x		167	189	485
OECD enhanced engagement countries								
Brazil		x				1575	124	321
China		x				1601	261	787
India					x	2072	89	314
Indonesia		x				667	587	1148
South Africa		x				564	330	1098
Developing countries								
Albania				x		71	86	243
Algeria	x					460	59	128
Arab Republic of Egypt			x			955	122	469
Armenia				x		222	50	96
Belarus				x		98	110	209
Benin			x			150	22	58
Bosnia Herzegovina				x		55	171	333
Bulgaria				x		69	157	215
Cambodia		x				60	409	985
Costa Rica				x		298	60	229
Croatia				x		88	164	503
Dominican Republic				x		131	72	159
Ecuador		x				380	84	287
El Salvador		x				465	98	251
Ethiopia	x					418	107	419
Former Yugoslav Republic of Macedonia (FYROM)				x		39	194	538
Georgia				x		37	92	124
Guatemala		x				435	120	376
Guyana			x			155	40	93
Honduras		x				428	92	252

Table 7.1a. Descriptive statistics on Enterprise Survey dataset (continued)

	2002	2003	2004	2005	2006	Number of observations (establishments)	Mean employment (persons)	Standard deviation, employment
Jamaica				x		50	61	88
Kazakhstan				x		303	82	154
Kyrgyz Republic		x				101	103	179
Kyrgyz Republic				x		73	174	357
Latvia				x		43	129	194
Lesotho		x				35	409	831
Lithuania			x			82	94	144
Lithuania				x		71	103	152
Madagascar				x		238	166	416
Malawi				x		306	325	1265
Mali		x				93	43	147
Mauritius, Republic of				x		152	147	393
Moldova		x				96	108	177
Moldova				x		135	125	288
Mongolia			x			170	72	184
Morocco			x			125	106	203
Nicaragua		x				452	45	170
Niger				x		75	41	120
Oman		x				69	31	23
Peru	x					134	51	128
Philippines		x				665	314	851
Romania				x		370	105	229
Senegal		x				149	41	63
Serbia Montenegro				x		74	205	332
Sri Lanka			x			408	375	630
Syrian Arab Republic		x				172	25	48
Tajikistan		x				107	23	54
Tajikistan				x		83	150	225
Tanzania		x				145	64	133
Thailand			x			1385	372	843
Ukraine				x		201	106	380
Uzbekistan		x				99	125	357
Uzbekistan				x		98	174	329
Vietnam				x		1370	340	869
Zambia	x					100	210	842

Source: World Bank Enterprise Surveys. Establishments reporting zero employment or zero sales have been excluded from all analysis.

Table 7.1b. Summary statistics on business environment indicators

	OECD member countries		OECD accession and enhanced engagement countries; developing countries	
Variable	Mean	SD	Mean	SD
Growth and innovation				
Annual compound employment growth rate	5.66	21.54	6.00	23.48
ln (Total Factor Productivity)	3.28	2.49	3.19	2.40
Whether firm introduced a new process (0/1)	29.6%	45.6%	36.7%	48.2%
Whether firm introduced a new product (0/1)	34.7%	47.6%	43.1%	49.5%
Whether the firm does R&D (0/1)	18.9%	39.2%	23.0%	42.1%
R&D spending/total sales	0.4%	2.8%	0.7%	4.1%
Establishment-level business environment				
Whether the firm exports (0/1)	28.1%	44.9%	28.0%	44.9%
Whether the firm uses Internet (0/1)	77.8%	41.6%	59.8%	49.0%
Whether the firm is part of a business association (0/1)	59.9%	49.0%	59.2%	49.2%
Whether the firm has ISO certification (0/1)	26.1%	43.9%	21.1%	40.8%
Whether the firm offers formal training programmes (0/1)	47.2%	49.9%	47.3%	49.9%
Fraction of borrowing in foreign currency	23.0%	33.5%	11.9%	29.7%
Fraction of investment capital from local banks	13.9%	25.4%	20.1%	30.9%
Log of (average annual wage)	9.54	0.89	8.08	1.79
Whether the firm established a new foreign joint venture (0/1)	6.6%	24.8%	6.4%	24.5%
Whether the firm established a new licensing agreement (0/1)	8.4%	27.8%	9.0%	28.7%
Enterprise characteristics				
Whether the firm is government owned (0/1)	1.6%	12.6%	6.8%	25.2%
Whether the firm is foreign owned (0/1)	9.5%	29.4%	12.4%	32.9%
Whether the firm is incorporated (0/1)	57.8%	49.4%	52.6%	49.9%
Fraction of workforce comprised of management employees	5.4%	12.0%	9.9%	14.7%
Fraction of workforce comprised of skilled production employees	51.5%	30.3%	38.9%	30.1%
Fraction of workforce comprised of unskilled production employees	23.0%	28.9%	34.3%	31.6%
Fraction of workforce comprised of female employees	17.4%	23.9%	28.2%	30.1%
Sectoral and country business environment				
US 4 digit ISIC sector average R&D intensity	1.7%	1.8%	1.6%	1.4%

Source: World Bank Enterprise Surveys. Establishments reporting zero employment or zero sales have been excluded from all analysis.

Table 7.1c. Questions underlying establishment-level business environment indicators

Variable	Underlying survey question
Growth and innovation	
Annual compound employment growth rate	The following table refers only to permanent workers of your plant: {Average number of workers}, {Average number of workers 3 years ago}
Whether firm introduced a new process (0/1)	Has your company undertaken any of the following initiatives in the last three years? {Introduced new technology that has substantially changed the way that the main product is produced}
Whether firm introduced a new product (0/1)	Has your company undertaken any of the following initiatives in the last three years? {Developed a major new product line}
Whether the firm does R&D (0/1)	How much did your establishment spend on design or R&D last year? {>0}
R&D spending/total sales	How much did your establishment spend on design or R&D last year? / Please provide the following information on your establishment's production, sales and expenses. {Total sales}
Establishment-level business environment	
Whether the firm exports (0/1)	What percent of your establishment's sales are:{exported directly}+{exported indirectly (through a distributor)}
Whether the firm uses Internet (0/1)	Does your enterprise regularly use e-mail or a website in its interactions with clients and suppliers?: {E-mail}, {Website}
Whether the firm has external auditor (0/1)	Does your establishment have its annual financial statement reviewed by an external auditor?
Whether the firm is part of a business association (0/1)	Is your establishment/firm a member of a business association or chamber of commerce?
Whether the firm has ISO certification (0/1)	Has your firm received ISO (e.g. 9000, 9002 or 14000) certification?
Whether the firm offers formal training programs (0/1)	Do you offer formal (beyond "on the job") training to your permanent employees?
Fraction of borrowing in foreign currency	What share of your total borrowing (loans, accounts payable) is denominated in foreign currency?
Fraction of investment capital from local banks	Please identify the contribution over the last year of each of the following sources of financing for your establishment's: ii) New investments (i.e. new land, buildings, machinery and equipment): {Local commercial banks}
Average annual wage	The following table refers only to permanent workers of your plant: {Total wages} / {Average number of workers}
Whether the firm established a new foreign joint venture (0/1)	Has your company undertaken any of the following initiatives in the last three years? {Agreed to a new joint venture with foreign partner}
Whether the firm established a new licensing agreement (0/1)	Has your company undertaken any of the following initiatives in the last three years? {Obtained a new licensing agreement}
Enterprise characteristics	
Whether the firm is government owned (0/1)	What percentage of your firm is owned by: {Government/State}
Whether the firm is foreign owned (0/1)	What percentage of your firm is owned by: {Private Sector: a) foreign}
Whether the firm is incorporated (0/1)	What is the current legal status of your firm? {Publicly listed company; Private held, limited company}
Fraction of workforce comprised of management employees	Average number of workers: {Management}, {Total}
Fraction of workforce comprised of skilled production employees	Average number of workers: {Skilled production workers}, {Total}
Fraction of workforce comprised of unskilled production employees	Average number of workers: {Unskilled production workers}, {Total}
Fraction of workforce comprised of female employees	The following table refers only to permanent workers of your plant: {Average number of workers of which: % female}

Note: Specific wording of survey questions may vary across countries.
Source: World Bank Enterprise Surveys.

The first of our four equations is an enterprise R&D investment equation, estimated using a probit estimator:

$$R\&D_{i,j,k} = \beta_0 + \beta_1[rel.\,to\ bus.\,env.]_{i,j,k} + \beta_2[controls]_{i,j,k} + \beta_3[industry]_k + \beta_4[country]_j + \varepsilon_{i,j,k} \quad (1)$$

Here, $R\&D_{i,j,k}$ indicates whether firm *i* in country *j* and sector *k* was actively engaged in research and development. The vector $[rel.\,to\ bus.\,env.]_{i,j,k}$ includes a set of variables describing the firm's relationship to its business environment including the firm's ability to fund investment and access capital as measured by its share of investment capital from local banks and the share of the firm's borrowing in foreign currency. This vector also includes an indicator of whether the firm competes in export markets, as a proxy correlate of the firm's opportunities to expand if its innovation is successful. We also include measures of the firm's roles in partnerships, which may expand access to both knowledge and input and output markets, via indicators of whether the firm established a new foreign joint venture and whether it entered into a new technology licensing agreement in the past three years.[11] The vector $[controls]_{i,j,k}$ includes variables indicating the firm's ownership (foreign, government), level of organization/legal status (whether the firm is incorporated), size class and age group.[12] The vector $[industry]_k$ contains a measure of the progressivity of the firm's sub-sector in terms of the US R&D intensity of that sub-sector, as calculated in Sharma *et al*. (2010). The vector $[country]_j$ is comprised of country fixed effects.

The second set of equations aims to explain the incidence of enterprise product and process innovation, estimated using a probit estimator:

$$\text{Innovate}_{i,j,k} = \beta_0 + \beta_1[rel.to\ bus.\,env.]_{i,j,k} + \beta_2[controls]_{i,j,k} + \beta_3[industry]_k + \beta_4[country]_j + \varepsilon_{i,j,k} \quad (2)$$

Here, $\text{Innovate}_{i,j,k}$ indicates whether the firm introduced a new product or process innovation in the last three years. The vector $[rel.\,to\ bus.\,env.]_{i,j,k}$ now includes a broader set of variables describing the firm's relationships to its business environment including the firm's R&D intensity as a correlate of its ability to innovate,[13] access to capital, access to implementation skills (proxied by whether the firm has a formal training programme), access to ideas (use of the Internet and whether the firm is part of a business association), as well as opportunities for expansion if the innovation is successful. The vector $[controls]_{i,j,k}$ contains the firm-level

controls as in specification (1), $[industry]_k$ contains a vector of two-digit industry fixed effects, and $[country]_j$ is the same as in specification (1).

The third equation seeks to explain variation among levels of the enterprises' TFP,[14] and is estimated via OLS:

$$\ln(\mathrm{TFP})_{i,j,k} = \beta_0 + \beta_1[rel.\,to\ bus.\,env.]_{i,j,k} + \beta_2[controls]_{i,j,k} + \beta_3[industry]_k + \beta_4[country]_j + \varepsilon_{i,j,k} \quad (3)$$

The regressor sets are nearly identical to those in specification (2), though they exclude a few of that specification's independent variables (R&D intensity, foreign JV, new licensing agreement; including them in the specification does not change our results).

Finally, the fourth equation is aimed at explaining variations among the rates of the enterprises' employment growth, with OLS estimation:

$$\begin{aligned}\text{Employment Growth Rate}_{i,j,k} = {} & \beta_0 \\ & + \beta_1[innovation]_{i,j,k} \\ & + \beta_2[workforce]_{i,j,k} \\ & + \beta_3[rel.\,to\ bus.\,env.]_{i,j,k} \\ & + \beta_4[controls]_{i,j,k} \\ & + \beta_5[industry]_k \\ & + \beta_6[country]_j + \varepsilon_{i,j,k} \end{aligned} \quad (4)$$

In this equation $[innovation]_{i,j,k}$ is comprised of the vector of the innovation variables (ln[TFP], introduced new product, introduced new process) studied in equations (1), (2) and (3) above, and $[workforce]_{i,j,k}$ characterizes the composition of the firm's workforce along the dimensions of skills (*e.g.* percentage of employees who are low-skilled) and gender (share of workforce comprised of females). Other vectors of independent variables are similarly defined as in equation (3).

We estimate these specifications using establishment-level data from all available countries, as well as separately using the subset of establishments located in OECD accession and enhanced engagement countries and developing countries, for all firms and for various subsamples of firms sorted by their age, size and innovating status.

Empirical findings

Innovation is an important driver of enterprise employment growth

Enterprise innovations, which are here reflected by the level of TFP and by self-reports of process and product innovation, are very strong positive correlates of employment growth among firms across our entire sample. The first column of Table 7.2 displays the results of estimating the employment growth equation (4) over the entire sample. Firms that introduce a process or a product innovation, for example, exhibit an annual employment growth rate respectively 2.1 and 2.9 percentage points higher than firms that do not, holding other factors equal.[15] Given that the mean annual employment growth rate of all enterprises in our sample is just below 6%, these impacts of process and product innovation on employment growth are quantitatively important. Moreover, a unit increase in the log of TFP is associated with nearly 2% higher employment growth. In principle, the level of TFP is likely persistent for a firm, unlike the concept of the variables indicating a recent product or process innovation, so that a persistently repeated annual boost of 2% to the employment growth rate of a firm can become quite substantial in total impact.

These results are particularly pronounced for smaller firms: in the case of process and TFP innovation, the results are statistically significant for the relatively small size classes of firms (micro, small and medium-size enterprises), but are not statistically significant for large established firms employing more than 200 employees.[16] On the other hand, product innovation is a strong and statistically significant correlate of employment growth for the largest size class of enterprises, as well as the smaller ones.

Table 7.2. Inclusive growth, innovation and business environment: econometric evidence

Full sample (OECD member, accession and enhanced engagement countries, and developing countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Model	Base	Base	Base	Base	Base	Base	Base	Base
Sample	Full	Micro	Small	Medium	Large	Young	Mature	Old
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
ln[Total Factor Prod.]	1.933+++	2.357+++	2.412+++	2.116+++	0.304	2.904+++	2.468+++	1.272+++
	(0.107)	(0.287)	(0.167)	(0.204)	(0.209)	(0.566)	(0.170)	(0.126)
Introduced new process	2.114+++	2.671++	2.664+++	2.629+++	0.138	1.269	3.007+++	1.582+++
	(0.386)	(1.102)	(0.596)	(0.676)	(0.699)	(2.011)	(0.592)	(0.462)
Introduced new product	2.873+++	2.810+++	2.605+++	1.688+++	3.360+++	3.698+	3.293+++	2.152+++
	(0.358)	(0.969)	(0.549)	(0.643)	(0.676)	(1.916)	(0.549)	(0.426)
Fraction of workforce unskilled	8.374+++	22.455+++	9.229+++	8.378+++	4.586+++	29.713+++	8.276+++	4.417+++
	(0.828)	(2.239)	(1.324)	(1.601)	(1.614)	(4.303)	(1.259)	(1.008)
Fraction of workforce female	1.486+	2.365	3.143++	3.474++	-2.436+	8.373++	0.256	-0.217
	(0.814)	(2.321)	(1.263)	(1.481)	(1.455)	(4.065)	(1.267)	(0.978)
Firm exports	3.020+++	8.593+++	2.463+++	1.203+	4.100+++	5.443++	3.463+++	2.252+++
	(0.425)	(1.473)	(0.672)	(0.677)	(0.752)	(2.379)	(0.669)	(0.492)
Fraction of investment capital from local banks	0.017+++	0.032+	0.012	0.012	0.021++	0.021	0.023++	0.016++
	(0.006)	(0.019)	(0.009)	(0.010)	(0.010)	(0.034)	(0.009)	(0.007)
Fraction of loans in foreign currency	2.687+++	10.529+++	4.636+++	3.891++	3.070++	6.894	2.569+	2.427++
	(0.885)	(3.040)	(1.629)	(1.543)	(1.256)	(4.417)	(1.391)	(1.037)
Fraction of workers skilled	3.634+++	9.454+++	4.263+++	6.310+++	5.035+++	18.168+++	3.332+++	1.185
	(0.804)	(1.884)	(1.314)	(1.663)	(1.669)	(4.066)	(1.189)	(1.009)
Firm uses Internet	3.624+++	6.694+++	2.725+++	2.665+++	1.061	9.344+++	2.933+++	2.540+++
	(0.428)	(1.043)	(0.626)	(0.893)	(1.092)	(2.142)	(0.648)	(0.528)
Firm has ISO certification	2.061+++	9.794+++	1.603++	0.874	0.942	4.037	2.503+++	1.529+++
	(0.467)	(1.837)	(0.780)	(0.740)	(0.762)	(2.786)	(0.751)	(0.528)
Firm has formal training programme	3.837+++	6.718+++	3.798+++	3.652+++	0.310	6.998+++	3.578+++	3.135+++
	(0.392)	(1.079)	(0.577)	(0.706)	(0.817)	(2.021)	(0.604)	(0.468)
Firm is part of a business association	0.643	-0.206	1.415++	-0.116	1.141	-1.092	0.852	0.866+
	(0.413)	(1.061)	(0.614)	(0.791)	(0.917)	(2.234)	(0.610)	(0.513)

Table 7.2. Inclusive growth, innovation and business environment: econometric evidence (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Model	Base	Base	Base	Base	Base	Base	Base	Base
Sample	Full	Micro	Small	Medium	Large	Young	Mature	Old
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
>10% Government-owned	-2.711+++	0.404	-1.382	-4.490+++	-3.783+++	-5.491	-4.186+++	-2.287+++
	(0.784)	(4.238)	(1.677)	(1.258)	(1.043)	(4.309)	(1.444)	(0.886)
>10% Private foreign owned	1.840+++	3.771	3.740+++	2.285+++	0.605	3.253	1.810++	0.143
	(0.556)	(2.533)	(1.041)	(0.859)	(0.773)	(2.810)	(0.840)	(0.704)
Size dummy: >200 employees	-26.901+++					-50.078+++	-28.839+++	-19.038+++
	(0.703)					(4.111)	(1.119)	(0.835)
Size dummy:51-200 employees	-19.644+++					-40.059+++	-20.456+++	-12.951+++
	(0.568)					(2.954)	(0.871)	(0.701)
Size dummy: 11-50 employees	-12.154+++					-25.962+++	-11.888+++	-7.988+++
	(0.452)					(2.233)	(0.656)	(0.587)
Age dummy: 5-15 yrs old	-10.677+++	-15.374+++	-7.654+++	-4.958+++	-8.394+++			
	(0.582)	(1.281)	(0.908)	(1.145)	(1.458)			
Age dummy: 15+ yrs old	-13.210+++	-20.074+++	-10.520+++	-6.708+++	-9.275+++			
	(0.600)	(1.382)	(0.941)	(1.137)	(1.449)			
Firm is incorporated	1.031++	3.639+++	0.837	0.740	0.692	3.602	0.142	1.568+++
	(0.454)	(1.328)	(0.699)	(0.857)	(0.915)	(2.287)	(0.685)	(0.577)
Constant	22.265++	33.955	25.302	-12.309	2.046	9.126	17.891	33.231
	(9.558)	(32.782)	(17.218)	(12.787)	(21.211)	(34.244)	(13.516)	(21.840)
Observations	24585	5875	9206	5470	4034	2169	10817	11305
Adjusted R-squared	0.150	0.190	0.145	0.120	0.126	0.202	0.131	0.110

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.
Source: Author's estimations.

Table 7.3. Inclusive growth, innovation and business environment: econometric evidence

OECD accession and enhanced engagement countries, and developing country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Model	Base	Base	Base	Base	Base	Base	Base	Base
Sample	Full	Micro	Small	Medium	Large	Young	Mature	Old
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
ln[Total Factor Prod.]	1.913+++	2.339+++	2.623+++	2.270+++	0.025	3.159+++	2.417+++	1.095+++
	(0.126)	(0.354)	(0.195)	(0.251)	(0.238)	(0.600)	(0.195)	(0.151)
Introduced new process	1.864+++	1.541	2.663+++	2.664+++	-0.491	1.387	2.734+++	1.020+
	(0.451)	(1.407)	(0.686)	(0.805)	(0.794)	(2.126)	(0.666)	(0.556)
Introduced new product	3.033+++	3.224+++	3.043+++	1.770++	3.412+++	4.313++	3.847+++	1.816+++
	(0.418)	(1.197)	(0.634)	(0.781)	(0.765)	(2.024)	(0.619)	(0.511)
Fraction of workforce unskilled	8.219+++	24.565+++	9.563+++	8.724+++	3.024+	32.127+++	7.505+++	3.488+++
	(0.939)	(2.673)	(1.482)	(1.904)	(1.801)	(4.522)	(1.384)	(1.169)
Fraction of workforce female	1.539+	3.740	2.019	3.602++	-2.536	8.464++	-0.562	-0.019
	(0.906)	(2.682)	(1.410)	(1.710)	(1.580)	(4.248)	(1.375)	(1.101)
Firm exports	2.963+++	8.943+++	2.165+++	1.580+	4.563+++	5.407++	3.178+++	2.279+++
	(0.498)	(1.900)	(0.779)	(0.816)	(0.855)	(2.516)	(0.764)	(0.587)
Fraction of investment capital from local banks	0.012+	0.011	0.011	0.009	0.022+	-0.002	0.019+	0.014+
	(0.007)	(0.023)	(0.011)	(0.012)	(0.011)	(0.035)	(0.010)	(0.008)
Fraction of loans in foreign currency	3.406+++	9.091+++	4.682++	4.682++	3.262++	9.120++	3.131++	2.635++
	(1.015)	(3.426)	(1.905)	(1.906)	(1.383)	(4.619)	(1.532)	(1.227)
Fraction of workers skilled	3.930+++	10.285+++	4.743+++	7.453+++	4.729++	19.027+++	3.387++	1.340
	(0.928)	(2.289)	(1.497)	(2.003)	(1.871)	(4.314)	(1.335)	(1.196)
Firm uses Internet	3.914+++	7.295+++	2.812+++	2.743+++	1.536	8.974+++	3.073+++	2.914+++
	(0.494)	(1.353)	(0.707)	(1.002)	(1.164)	(2.287)	(0.728)	(0.620)
Firm has ISO certification	1.439++	6.679+++	1.127	1.093	1.132	2.325	1.683+	1.236+
	(0.571)	(2.496)	(0.968)	(0.941)	(0.877)	(3.019)	(0.875)	(0.667)
Firm has formal training programme	3.024+++	6.265+++	3.392+++	3.277+++	-0.277	5.097++	3.270+++	2.187+++
	(0.466)	(1.408)	(0.681)	(0.861)	(0.910)	(2.147)	(0.696)	(0.572)

Table 7.3. Inclusive growth, innovation and business environment: econometric evidence (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Model	Base	Base	Base	Base	Base	Base	Base	Base
Sample	Full	Micro	Small	Medium	Large	Young	Mature	Old
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
Firm is part of a business association	1.024++	-0.048	1.571++	-0.147	1.201	-1.407	1.231+	1.394++
	(0.464)	(1.264)	(0.682)	(0.908)	(0.989)	(2.329)	(0.668)	(0.586)
>10% government-owned	-2.794+++	0.640	-1.547	-4.868+++	-4.154+++	-5.470	-4.748+++	-2.203++
	(0.848)	(4.558)	(1.839)	(1.390)	(1.136)	(4.345)	(1.536)	(0.960)
>10% private foreign owned	1.802+++	6.674++	2.463++	3.029+++	0.924	2.626	1.370	0.247
	(0.646)	(3.050)	(1.193)	(1.046)	(0.890)	(2.932)	(0.928)	(0.870)
Size dummy: >200 employees	-28.101+++					-48.795+++	-28.959+++	-20.417+++
	(0.831)					(4.269)	(1.268)	(1.028)
Size dummy:51-200 employees	-20.735+++					-38.799+++	-20.505+++	-14.341+++
	(0.688)					(3.121)	(1.017)	(0.883)
Size dummy: 11-50 employees	-12.790+++					-24.856+++	-11.693+++	-8.975+++
	(0.551)					(2.419)	(0.778)	(0.741)
Age dummy: 5-15 years old	-10.749+++	-15.506+++	-7.979+++	-6.108+++	-8.939+++			
	(0.657)	(1.554)	(1.005)	(1.322)	(1.544)			
Age dummy: 15+ years old	-12.948+++	-18.914+++	-10.993+++	-7.611+++	-9.244+++			
	(0.683)	(1.713)	(1.055)	(1.328)	(1.540)			
Firm is incorporated	0.356	4.472++	0.736	0.671	0.610	2.984	-0.619	1.202+
	(0.538)	(1.777)	(0.822)	(1.011)	(1.030)	(2.436)	(0.776)	(0.727)
Constant	9.626++	13.935	-27.335++	-21.099++	-4.986	22.397	-19.467+	10.974
	(4.572)	(13.757)	(12.000)	(8.848)	(10.213)	(28.432)	(10.625)	(9.558)
Observations	18564	3921	7169	4159	3315	1900	8378	8090
Adjusted R-squared	0.150	0.187	0.143	0.122	0.140	0.196	0.131	0.104

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.
Source: Author's estimations.

Table 7.3 highlights that these results are just as significant, and comparable in magnitude, for the restricted sample of OECD accession and enhanced engagement countries and developing countries.

As we discussed above, the stimulating impacts of an enterprise's innovation on its employment might, or might not, as a matter of economic logic, be offset at the national level by corresponding declines in the output and employment of its domestic competitive rivals. To assess this possibility empirically, we construct variables to represent aggregate average innovation by firms in the same country, sector and size class as each given firm. We run regressions like those reported in Tables 7.2 and 7.3 that are augmented to include these constructed variables. If there were an offset to an innovating firm's employment growth from a corresponding negative impact on "neighbouring" firms' employment, we would expect to see significant negative correlations in the augmented employment growth regressions between an enterprise's employment growth rate and the constructed variables indicating aggregate innovation by its "neighbours". We did not find this result in the all-inclusive sample, nor over the size and age specific subsamples. In short, no negative offset to enterprises' innovation-driven employment growth shows up significantly in our data.[17]

Innovation-driven employment growth is inclusive

The data we study show that innovation-driven growth is inclusive. Descriptively, across all countries in our sample, innovative firms hire a larger share of unskilled workers than non-innovative firms: the mean employment share of unskilled workers for innovative firms (the combined groups of process and product innovators) is 34%, versus 30% for non-innovative firms.[18] Comparisons of the employment growth regressions in Tables 7.4 and 7.5 over the subsamples of enterprises with and without innovation confirm that unskilled workers are a major plus factor for employment growth associated with innovation. In Table 7.4, over all the countries studied, the share of the workforce that is unskilled contributes more to employment growth for the combined group of process and product innovators, as well as for process and product innovators separately, than for non-innovators. In the full sample across all firms, a 10 percentage point increase in the share of unskilled workers is associated with an employment growth rate that is almost one percentage point higher, all else equal. Given that the mean annual employment growth rate of all enterprises in our sample is just below 6%, the contribution of unskilled labour to employment growth is quantitatively important. When the estimation is run on sub-samples split by innovation status, the coefficient is larger for the joint group of process and product innovators (10.0) than for non-innovators (6.4). The effects of the share of unskilled workers on employment growth estimated on the separate

sub-samples of process-innovating firms and non-innovators are 9.0 versus 7.8, while for product-innovating firms and non-innovators they are 10.4 versus 7.2. The null hypothesis that the effect of the share of unskilled workers on employment growth is the same when estimated over the two sub-samples to be compared is rejected at conventional levels of significance for the process- or product-innovators/non-innovators sub-sample split, but not for the product-innovators/non-innovators and process-innovators/non-innovators splits.[19]

The same relationship holds over just the non-OECD countries for the regressions estimated over the combined group of process and product innovators, and over product innovators, as reported in Table 7.5, although the differences are not as large as for the sample of all countries. The coefficient on the share of the unskilled workforce across all firms is 8.2. When the estimation is run on sub-samples that are split by innovation status, the coefficient is again larger for the group of firms with either process or product innovations (9.1) than it is for non-innovators (6.8). For the sub-sample of only process innovators, the coefficient is estimated to be 7.6, versus 8.2 for non-process innovators. Comparing the sub-samples split by product innovation, the coefficient is 9.4 for innovators versus 7.6 for non-innovators.

One additional dimension of inclusiveness that we can demonstrate with our enterprise data is the participation by the female workforce in innovation-driven growth. Across all countries, innovative firms hire larger shares of female workers than non-innovative firms: the mean employment share of female workers by innovative firms (the combined group of process and product innovators) is 29%, versus 22% for non-innovative firms.[20] In the employment growth rate regressions of Tables 7.4 and 7.5, the positive contributions of the share of female employees to employment growth associated with innovation are statistically significant (at the 5 and 10% levels, respectively) for the combined group of process and product innovators, but not for non-innovators. Our findings suggest that a 10 percentage point increase in the share of female workers at an establishment is associated with an employment growth rate that is two-tenths of a percentage point higher. Based on findings reported in Tables 7.2 and 7.3, female participation contributes significantly to employment growth for young and medium-size firms across all countries, and across the non-OECD countries where this relationship is estimated to be more than twice the magnitude of the same relationship when it is estimated for the sample of all firms.

Table 7.4. Differential effects of determinants of growth for innovators and non-innovators

Full sample (OECD member countries, accession and enhanced engagement countries, and developing countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	Full	Process innovators	Not process innovators	Product innovators	Not product innovators	Product/ process innovators	Non-innovators
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
ln[Total Factor Prod.]	1.933+++	1.956+++	1.888+++	2.258+++	1.736+++	2.149+++	1.735+++
	(0.107)	(0.199)	(0.128)	(0.176)	(0.136)	(0.156)	(0.149)
Introduced new process	2.114+++			1.702+++	2.396+++		
	(0.386)			(0.575)	(0.540)		
Introduced new product	2.873+++	2.852+++	2.879+++				
	(0.358)	(0.578)	(0.462)				
Fraction of workforce unskilled	8.374+++	9.008+++	7.761+++	10.390+++	7.204+++	9.973+++	6.385+++
	(0.828)	(1.401)	(1.033)	(1.357)	(1.047)	(1.162)	(1.186)
Fraction of workforce female	1.486+	1.965	1.008	1.665	1.519	2.383++	0.569
	(0.814)	(1.355)	(1.027)	(1.255)	(1.077)	(1.109)	(1.214)
Firm exports	3.020+++	2.916+++	3.082+++	3.087+++	2.883+++	2.776+++	3.434+++
	(0.425)	(0.665)	(0.556)	(0.621)	(0.590)	(0.549)	(0.685)
Fraction of investment capital from local banks	0.017+++	0.010	0.022+++	0.015+	0.019++	0.017++	0.017+
	(0.006)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.010)
Fraction of loans in foreign currency	2.687+++	2.427+	2.734++	3.564+++	2.356+	2.235++	3.936+++
	(0.885)	(1.392)	(1.152)	(1.309)	(1.211)	(1.138)	(1.431)
Fraction of workers skilled	3.634+++	3.897+++	3.448+++	5.379+++	2.708+++	4.864+++	2.510++
	(0.804)	(1.379)	(0.994)	(1.333)	(1.008)	(1.141)	(1.133)
Firm uses Internet	3.624+++	4.617+++	3.253+++	4.587+++	2.977+++	4.827+++	2.621+++
	(0.428)	(0.783)	(0.516)	(0.731)	(0.533)	(0.629)	(0.591)
Firm has ISO certification	2.061+++	2.490+++	1.726+++	2.193+++	1.942+++	2.111+++	2.379+++
	(0.467)	(0.715)	(0.624)	(0.685)	(0.650)	(0.598)	(0.769)
Firm has formal training programme	3.837+++	3.286+++	3.950+++	3.447+++	4.119+++	3.426+++	4.259+++
	(0.392)	(0.649)	(0.495)	(0.611)	(0.516)	(0.529)	(0.592)

Table 7.4. Differential effects of determinants of growth for innovators and non-innovators (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	Full	Process innovators	Not process innovators	Product innovators	Not product innovators	Product/ process innovators	Non-innovators
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
Firm is part of a business association	0.643	0.448	0.770	0.591	0.706	0.873	0.414
	(0.413)	(0.690)	(0.518)	(0.656)	(0.535)	(0.569)	(0.606)
>10% Government-owned	-2.711+++	-3.273++	-2.662+++	-2.668+	-2.772+++	-2.829++	-2.830+++
	(0.784)	(1.336)	(0.973)	(1.387)	(0.954)	(1.142)	(1.082)
>10% Private foreign owned	1.840+++	2.496+++	1.557++	1.777++	1.756++	1.904+++	1.555+
	(0.556)	(0.865)	(0.731)	(0.824)	(0.760)	(0.722)	(0.886)
Size dummy: >200 employees	-26.901+++	-29.509+++	-25.139+++	-31.057+++	-24.511+++	-29.438+++	-24.132+++
	(0.703)	(1.203)	(0.888)	(1.121)	(0.918)	(0.976)	(1.050)
Size dummy:51-200 employees	-19.644+++	-21.760+++	-18.796+++	-23.292+++	-17.768+++	-21.775+++	-17.945+++
	(0.568)	(1.026)	(0.692)	(0.935)	(0.723)	(0.818)	(0.802)
Size dummy: 11-50 employees	-12.154+++	-13.716+++	-11.816+++	-14.534+++	-11.092+++	-13.740+++	-11.182+++
	(0.452)	(0.876)	(0.530)	(0.790)	(0.551)	(0.687)	(0.599)
Age dummy: 5-15 years old	-10.677+++	-8.939+++	-11.580+++	-10.443+++	-10.701+++	-10.099+++	-11.166+++
	(0.582)	(1.006)	(0.715)	(0.954)	(0.735)	(0.828)	(0.819)
Age dummy: 15+ years old	-13.210+++	-12.195+++	-13.679+++	-13.293+++	-12.841+++	-13.150+++	-13.015+++
	(0.600)	(1.046)	(0.734)	(0.982)	(0.759)	(0.856)	(0.842)
Firm is incorporated	1.031++	0.838	1.138++	0.840	1.225++	0.849	1.114+
	(0.454)	(0.792)	(0.557)	(0.763)	(0.567)	(0.652)	(0.636)
Constant	22.265++	28.399++	15.943	18.325	29.024++	23.291++	26.400
	(9.558)	(13.696)	(13.526)	(14.001)	(13.137)	(11.495)	(18.058)
Observations	24585	8759	15826	10192	14393	13390	11195
R-squared	0.154	0.179	0.145	0.166	0.150	0.161	0.148
Adjusted R-squared	0.150	0.169	0.139	0.157	0.144	0.154	0.140

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.
Source: Author's estimations.

Table 7.5. Differential effects of determinants of growth for innovators and non-innovators

OECD accession and enhanced engagement countries, and developing country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	Full	Process innovators	Not process innovators	Product innovators	Not product innovators	Product/process innovators	Non-innovators
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
ln[Total Factor Prod.]	1.913+++	1.804+++	1.936+++	2.207+++	1.721+++	2.041+++	1.796+++
	(0.126)	(0.221)	(0.155)	(0.199)	(0.164)	(0.176)	(0.183)
Introduced new process	1.864+++			1.488++	1.921+++		
	(0.451)			(0.641)	(0.649)		
Introduced new product	3.033+++	3.448+++	2.726+++				
	(0.418)	(0.640)	(0.555)				
Fraction of workforce unskilled	8.219+++	7.637+++	8.158+++	9.363+++	7.558+++	9.149+++	6.795+++
	(0.939)	(1.523)	(1.198)	(1.489)	(1.212)	(1.276)	(1.396)
Fraction of workforce female	1.539+	1.535	1.285	1.617	1.757	2.145+	1.024
	(0.906)	(1.456)	(1.167)	(1.350)	(1.231)	(1.192)	(1.415)
Firm exports	2.963+++	3.402+++	2.711+++	2.619+++	3.253+++	2.749+++	3.444+++
	(0.498)	(0.741)	(0.673)	(0.705)	(0.708)	(0.624)	(0.838)
Fraction of investment capital from local banks	0.012+	0.003	0.019++	0.010	0.013	0.013	0.010
	(0.007)	(0.010)	(0.009)	(0.010)	(0.010)	(0.009)	(0.012)
Fraction of loans in foreign currency	3.406+++	2.899+	3.600+++	3.728+++	3.676++	2.887++	5.105+++
	(1.015)	(1.549)	(1.345)	(1.439)	(1.437)	(1.270)	(1.702)
Fraction of workers skilled	3.930+++	3.316++	4.040+++	5.399+++	3.016++	4.861+++	2.831++
	(0.928)	(1.515)	(1.180)	(1.474)	(1.198)	(1.265)	(1.374)
Firm uses Internet	3.914+++	4.404+++	3.871+++	4.903+++	3.091+++	4.890+++	2.990+++
	(0.494)	(0.851)	(0.616)	(0.790)	(0.641)	(0.686)	(0.727)
Firm has ISO certification	1.439++	1.825++	1.066	2.143+++	0.805	1.770++	1.342
	(0.571)	(0.817)	(0.801)	(0.800)	(0.826)	(0.700)	(1.010)
Firm has formal training programme	3.024+++	2.361+++	3.272+++	2.182+++	3.843+++	2.302+++	4.094+++
	(0.466)	(0.722)	(0.612)	(0.691)	(0.635)	(0.600)	(0.748)
Firm is part of a business association	1.024++	0.720	1.041+	0.983	0.987	1.260++	0.542
	(0.464)	(0.737)	(0.600)	(0.706)	(0.620)	(0.615)	(0.717)

Table 7.5. Differential effects of determinants of growth for innovators and non-innovators (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	Full	Process innovators	Not process	Product innovators	Not product	Product/process	Non-innovators
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country FE	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y
Dependent Var	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate	Employment growth rate
>10% Government-owned	-2.794+++	-3.431++	-2.682++	-2.741+	-2.949+++	-2.981++	-2.844++
	(0.848)	(1.390)	(1.077)	(1.441)	(1.058)	(1.194)	(1.220)
>10% Private foreign owned	1.802+++	2.484+++	1.552+	1.789+	1.598+	1.910++	1.490
	(0.646)	(0.949)	(0.882)	(0.936)	(0.895)	(0.812)	(1.075)
Size dummy: >200 employees	-28.101+++	-29.501+++	-26.802+++	-32.147+++	-25.581+++	-29.820+++	-26.106+++
	(0.831)	(1.361)	(1.074)	(1.282)	(1.101)	(1.117)	(1.276)
Size dummy:51-200 employees	-20.735+++	-21.337+++	-20.510+++	-23.982+++	-18.926+++	-21.896+++	-19.831+++
	(0.688)	(1.173)	(0.865)	(1.073)	(0.906)	(0.942)	(1.028)
Size dummy: 11-50 employees	-12.790+++	-13.232+++	-12.851+++	-14.744+++	-11.860+++	-13.451+++	-12.605+++
	(0.551)	(1.012)	(0.665)	(0.905)	(0.697)	(0.794)	(0.772)
Age dummy: 5-15 yrs old	-10.749+++	-8.793+++	-11.851+++	-10.477+++	-10.675+++	-10.058+++	-11.352+++
	(0.657)	(1.062)	(0.837)	(1.016)	(0.863)	(0.884)	(0.986)
Age dummy: 15+ yrs old	-12.948+++	-11.567+++	-13.642+++	-13.349+++	-12.134+++	-12.860+++	-12.588+++
	(0.683)	(1.114)	(0.868)	(1.053)	(0.902)	(0.922)	(1.025)
Firm is incorporated	0.356	0.393	0.282	0.137	0.703	0.167	0.472
	(0.538)	(0.879)	(0.686)	(0.861)	(0.693)	(0.736)	(0.798)
Constant	9.626++	6.339	11.196+	-1.017	-5.363	3.319	3.173
	(4.572)	(10.902)	(6.535)	(10.743)	(9.544)	(10.239)	(7.565)
Observations	18564	6965	11599	8092	10472	10547	8017
R-squared	0.155	0.181	0.149	0.175	0.149	0.164	0.152
Adjusted R-squared	0.150	0.171	0.141	0.165	0.141	0.156	0.142

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.
Source: Author's estimations.

Finally, it is stimulating to note that when the enterprise level wage rate is introduced as an additional variable into the regression specifications reported in Tables 7.4 and 7.5, there is a significant negative association between the average annual wage levels and the employment growth rates for the non-innovating firms. In contrast, there is no significant correlation between wage levels and employment growth rates for both process and product innovators. These correlations reflect only intra-national differences, due to the national fixed effects variables. While these differences might arise from exogenous intra-national regional variations in wage rates, inasmuch as they arise instead from differences among the jobs filled by the enterprises themselves, the resulting regressions are unsuitable for testing hypotheses about the impacts of wages on employment. Nevertheless, the estimation results are consistent with the hypothesis that innovative enterprises can afford to employ more in a manner insensitive to wage costs, due apparently to their enhanced opportunities to cover those costs with innovation-driven growth, while enterprises without fresh innovation, on average, have less compensatory opportunities for employment growth and thus employ in a manner far more sensitive to labour costs. Under this hypothesis, and in view of our finding that innovative firms hire a larger share of unskilled workers than non-innovative firms, innovation might ease concerns related to the low-wage trap for unskilled labour.

Access to export markets, finance, communications and other essential business services are key additional correlates of employment growth

In addition to innovation as a source of inclusive growth, there are a number of other significant correlates of employment growth that have strong policy implications - including support for the competition policy mandate to assure access to essential business services for entering markets and expanding outputs. Table 7.2 reports the statistically significant importance for employment growth over our most inclusive sample of access to: finance (investment capital from both local banks and foreign borrowing), communications (enterprises using the Internet grow significantly faster), export markets, and other essential business services such as ISO management certification and formal worker training programmes.[21] In addition, having less government ownership and having greater access to global know-how through foreign ownership are both positive correlates of enterprise employment growth. The same relationships hold in our non-OECD countries sample, as reported in Table 7.3, with the additional significance of the variable indicating that the firm is part of a business association, which had no statistically significant relationship with enterprise employment growth across all countries.

Notable policy implications also seem to be indicated by some significant differences between innovators and non-innovators (Tables 7.4 and 7.5), and among firms in various age and size categories. One striking example is that ISO certification is associated with more than 2.1 and 1.8 percentage points of added employment growth for product and process innovators respectively in non-OECD countries, while it is statistically unrelated to employment growth for non-innovators. The large firms (with over 200 employees) in both the all-country and non-OECD country samples are different from smaller firms in that while their employment growth is significantly affected, on average, by their product innovations, it is not significantly related to their process innovations or their TFP. In addition, large firms' employment growth is unrelated to Internet use, ISO certification, use of formal job training programmes, membership in a business association, and incorporation status. The young firms are different on average since their employment growth rates are not significantly related to process innovation (though they are significantly related to TFP and product innovation), ISO certification, membership in a business association, and their incorporation status. In contrast, Internet use and formal job training are much more important to the employment growth of young firms than they are to other categories of firms.

What are the individual characteristics of innovative enterprises?

Our regressions estimating the parameters of the R&D, product innovation, process innovation and TFP equations (1), (2) and (3) discussed above are reported in Tables 7.6 to 7.11 for the sample across all countries studied and for the non-OECD countries sample. It should be noted that these equations together have an architecture that has elements of a triangular system. Enterprise R&D that is studied in (1) is a significant explanatory variable in the set of process and product innovation equations (2).[22] Product and process innovation are themselves explanatory variables in the TFP equation (3), although only product innovation is estimated to have a significant positive coefficient. Product innovation, process innovation, and TFP are all significant explanatory variables in the employment growth equation (4), along with many of the variables indicating characteristics of the enterprises that also appear as explanatory variables in equations (1), (2), and (3).[23]

It is clear from Tables 7.6 to 7.11 that enterprise size counts for innovation. Bigger enterprises, from micro (one to ten employees) on up to over 200 employees, are more likely to invest in R&D, more likely to innovate given the intensity of their R&D spending, and more likely to have superior TFP, given their innovation performance. This is the case given all the other controls accounted for in the regressions, and irrespective of

whether the OECD-country enterprises are included in the sample. This finding comes as no surprise, since bigger firms are apt to have more resources and greater incentives to innovate, and it is unlikely that the other control variables reflect all the advantages of scale for innovation.[24] It is striking that among the firms in the largest size category (greater than 200 employees), the oldest age group is some 12% more likely to invest in R&D than young firms. In contrast, there is no age effect on innovation in our data, given controls for the size of the enterprise. Throughout the R&D, innovation and TFP regressions there are hardly any statistically significant coefficients on age group indicator variables, inasmuch as the regressions include size category variables as well, or are estimated over subsamples of firms confined to given size categories.

Enterprises that are incorporated are significantly more likely to do R&D, and incorporation is a plus factor for process innovation by old and large firms and for TFP of micro and mature firms. Government ownership stake in an enterprise (of greater than 10%) is a generally significant negative factor for innovation and for TFP. Foreign private ownership stake in an enterprise (of greater than 10%) is a significantly negative factor for innovation, especially in the non-OECD sample, and yet is a positive factor overall for TFP.

Foreign borrowing (but not investment capital from local banks) is a strong and statistically significant correlate of R&D activity and TFP for small and young establishments, but is not directly a significant correlate of their innovation (while controlling for R&D), and access to credit does not show material relationships with any of our innovation indicators for other category firms. Firms that export are significantly more likely to engage in R&D (except for large firms employing more than 200 employees) and to innovate (except for large and young firms). There is a strong and significant positive correlation in all categories of firms between export activity and TFP. Use of the Internet, access to other essential business services (ISO certification, formal worker training programmes, being part of a business association), and formal cooperation with other firms (participation in a new foreign joint venture and entering into a new licensing agreement) are all generally strong positive correlates of enterprise product and process innovation. Internet use, formal training programmes (for relatively old and large firms), and membership in a business association (for old firms particularly) are significant positive correlates of TFP.

Table 7.6. Business environment determinants of establishment-level R&D

Full sample (OECD member countries, accession and enhanced engagement countries, and developing countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	R&D	R&D	R&D	R&D	R&D	R&D	R&D	R&D
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)
Firm exports	0.063+++	0.069+++	0.070+++	0.073+++	0.023	0.065+++	0.066+++	0.059+++
	(0.007)	(0.015)	(0.011)	(0.014)	(0.020)	(0.022)	(0.010)	(0.010)
Fraction of investment capital from local banks	0.000+	0.000+++	0.000	0.000	-0.000	-0.000	0.000+	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
US Sector R&D intensity	1.642+++	1.598+++	1.717+++	1.694+++	1.431+++	0.578	1.933+++	1.793+++
	(0.167)	(0.269)	(0.255)	(0.383)	(0.531)	(0.550)	(0.250)	(0.257)
Firm undertook a new foreign joint venture	0.051+++	0.084+++	0.024	0.077+++	0.052+	0.048	0.022	0.085+++
	(0.013)	(0.029)	(0.020)	(0.028)	(0.032)	(0.037)	(0.018)	(0.020)
Firm obtained a new licensing agreement	0.083+++	0.069+++	0.091+++	0.108+++	0.065++	0.070++	0.084+++	0.070+++
	(0.013)	(0.027)	(0.024)	(0.028)	(0.030)	(0.038)	(0.018)	(0.020)
Fraction of loans in foreign currency	-0.004	0.015	0.066+++	-0.002	-0.008	0.091+++	-0.037+	-0.006
	(0.014)	(0.021)	(0.025)	(0.034)	(0.039)	(0.035)	(0.020)	(0.023)
>10% government-owned	-0.003	0.019	0.028	-0.031	-0.046	0.072+	-0.016	0.020
	(0.012)	(0.025)	(0.029)	(0.028)	(0.028)	(0.049)	(0.019)	(0.019)
>10% private foreign owned	0.011	0.027+	0.030+	0.028	-0.017	-0.023	-0.001	0.029++
	(0.008)	(0.018)	(0.017)	(0.019)	(0.021)	(0.022)	(0.011)	(0.015)
Size dummy: >200 employees	0.270+++					0.092++	0.250+++	0.324+++
	(0.013)					(0.041)	(0.021)	(0.020)

Table 7.6. Business environment determinants of establishment-level R&D (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	R&D	R&D	R&D	R&D	R&D	R&D	R&D	R&D
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)
	(0.011)					(0.030)	(0.016)	(0.017)
Size dummy: 11-50 employees	0.081+++					0.045++	0.094+++	0.082+++
	(0.008)					(0.020)	(0.011)	(0.014)
Age dummy: 5-15 years old	0.008	-0.004	0.016	0.037	0.046			
	(0.009)	(0.010)	(0.014)	(0.025)	(0.040)			
Age dummy: 15+ years old	0.021++	0.004	0.010	0.037	0.116+++			
	(0.010)	(0.011)	(0.014)	(0.025)	(0.038)			
Firm is incorporated	0.046+++	0.018+	0.042+++	0.020	0.040	0.027	0.054+++	0.017
	(0.008)	(0.011)	(0.012)	(0.019)	(0.026)	(0.021)	(0.011)	(0.013)
Observations	24491	6206	8901	5339	3775	2370	10734	10989
Pseudo R-squared	0.172	0.190	0.132	0.143	0.148	0.174	0.173	0.181

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.

Source: Authors' estimations.

Table 7.7. Business environment determinants of establishment-level R&D

OECD accession and enhanced engagement countries, and developing country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	R&D	R&D	R&D	R&D	R&D	R&D	R&D	R&D
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)
Firm exports	0.051+++	0.089+++	0.055+++	0.060+++	0.011	0.056++	0.060+++	0.041+++
	(0.008)	(0.021)	(0.013)	(0.017)	(0.022)	(0.023)	(0.012)	(0.012)
Fraction of investment capital from local banks	0.000	0.000++	0.000	-0.000	-0.000	-0.000	0.000+	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
US Sector R&D intensity	1.797+++	2.179+++	1.759+++	1.850+++	1.710+++	1.022+	2.131+++	1.778+++
	(0.211)	(0.414)	(0.315)	(0.487)	(0.596)	(0.595)	(0.309)	(0.337)
Firm undertook a new foreign joint venture	0.053+++	0.098+++	0.019	0.073++	0.068+	0.050	0.010	0.108+++
	(0.015)	(0.038)	(0.023)	(0.032)	(0.036)	(0.039)	(0.020)	(0.025)
Firm obtained a new licensing agreement	0.088+++	0.070++	0.096+++	0.123+++	0.075++	0.072++	0.098+++	0.067+++
	(0.015)	(0.035)	(0.028)	(0.031)	(0.032)	(0.040)	(0.021)	(0.024)
Fraction of loans in foreign currency	-0.002	0.015	0.072++	-0.008	-0.043	0.100+++	-0.062++	0.015
	(0.017)	(0.028)	(0.030)	(0.041)	(0.042)	(0.037)	(0.025)	(0.029)
>10% government-owned	0.002	0.032	0.028	-0.026	-0.025	0.066	-0.008	0.014
	(0.013)	(0.032)	(0.032)	(0.030)	(0.030)	(0.049)	(0.022)	(0.021)
>10% private foreign owned	0.002	0.028	0.018	0.017	-0.023	-0.022	-0.001	0.005
	(0.010)	(0.022)	(0.020)	(0.022)	(0.023)	(0.023)	(0.013)	(0.018)
Size dummy: >200 employees	0.238+++					0.080++	0.232+++	0.281+++
	(0.015)					(0.042)	(0.024)	(0.024)

Table 7.7. Business environment determinants of establishment-level R&D (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	R&D	R&D	R&D	R&D	R&D	R&D	R&D	R&D
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)
Size dummy:51-200 employees	0.160+++					0.097+++	0.174+++	0.176+++
	(0.012)					(0.031)	(0.018)	(0.021)
Size dummy: 11-50 employees	0.064+++					0.034	0.078+++	0.066+++
	(0.010)					(0.022)	(0.013)	(0.018)
Age dummy: 5-15 years old	0.007	-0.004	0.017	0.022	0.040			
	(0.011)	(0.013)	(0.016)	(0.028)	(0.041)			
Age dummy: 15+ years old	0.012	-0.003	0.008	0.012	0.091++			
	(0.011)	(0.015)	(0.016)	(0.028)	(0.039)			
Firm is incorporated	0.063+++	0.043+++	0.065+++	0.059++	0.096+++	0.027	0.065+++	0.051+++
	(0.009)	(0.017)	(0.014)	(0.023)	(0.028)	(0.022)	(0.012)	(0.017)
Observations	18272	4216	6793	3991	3035	2085	8244	7711
Pseudo R-squared	0.159	0.180	0.131	0.135	0.134	0.177	0.163	0.163

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.

Source: Authors' estimations.

Table 7.8. Business environment determinants of establishment-level innovation

Full sample (OECD member and accession and enhanced engagement countries, and developing countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced
Dependent Var	new product	new product	new product	new product	new product	new product	new product	new product	new process	new process	new process	new process	new process	new process	new process	new process
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Reporting	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect
Firm R&D intensity	0.414+++	0.190	0.384+++	0.680+++	0.527++	0.169	0.447+++	0.504+++	0.300+++	0.130	0.270+++	0.318	0.645++	0.108	0.455+++	0.265++
	(0.082)	(0.147)	(0.116)	(0.233)	(0.255)	(0.183)	(0.136)	(0.128)	(0.073)	(0.111)	(0.100)	(0.201)	(0.283)	(0.180)	(0.130)	(0.106)
Fraction of workers skilled	-0.017	-0.013	-0.013	0.016	-0.066++	0.002	-0.016	-0.028	0.019+	0.040++	0.009	0.030	-0.023	0.052	-0.007	0.042++
	(0.012)	(0.022)	(0.020)	(0.028)	(0.032)	(0.037)	(0.018)	(0.019)	(0.011)	(0.017)	(0.017)	(0.027)	(0.033)	(0.035)	(0.017)	(0.017)
Firm uses Internet	0.130+++	0.104+++	0.135+++	0.129+++	0.171+++	0.092+++	0.128+++	0.142+++	0.106+++	0.082+++	0.106+++	0.084+++	0.136+++	0.145+++	0.100+++	0.107+++
	(0.008)	(0.015)	(0.013)	(0.021)	(0.029)	(0.026)	(0.013)	(0.013)	(0.008)	(0.012)	(0.011)	(0.020)	(0.031)	(0.024)	(0.012)	(0.011)
Firm has ISO certification	0.107+++	0.136+++	0.087+++	0.061+++	0.119+++	0.073++	0.117+++	0.101+++	0.082+++	0.062+++	0.079+++	0.073+++	0.094+++	0.085+++	0.093+++	0.074+++
	(0.009)	(0.025)	(0.017)	(0.017)	(0.019)	(0.033)	(0.014)	(0.013)	(0.009)	(0.019)	(0.016)	(0.017)	(0.020)	(0.031)	(0.014)	(0.012)
Firm has formal training programme	0.109+++	0.114+++	0.102+++	0.116+++	0.114+++	0.094+++	0.095+++	0.124+++	0.079+++	0.064+++	0.077+++	0.104+++	0.058++	0.026	0.096+++	0.075+++
	(0.008)	(0.016)	(0.012)	(0.017)	(0.022)	(0.024)	(0.012)	(0.012)	(0.007)	(0.013)	(0.011)	(0.016)	(0.023)	(0.023)	(0.011)	(0.010)
Firm exports	0.047+++	0.147+++	0.075+++	0.001	-0.011	0.033	0.065+++	0.039+++	0.031+++	0.057+++	0.043+++	0.029+	0.006	-0.004	0.040+++	0.035+++
	(0.008)	(0.022)	(0.014)	(0.016)	(0.020)	(0.029)	(0.013)	(0.012)	(0.008)	(0.017)	(0.013)	(0.015)	(0.020)	(0.026)	(0.012)	(0.011)
Fraction of investment capital from local banks	0.000++	0.000	0.000++	0.000	0.000	-0.000	0.000++	0.000	0.000+++	0.000+	0.000	0.001+++	0.000	0.000	0.000++	0.000+++
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm is part of a business association	0.034+++	0.030++	0.034+++	0.046++	0.056++	0.055++	0.039+++	0.033++	0.034+++	0.044+++	0.037+++	0.033+	-0.003	0.077+++	0.047+++	0.008
	(0.008)	(0.015)	(0.013)	(0.019)	(0.025)	(0.027)	(0.012)	(0.013)	(0.008)	(0.012)	(0.012)	(0.018)	(0.026)	(0.027)	(0.011)	(0.012)
Firm undertook a new foreign joint venture	0.123+++	0.144+++	0.097+++	0.152+++	0.121+++	0.247+++	0.077+++	0.142+++	0.044+++	0.115+++	0.008	0.012	0.110+++	0.155+++	0.036	0.031
	(0.016)	(0.044)	(0.029)	(0.031)	(0.030)	(0.051)	(0.025)	(0.024)	(0.014)	(0.037)	(0.023)	(0.028)	(0.031)	(0.050)	(0.023)	(0.020)
Firm obtained a new licensing agreement	0.220+++	0.262+++	0.198+++	0.223+++	0.210+++	0.232+++	0.204+++	0.226+++	0.190+++	0.140+++	0.194+++	0.202+++	0.214+++	0.227+++	0.195+++	0.174+++
	(0.015)	(0.039)	(0.028)	(0.027)	(0.027)	(0.047)	(0.022)	(0.023)	(0.015)	(0.033)	(0.027)	(0.029)	(0.029)	(0.048)	(0.022)	(0.023)

Table 7.8. Business environment determinants of establishment-level innovation (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Dependent Var	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Reporting	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect
Fraction of loans in foreign currency	-0.058+++	-0.023	-0.007	-0.050	-0.067++	-0.060	-0.056++	-0.082+++	-0.049+++	-0.011	-0.054+	-0.063+	-0.021	-0.176+++	-0.024	-0.051++
	(0.017)	(0.039)	(0.034)	(0.038)	(0.034)	(0.053)	(0.027)	(0.026)	(0.016)	(0.029)	(0.029)	(0.035)	(0.036)	(0.049)	(0.025)	(0.023)
>10% Government-owned	-0.071+++	0.044	-0.121+++	-0.090+++	-0.071++	0.039	-0.087+++	-0.114+++	-0.042+++	-0.031	-0.058++	-0.043	-0.052+	-0.076	-0.094+++	-0.024
	(0.015)	(0.051)	(0.034)	(0.030)	(0.028)	(0.056)	(0.027)	(0.021)	(0.013)	(0.029)	(0.027)	(0.028)	(0.029)	(0.044)	(0.021)	(0.019)
>10% Private foreign owned	-0.012	-0.078+++	-0.003	0.018	-0.010	-0.054	0.004	-0.018	-0.024++	-0.038+	-0.041++	-0.051+++	0.020	-0.058+	-0.016	-0.031++
	(0.011)	(0.027)	(0.022)	(0.021)	(0.021)	(0.033)	(0.016)	(0.017)	(0.009)	(0.019)	(0.017)	(0.019)	(0.022)	(0.029)	(0.014)	(0.015)
Size dummy: >200 employees	0.037+++					-0.000	0.024	0.066+++	0.087+++					0.164+++	0.086+++	0.101+++
	(0.014)					(0.049)	(0.021)	(0.021)	(0.014)					(0.052)	(0.022)	(0.021)
Size dummy:51-200 employees	0.023++					0.049	-0.003	0.055+++	0.043+++					0.047	0.029+	0.070+++
	(0.011)					(0.036)	(0.017)	(0.018)	(0.011)					(0.034)	(0.016)	(0.017)
Size dummy: 11-50 employees	0.003					0.016	-0.016	0.031++	0.032+++					0.036	0.020	0.055+++
	(0.009)					(0.027)	(0.013)	(0.015)	(0.009)					(0.026)	(0.013)	(0.015)
Age dummy: 5-15 years old	0.022+	0.026	0.002	0.018	0.075++				0.017	-0.003	0.026	0.049+	0.021			
	(0.011)	(0.017)	(0.018)	(0.027)	(0.037)				(0.010)	(0.014)	(0.016)	(0.026)	(0.040)			
Age dummy: 15+ years old	0.013	-0.016	0.004	0.028	0.060				-0.001	-0.026+	0.011	0.036	0.020			
	(0.011)	(0.019)	(0.019)	(0.026)	(0.037)				(0.011)	(0.015)	(0.017)	(0.025)	(0.040)			
Firm is incorporated	0.002	0.007	0.023	-0.028	-0.012	-0.028	0.013	0.023	0.011	0.003	0.011	-0.011	0.070+++	-0.017	0.005	0.036+++
	(0.009)	(0.018)	(0.015)	(0.021)	(0.024)	(0.028)	(0.013)	(0.015)	(0.008)	(0.014)	(0.013)	(0.020)	(0.026)	(0.026)	(0.013)	(0.014)
Observations	26108	6758	9558	5637	4136	2600	11412	11755	24258	6041	8976	5326	3852	2353	10693	10847
Pseudo R-squared	0.117	0.121	0.118	0.114	0.119	0.122	0.113	0.137	0.178	0.179	0.185	0.155	0.143	0.157	0.178	0.194

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.

Source: Authors' estimations.

Table 7.9. Business environment determinants of establishment-level innovation

OECD accession and enhanced engagement countries, and developing country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Dependent Var	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect
Reporting	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)	(Marg. Eff SE)
Firm R&D intensity	0.376+++	0.256	0.319++	0.615++	0.446	0.344+	0.368++	0.401+++	0.331+++	0.213	0.293++	0.425+	0.418	0.323	0.470+++	0.237+
	(0.089)	(0.171)	(0.124)	(0.253)	(0.277)	(0.201)	(0.149)	(0.136)	(0.092)	(0.173)	(0.124)	(0.250)	(0.365)	(0.224)	(0.160)	(0.134)
Fraction of workers skilled	-0.000	-0.003	0.009	0.024	-0.052	0.017	-0.001	-0.016	0.035++	0.092+++	0.039+	0.011	-0.040	0.090++	0.004	0.049++
	(0.014)	(0.027)	(0.023)	(0.032)	(0.035)	(0.040)	(0.021)	(0.022)	(0.014)	(0.028)	(0.023)	(0.033)	(0.042)	(0.040)	(0.021)	(0.023)
Firm uses Internet	0.153+++	0.130+++	0.141+++	0.162+++	0.167+++	0.121+++	0.142+++	0.172+++	0.126+++	0.100+++	0.121+++	0.111+++	0.148+++	0.152+++	0.120+++	0.124+++
	(0.009)	(0.019)	(0.014)	(0.022)	(0.030)	(0.027)	(0.014)	(0.015)	(0.010)	(0.020)	(0.015)	(0.024)	(0.080)	(0.027)	(0.015)	(0.016)
Firm has ISO certification	0.123+++	0.182+++	0.087+++	0.083+++	0.137+++	0.093+++	0.115+++	0.125+++	0.098+++	0.116+++	0.073+++	0.084+++	0.102+++	0.118+++	0.106+++	0.083+++
	(0.011)	(0.031)	(0.020)	(0.021)	(0.021)	(0.036)	(0.017)	(0.016)	(0.011)	(0.028)	(0.020)	(0.021)	(0.060)	(0.036)	(0.017)	(0.016)
Firm has formal training programme	0.075+++	0.104+++	0.061+++	0.079+++	0.097+++	0.084+++	0.071+++	0.074+++	0.082+++	0.103+++	0.076+++	0.099+++	0.049+	0.028	0.108+++	0.069+++
	(0.009)	(0.020)	(0.014)	(0.019)	(0.024)	(0.026)	(0.014)	(0.014)	(0.009)	(0.020)	(0.014)	(0.020)	(0.028)	(0.026)	(0.014)	(0.014)
Firm exports	0.014	0.120+++	0.052+++	-0.054+++	-0.030	0.007	0.037++	-0.003	0.020++	0.047+	0.049+++	0.008	-0.009	-0.011	0.034++	0.024
	(0.010)	(0.026)	(0.016)	(0.018)	(0.022)	(0.031)	(0.015)	(0.015)	(0.010)	(0.026)	(0.016)	(0.019)	(0.023)	(0.030)	(0.015)	(0.015)
Fraction of investment capital from local banks	0.000++	0.000	0.000++	0.000	0.000	-0.000	0.000+	0.000	0.000+++	0.000	0.000	0.001+	0.000	0.000	0.000	0.000++
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm is part of a business association	0.040+++	0.024	0.043+++	0.051++	0.058++	0.057++	0.049+++	0.029++	0.043+++	0.066+++	0.048+++	0.043++	-0.002	0.074++	0.053+++	0.016
	(0.009)	(0.017)	(0.014)	(0.021)	(0.026)	(0.028)	(0.013)	(0.015)	(0.009)	(0.018)	(0.014)	(0.021)	(0.028)	(0.029)	(0.014)	(0.015)
Firm undertook a new foreign joint venture	0.120+++	0.187+++	0.078++	0.137+++	0.129+++	0.269+++	0.074+++	0.136+++	0.063+++	0.191+++	0.014	0.013	0.130+++	0.163+++	0.050+	0.051+
	(0.018)	(0.053)	(0.032)	(0.035)	(0.034)	(0.052)	(0.027)	(0.028)	(0.018)	(0.053)	(0.030)	(0.034)	(0.255)	(0.054)	(0.027)	(0.027)
Firm obtained a new licensing agreement	0.210+++	0.233+++	0.187+++	0.224+++	0.206+++	0.202+++	0.198+++	0.216+++	0.199+++	0.197+++	0.204+++	0.192+++	0.207+++	0.231+++	0.197+++	0.183+++
	(0.016)	(0.045)	(0.031)	(0.029)	(0.030)	(0.050)	(0.023)	(0.027)	(0.017)	(0.044)	(0.031)	(0.030)	(0.558)	(0.050)	(0.024)	(0.027)

Table 7.9. Business environment determinants of establishment-level innovation (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Dependent Var	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new product	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process	Introduced new process
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit	Probit
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Reporting	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)	Marginal effect (Marg. Eff SE)
Fraction of loans in foreign currency	-0.036+	-0.017	0.035	-0.032	-0.071+	-0.049	-0.033	-0.063++	-0.066+++	-0.020	-0.092++	-0.070	-0.035	-0.191+++	-0.028	-0.077++
	(0.020)	(0.044)	(0.040)	(0.045)	(0.037)	(0.056)	(0.030)	(0.031)	(0.020)	(0.043)	(0.039)	(0.045)	(0.043)	(0.055)	(0.031)	(0.031)
>10% Government-owned	-0.049+++	0.052	-0.112+++	-0.076++	-0.036	0.041	-0.065++	-0.095+++	-0.040++	-0.060	-0.054	-0.037	-0.032	-0.088+	-0.090+++	-0.034
	(0.016)	(0.053)	(0.037)	(0.032)	(0.030)	(0.057)	(0.030)	(0.023)	(0.017)	(0.040)	(0.036)	(0.034)	(0.033)	(0.050)	(0.028)	(0.024)
>10% Private foreign owned	-0.022+	-0.086++	-0.000	-0.007	-0.003	-0.052	-0.006	-0.040+	-0.032++	-0.036	-0.047++	-0.075+++	0.027	-0.054	-0.028	-0.039+
	(0.012)	(0.032)	(0.025)	(0.024)	(0.023)	(0.035)	(0.018)	(0.021)	(0.012)	(0.031)	(0.023)	(0.023)	(0.030)	(0.034)	(0.018)	(0.021)
Size dummy: >200 employees	0.016					-0.027	0.023	0.036	0.101+++					0.166+++	0.112+++	0.102+++
	(0.016)					(0.050)	(0.024)	(0.025)	(0.017)					(0.055)	(0.026)	(0.028)
Size dummy:51-200 employees	0.016					0.020	0.000	0.042+	0.059+++					0.046	0.052++	0.076+++
	(0.013)					(0.038)	(0.020)	(0.022)	(0.014)					(0.039)	(0.021)	(0.025)
Size dummy: 11-50 employees	-0.011					-0.007	-0.023	0.014	0.035+++					0.026	0.039++	0.043++
	(0.011)					(0.029)	(0.015)	(0.019)	(0.012)					(0.031)	(0.017)	(0.021)
Age dummy: 5-15 years old	0.014	0.015	-0.001	-0.005	0.071+				0.023+	-0.014	0.047++	0.045	0.014			
	(0.012)	(0.021)	(0.020)	(0.029)	(0.039)				(0.013)	(0.021)	(0.020)	(0.030)	(0.042)			
Age dummy: 15+ years old	-0.005	-0.030	-0.008	-0.014	0.040				-0.009	-0.026	0.008	0.012	0.004			
	(0.013)	(0.023)	(0.021)	(0.029)	(0.039)				(0.013)	(0.024)	(0.022)	(0.030)	(0.041)			
Firm is incorporated	-0.002	0.014	0.015	-0.024	0.003	-0.036	0.014	0.018	0.023++	0.032	0.018	-0.004	0.088+++	-0.023	0.021	0.067+++
	(0.010)	(0.023)	(0.017)	(0.023)	(0.027)	(0.030)	(0.015)	(0.018)	(0.011)	(0.023)	(0.017)	(0.025)	(0.038)	(0.029)	(0.016)	(0.019)
Observations	19889	4736	7450	4289	3396	2282	8922	8477	18039	4016	6868	3978	3112	2028	8203	7569
Pseudo R-squared	0.117	0.120	0.120	0.125	0.130	0.123	0.111	0.141	0.160	0.175	0.171	0.127	0.137	0.147	0.160	0.180

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.

Source: Authors' estimations.

Table 7.10. Business environment determinants of establishment-level TFP

Full sample (OECD member countries, accession and enhanced engagement countries, and developing countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)
Introduced new product	0.046+	0.183+++	0.037	0.002	-0.050	0.046	0.049	0.068
	(0.028)	(0.056)	(0.046)	(0.059)	(0.069)	(0.091)	(0.042)	(0.042)
Introduced new process	0.023	0.078	0.011	-0.014	0.083	-0.073	0.051	0.034
	(0.030)	(0.063)	(0.050)	(0.063)	(0.072)	(0.099)	(0.045)	(0.046)
Fraction of workers skilled	0.193+++	0.076	0.182++	0.168	0.261++	0.066	0.196+++	0.190+++
	(0.047)	(0.091)	(0.079)	(0.107)	(0.120)	(0.150)	(0.070)	(0.072)
Firm uses Internet	0.349+++	0.442+++	0.326+++	0.320+++	0.138	0.265++	0.427+++	0.303+++
	(0.033)	(0.061)	(0.052)	(0.082)	(0.113)	(0.105)	(0.049)	(0.052)
Firm has ISO certification	-0.202+++	-0.047	0.017	-0.296+++	-0.366+++	-0.295++	-0.291+++	-0.155+++
	(0.035)	(0.094)	(0.064)	(0.065)	(0.075)	(0.131)	(0.055)	(0.051)
Firm has formal training programme	0.075++	0.104	0.017	-0.056	0.274+++	0.054	0.058	0.106++
	(0.031)	(0.064)	(0.048)	(0.064)	(0.084)	(0.099)	(0.046)	(0.046)
Firm exports	0.479+++	0.498+++	0.328+++	0.459+++	0.538+++	0.468+++	0.443+++	0.464+++
	(0.033)	(0.083)	(0.055)	(0.061)	(0.074)	(0.115)	(0.050)	(0.047)
Fraction of investment capital from local banks	-0.000	-0.001	-0.000	0.000	-0.001	0.001	-0.000	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Firm is part of a business association	0.070++	0.068	0.050	0.140+	0.155	-0.066	0.088+	0.105++
	(0.032)	(0.060)	(0.051)	(0.073)	(0.095)	(0.108)	(0.046)	(0.050)
Fraction of loans in foreign currency	-0.023	-0.218	0.387+++	-0.149	0.084	0.461++	-0.193+	0.042
	(0.069)	(0.169)	(0.136)	(0.143)	(0.129)	(0.216)	(0.105)	(0.102)

Table 7.10. Business environment determinants of establishment-level TFP (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)	Coefficient(SE)
>10% Government-owned	-0.214+++	-0.233	0.060	-0.247++	-0.233++	0.241	-0.039	-0.210++
	(0.061)	(0.189)	(0.140)	(0.116)	(0.107)	(0.220)	(0.109)	(0.085)
>10% Private foreign owned	0.152+++	0.179	0.058	0.147+	0.141+	0.098	0.213+++	0.080
	(0.043)	(0.125)	(0.085)	(0.078)	(0.078)	(0.136)	(0.062)	(0.068)
Size dummy: >200 employees	1.579+++					1.498+++	1.541+++	1.524+++
	(0.053)					(0.196)	(0.082)	(0.078)
Size dummy:51-200 employees	1.067+++					0.989+++	1.087+++	0.991+++
	(0.043)					(0.142)	(0.064)	(0.067)
Size dummy: 11-50 employees	0.570+++					0.417+++	0.586+++	0.515+++
	(0.035)					(0.108)	(0.049)	(0.057)
Age dummy: 5-15 yrs old	-0.064	-0.010	-0.015	-0.080	-0.186			
	(0.043)	(0.071)	(0.071)	(0.101)	(0.143)			
Age dummy: 15+ yrs old	0.032	0.141+	0.033	-0.062	-0.169			
	(0.044)	(0.077)	(0.074)	(0.100)	(0.142)			
Firm is incorporated	0.158+++	0.291+++	0.034	0.043	0.015	-0.017	0.151+++	0.061
	(0.035)	(0.073)	(0.058)	(0.078)	(0.094)	(0.111)	(0.051)	(0.056)
Constant	3.402+++	3.764+++	4.221+++	4.214+++	5.706+++	6.478+++	3.143+++	3.581+++
	(0.279)	(0.566)	(0.417)	(0.614)	(0.915)	(1.139)	(0.309)	(0.891)
Observations	26104	6761	9554	5645	4144	2610	11410	11755
R-squared	0.367	0.403	0.335	0.319	0.318	0.393	0.381	0.358
Adjusted R-squared	0.364	0.395	0.328	0.307	0.303	0.371	0.376	0.353

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.
Source: Authors' estimations.

Table 7.11. Business environment determinants of establishment-level TFP

OECD accession and enhanced engagement countries, and developing country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Reporting	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
Introduced new product	0.011	0.160++	0.022	-0.082	-0.067	0.055	0.008	0.026
	(0.032)	(0.066)	(0.051)	(0.067)	(0.075)	(0.097)	(0.046)	(0.049)
Introduced new process	-0.014	0.072	0.000	-0.047	0.010	-0.134	0.048	-0.014
	(0.034)	(0.077)	(0.056)	(0.070)	(0.079)	(0.104)	(0.050)	(0.054)
Fraction of workers skilled	0.227+++	0.050	0.191++	0.105	0.275++	0.055	0.201++	0.282+++
	(0.053)	(0.109)	(0.087)	(0.120)	(0.129)	(0.159)	(0.078)	(0.084)
Firm uses Internet	0.306+++	0.382+++	0.285+++	0.271+++	0.149	0.294+++	0.407+++	0.200+++
	(0.038)	(0.076)	(0.057)	(0.087)	(0.116)	(0.112)	(0.055)	(0.059)
Firm has ISO certification	-0.226+++	-0.026	-0.016	-0.282+++	-0.359+++	-0.260+	-0.348+++	-0.142++
	(0.041)	(0.113)	(0.077)	(0.077)	(0.082)	(0.142)	(0.062)	(0.062)
Firm has formal training programme	0.060+	0.128	0.001	-0.066	0.309+++	0.080	0.038	0.084
	(0.035)	(0.079)	(0.055)	(0.074)	(0.090)	(0.105)	(0.052)	(0.055)
Firm exports	0.506+++	0.548+++	0.383+++	0.468+++	0.515+++	0.457+++	0.478+++	0.495+++
	(0.037)	(0.100)	(0.062)	(0.069)	(0.081)	(0.122)	(0.056)	(0.055)
Fraction of investment capital from local banks	-0.000	-0.001	0.000	-0.001	-0.000	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Firm is part of a business association	0.134+++	0.112+	0.103+	0.151+	0.202++	-0.071	0.133+++	0.219+++
	(0.035)	(0.068)	(0.055)	(0.079)	(0.098)	(0.111)	(0.050)	(0.056)
Fraction of loans in foreign currency	0.019	-0.340+	0.272+	0.002	0.127	0.374+	-0.219+	0.185
	(0.077)	(0.183)	(0.155)	(0.166)	(0.137)	(0.226)	(0.114)	(0.119)

Table 7.11. Business environment determinants of establishment-level TFP (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Var	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)	ln(TFP)
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Sample	ALL	Micro	Small	Medium	Large	Young	Mature	Old
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	N	N	N	N	N	N	N
Reporting	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
>10% Government-owned	-0.174+++	-0.231	0.088	-0.145	-0.269++	0.249	-0.047	-0.172+
	(0.064)	(0.196)	(0.149)	(0.120)	(0.112)	(0.221)	(0.114)	(0.090)
>10% Private foreign owned	0.131+++	0.259+	-0.004	0.141	0.082	0.087	0.201+++	0.050
	(0.048)	(0.140)	(0.095)	(0.089)	(0.086)	(0.142)	(0.068)	(0.082)
Size dummy: >200 employees	1.446+++					1.456+++	1.382+++	1.414+++
	(0.060)					(0.204)	(0.091)	(0.094)
Size dummy:51-200 employees	0.925+++					0.941+++	0.949+++	0.845+++
	(0.051)					(0.150)	(0.074)	(0.082)
Size dummy: 11-50 employees	0.482+++					0.374+++	0.482+++	0.465+++
	(0.041)					(0.117)	(0.058)	(0.070)
Age dummy: 5-15 years old	-0.043	0.017	-0.014	-0.083	-0.191			
	(0.047)	(0.083)	(0.077)	(0.110)	(0.147)			
Age dummy: 15+ years old	-0.027	0.037	-0.004	-0.171	-0.183			
	(0.049)	(0.091)	(0.081)	(0.110)	(0.145)			
Firm is incorporated	0.109+++	0.156+	-0.010	0.074	0.139	-0.059	0.115++	-0.008
	(0.040)	(0.091)	(0.066)	(0.087)	(0.101)	(0.118)	(0.057)	(0.069)
Constant	3.258+++	3.553+++	4.023+++	4.055+++	5.609+++	6.222+++	3.086+++	3.447+++
	(0.281)	(0.581)	(0.420)	(0.611)	(0.904)	(1.143)	(0.311)	(0.890)
Observations	19885	4738	7446	4297	3404	2284	8920	8477
R-squared	0.353	0.407	0.328	0.320	0.304	0.383	0.373	0.345
Adjusted R-squared	0.351	0.397	0.321	0.308	0.288	0.361	0.367	0.338

Note: In all regression tables, '+' denotes 10% significance level, '++' denotes 5% significance level '+++' denotes 1% significance level.
Source: Authors' estimations.

Table 7.12. Pairwise correlations, rank of country fixed effects and Doing Business rank indicators

Sample restricted to non-OECD, young firms (2284 observations)

	Overall ease of doing business (rank)	Employing workers (rank)	Starting a business (rank)	Construction permits (rank)	Registering property (rank)	Getting credit (rank)	Protecting investors (rank)	Paying taxes (rank)	Trading across borders (rank)	Enforcing contracts (rank)	Closing a business (rank)	New product specification: rank of country FE
Employing workers (rank)	0.44***											
Starting a business (rank)	0.69***	0.52***										
Construction permits (rank)	0.58***	0.38***	0.42***									
Registering property (rank)	0.68***	0.29**	0.3**	0.37***								
Getting credit (rank)	0.66***	0.14	0.34***	0.15	0.4***							
Protecting investors (rank)	0.63***	0.34***	0.52***	0.29**	0.24*	0.44***						
Paying taxes (rank)	0.45***	0.12	0.12	0.21	0.25*	0.14	0.3**					
Trading across borders (rank)	0.49***	0.01	0.22*	0.37***	0.17	0.35***	0.23*	0.11				
Enforcing contracts (rank)	0.52***	0.24*	0.32**	0.11	0.49***	0.26**	0.15	0.16	0.02			
Closing a business (rank)	0.39***	0.29**	0.19	0.16	0.26**	0.03	-0.04	0.11	0.11	0.35***		
New product specification: rank of country FE	***0.22****	***0.11***	***-0.02***	***0.14***	***0.34******	***0.29*****	***0.05***	***0.21***	***-0.1***	***0.21***	***0.03***	
New process specification: rank of country FE	***0.23****	***0.09***	***0.05***	***0.17***	***0.3*****	***0.27*****	***-0.02***	***0.12***	***-0.11***	***0.23****	***0.15***	***0.48******

Note: *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Source: Authors' estimations.

The roles of competition in innovation-driven growth

How important is product market competition in stimulating innovation-driven growth? We explore this important policy question at two levels given our available data: the first based on firm-level proxies for the intensity of active competition; and the second based on national-level assessments of the openness of the business environment to competition.

Firm-level intensity of competition variables

We test whether two measures of firm-level competition—the self-reported number of competitors faced by a firm and whether the firm faces a foreign competitor—are correlated with R&D investment, product and process innovation, TFP and employment growth. Unfortunately, however, these variables were not collected in all the country surveys that comprise our full sample. Accordingly, we restrict our analysis of these firm-level competition variables to the sample of firms for which they are available, constituting less than 50% of our full all-country sample. We do not find any statistically significant effects at the level of the enterprise in any of the four firm-level R&D, innovation, TFP, and employment growth equations for either the self-reported number of competitors, the log of this measure or an indicator of the presence of a foreign competitor, given the controls in our framework.[25] This empirical result is not unexpected - in light of our discussion above of the logically ambiguous and countervailing effects of the degree of active competition on R&D investment and the resulting innovation.

National-level business environment competitiveness variables

To explore the importance of national-level measures of the openness to competition of the business environment, we follow the spirit of Loayza, Oviedo and Serven (2010) and Djankov, McLiesh and Ramalho (2006) by examining the associations between our innovation variables and the aggregate national rank across regulations that affect all 10 stages of the life of a business, as covered by the Doing Business indicators (see the discussion above).

Rather than replace the country-level fixed effects with the DB rank order variables as additional explanatory variables in the existing firm-level regressions, we examine the rank correlation between the country-level fixed effects from the firm-level regressions and the DB variables. A key advantage of this approach is that it overcomes the challenging interpretation problem, both economically and statistically, of including a rank order variable in

regressions having a mix of discrete and continuous variables. This approach also allows the relative importance of the 10 constituent DB sub-indices to be examined, as the collinearity of the individual DB variables does not conflate the econometric results when correlations are examined one-by-one. We report correlation results only for innovation outcomes, as the fixed effects from employment growth and TFP reflect a broader and more various range of factors - including important cross-country differences in macroeconomic facets of growth in the case of employment growth, and firm-specific knowledge and other assets that have built up over time in the case of TFP. We focus on the more vulnerable young enterprises for several reasons. We articulated above why incentives to innovate are heightened by opportunities to expand in response to progressive success, and how these opportunities are affected by the business environment particularly for young firms. For older, more established firms that are not so vulnerable, the business environment may have far less of a direct impact on their ability to expand; for older firms, a difficult or repressive business environment may be, at least in part, an encouragement to invest in innovation and expansion due to the entry barriers that the environment creates. In addition, young enterprises are particularly important in their higher general levels of employment growth: for non-OECD countries, the average employment growth of young firms (less than 5 years of age) is 27%, versus 10% for mature firms (between 5 and 15 years of age) and 3.5% for old firms (greater than 15 years of age).[26]

Table 7.12 reports correlation results for young firms in the non-OECD countries. Higher fixed-effect values mean more progressive country-level innovation outcomes on average, holding constant enterprise-level variables. In the reported rank correlations, the largest fixed-effect value is given the lowest numerical rank. Similarly, for the DB indicators, the country assessed to have the most competitive business environment (both overall and with regard to the subjects of the specific constituent sub-indices such as getting credit, protecting investors and trading across borders) is given the lowest numerical rank. So a positive correlation between country fixed-effects and the DB variables indicates that the competitiveness of the business environment matters for our key outcome variables, and that the aggregate DB indicator and/or specific attributes of the business environment are importantly salient in characterising the countries with the business environments that are the most successful in stimulating enterprise innovation.

We find that the overall DB variable has significant positive rank-order correlations with the country fixed-effects from both the product and process innovation regressions. The constituent components of DB that focus on getting credit and on registering property have significant positive associations with the country fixed-effects from both the product and process

innovation regressions. And the constituent component that focuses on enforcing contracts has a significant positive association with the country fixed-effects from the process innovation regression.

Thus, the data show that the openness to competition of the various countries' economies is stimulating of innovation achieved by the group of young firms that is of particular importance to employment growth. As shown above, the innovation fostered by the economies' openness to competition drives employment growth, and that growth is decidedly inclusive.

Conclusions

In this paper we present evidence that innovation - as proxied by the level of TFP and enterprise self-reports on their introduction of new products and processes - is an important driver of employment growth at the enterprise level. For the cross-section (mentioned above in the section on "Data and empirical specification"), we find that firms that innovate in products and in processes, and that have attained higher total factor productivity, exhibit higher employment growth relative to non-innovative firms. While our finding that product innovation makes a strong positive contribution to employment growth is broadly consistent with previous work in this area, past studies found no contribution to employment growth from process innovation. In contrast, our controls for the size heterogeneity of our studied enterprises enable us to show that process and TFP innovation have statistically significant positive effects on employment for relatively small firms, but not for establishments employing more than 200 employees. We note that most previous firm-level studies on the innovation-employment link did not address the net effect on aggregate employment, as they were not designed to test whether the employment gains of innovating firms are achieved at the expense of their domestic competitive rivals. In this paper, we design such a test and find no evidence of national-level negative offsets of enterprises' innovation-driven employment gains.

There is a widespread perception, based largely on casual empiricism rather than careful empirical testing, that innovation-driven growth is not inclusive in that it tends to replace low-skilled jobs with jobs characterised by higher levels of qualification. Our findings decidedly reject this view. Indeed, our data suggest that more innovative firms hire a larger share of unskilled workers relative to non-innovative firms. And our econometric estimates indicate that the share of the workforce that is unskilled contributes more to employment growth for firms that innovate (in products and/or processes) than for non-innovators. Our finding that, on average, there is a selection bias that favours inclusive growth from innovation is comforting in view of the world-wide concerns about rising income inequalities and claims that the

substantial benefits of economic growth have not been shared by the poor and unskilled.

Our results support the importance of microeconomic framework policies that actively enable competition by boosting access to efficient productive inputs, crucial information, needed credit and risk capital, domestic and export distribution channels, flexible employment opportunities, and commercial freedom as determinants of innovation, productivity and employment growth. The findings highlight how important elements of business, legal and physical infrastructure can facilitate productive entrepreneurship, which in turn can significantly affect economic growth and poverty alleviation because of the important linkages between entrepreneurial activity and the creation of productive jobs, new output, and new demand for inputs of all kinds. Indeed our results indicate that access to finance, export markets, Internet communication and other essential business services (*e.g.* ISO management certification, formal worker training programmes, and opportunities for licensing and joint ventures) are strong positive correlates of enterprise employment growth that is inclusive, especially for small and young firms in non-OECD countries. Our analysis confirms the importance of a country's business environment in determining the incentives behind competition and innovation outcomes. We find that the country-level "Doing Business" indicators (including access to credit, registering property, and enforcing contracts) summarising the overall business environment are significant positive correlates of both product and process innovation for young firms in the non-OECD countries.

Far more empirical research is needed to go beyond the indicative correlations presented here that are enabled by our cross-sectional data set towards more sure and detailed identification of causal links between elements of innovation and competition policy and resulting advances in growth and poverty elimination. Tracking enterprises over time could create a panel data set with more opportunities for strong instruments from exogenous changes in the economic environments to identify robustly the directions of causality suggested by the system of equations. Ideally, data following the workers as well as following the enterprises and their environments could be analysed jointly to ascertain with more specificity just what policies best contribute to innovation-driven inclusive growth.

Notes

1. Although the concept of 'inclusive growth' has received considerable attention in the economics literature, there is no widely accepted definition for it. Because of increasing concerns about rising income inequalities and claims that the poor in many parts of the world have not been benefitting much from economic growth, the term inclusive growth is often used interchangeably with a host of other terms, including 'broad-based growth,' 'shared growth,' and 'pro-poor growth.' For some of the pertinent definitional issues see Tang (2008).

2. See Dutz (2007) for a broad definition of innovation and a description of four areas that provide key levers for innovation policy.

3. A number of recent papers have sought to ascertain empirically whether low-wage employment is a static phenomenon or a transitory experience, that is, whether low-paid jobs enhance the future occupational advancement prospects of unemployed persons (stepping-stone effect) or give rise to adverse signals related to these persons' true productivity, thus increasing the probability for a low-pay-no-pay cycle (poverty trap). Although the evidence is somewhat mixed and subject to debate, there seems to be greater support for the stepping-stone effect. For analysis of the pathways of upward mobility for low-wage workers, see among others Booth *et al*. (2002), Knabe and Plum (2010) and Mosthaf (2011).

4. The *OECD Reviews of Innovation Policy* offer a comprehensive assessment of the innovation system of individual OECD member and non-member countries, focusing on the role of government.

5. Using data on German manufacturing and service-sector firms from the third Community Innovation Surveys (CIS3) for the period 1998-2000, Peters (2005) finds that product innovations have a net positive impact on employment while process innovations are associated with employment reduction for manufacturing but not service firms. These findings are largely confirmed by Harrison *et al*. (2008) in a study that is also based on CIS3. Using comparable firm-level data across four European countries - France, Germany, Spain, UK - they find that process innovation has significant displacement effects that are partially counteracted by

compensation mechanisms. The displacement effects of process innovation are most pronounced in manufacturing. On the other hand, product innovation is associated with employment growth and these results are similar across countries. Based on a firm-level comparison across provinces and cities in China, Mairesse *et al.* (2009) find that the market expansion effects of product innovation more than counterbalance the displacement effects of process innovation, the net result being that innovation makes a strong positive contribution to total employment growth. Alvarez *et al.* (2011) find that in the case of Chile, process innovation is generally not a relevant determinant of employment growth, and that product innovation is positively associated with employment growth.

6. Dutz, Ordover and Willig (2000) make the case for a pro-innovation competition policy that facilitates the entry and expansion of vulnerable (typically young and small but potentially fast-growing) firms led by grassroots entrepreneurs by focusing on access policies on the supply side. Such a more activist supply-side competition policy emphasizes: preserving rewards from productive innovation through the protection of commercial freedom, property rights and contracts; eliminating barriers to grassroots entry; and promoting access to essential business services by opening 'strategic bottlenecks' to competition. According to this view, advocacy for improving the competitiveness of the business environment is one of the most important roles for competition agencies.

7. Gorodnichenko and Schnitzer (2010) show how financial constraints restrain firms' innovation and export activities. Ayyagari, Demirgüç-Kunt and Maksimovic (2007) show that positive factors for firms' innovations in emerging markets include external finance, private ownership without control by a financial institution, export activity, and in a separate paper, freedom from unfortunately pervasive corruption. Aterido, Hallward-Driemeier and Pages (2009) focus on how enterprise size is crucial to the impact of finance on its employment growth.

8. Melitz (2003, 2008) pioneered the view that firms' trade activities are themselves endogenous and heavily influenced by productivity. Gorodnichenko, Svejnar and Terrell (2010) emphasize how exposure to globalization promotes firms' innovations in products and technology.

9. The approach taken in this paper falls within the ambit of inclusive growth analysis as it explicitly analyzes growth through firm-level data and the overall statistical distribution of innovation, TFP and employment growth outcomes rather than only economy-wide aggregates and the statistical mean of outcome variables. It also explicitly explores whether growth has the potential to raise the living standards of broad segments of the population and the reasons why this is so. See Ianchovichina and

Lundstrom (2009) for a variety of definitions for inclusive or more shared growth.

10. OECD: 15 member countries, 1 accession country (Russian Federation) and 5 enhanced engagement countries (Brazil, China, India, Indonesia, South Africa); 50 developing countries.

11. As summarized in Table 7.1c, these indicators are constructed based on responses to the following questions asked in the Enterprise Surveys: "Has your company undertaken any of the following initiative in the last three years: Agreed to a new joint venture with foreign partner?" and "Has your company undertaken any of the following initiative in the last three years: Obtained a new licensing agreement?"

12. We classify firms into four size categories based on the number of full-time permanent employees: micro (1 to 10), small (11 to 50), medium (51 to 200) and large (more than 200). Establishment age is determined by responses to "In what year did your firm begin operations in this country?" and is used to separate firms into three age classes: young (less than five years old), mature (five to 15 years old) and old (more than 15 years since started operations).

13. We use R&D intensity in the innovation equations as it may more accurately capture the differential effect of additional spending on R&D on the likelihood of innovation. Using an R&D indicator variable (as is estimated in equation 1) in place of R&D intensity in the innovation equations does not substantively alter our results or conclusions.

14. We calculate TFP by estimating a Cobb-Douglas production function from our enterprise data separately for each two-digit ISIC industry. Output is the real value of enterprise sales and inputs are the real value of fixed assets, total labour costs (actual or ILO wages) and materials expense. All variables are in logs. Each firm's residual from its industry regression is the natural logarithm of its TFP - higher values imply lower average and marginal costs of producing value.

15. Our measure of employment growth is defined in annual percentage terms rather than in logs, so the estimated coefficients can be interpreted directly as the change in the percentage employment growth rate given a unit increase in the regressor. These findings, especially the positive impact of product innovation on employment at the firm level, are consistent with the estimates presented in some recent papers - see for example, Peters (2005), Mairesse *et al*. (2009), and Alvarez *et al*. (2011)

16. Note that comparing coefficient estimates across different size categories does not yield much new information, as the average employment growth rate is starkly different between micro and large firms. However, the finding that product and TFP innovation has no statistically significant

effect on employment growth for large firms, while it does for smaller firms, is informative.

17. In fact, we see, but do not further explore here, evidence of statistically significant positive employment spillover effects of aggregate neighbouring firm process innovation on firm-level employment growth in the non-OECD developing countries sub-sample.

18. The null hypothesis that the means are the same across the two sub-samples is rejected at the 1% level of significance, based on a two-sample t-test.

19. For testing the equality of the coefficients on the variables measuring the shares of unskilled workers: for the process-innovators and non-innovators equations, we find z = (9.008-7.761)/(1.4012+1.0332)1/2 = .716 < 1.96 (5% for two-tailed test); and for the product-innovators and non-innovators equations, we find z = (10.390-7.204)/(1.3572+1.0472)1/2 = 1.856 < 1.96 (5% for two-tailed test). Thus, in both cases the maintained hypothesis that the two coefficients are equal cannot be rejected at the 5% level. For the regressions run over the process- or product-innovators/non-innovators, z = (9.973-6.385)/(1.1622+1.1862)1/2 = 2.161 > 1.96 (5% for two-tailed test). In this case, there is a statistically significant sub-sample difference in the estimated coefficients of the share of unskilled workers.

20. The null hypothesis that the means are the same across the two sub-samples is rejected at the 1% level of significance, based on a two-sample t-test.

21. ISO management certification refers to a family of internationally recognized management quality standards. The certification status of surveyed establishments is ascertained directly in the Enterprise Surveys. Formal training programs refer to "beyond the job" training opportunities offered to employees of the respondent establishment. Table 7.1c contains a detailed listing of the definition of these and other enterprise-level business environment indicators used in this study.

22. However, in (1), R&D is a binary variable, while in (2), the explanatory variable is the continuous non-negative R&D intensity.

23. We have not estimated these equations nor analyzed the total treatment effects of variations in the explanatory variables in ways that take the system architecture and mixture of binary with continuous variables into account. Precise methods for calculating such treatment effects are not well-established although there is a growing literature in this area (see: Heckman and Vytlacil (2001, 2005), Das (2005), Hall and Horowitz (2005), Imbens and Newey (2009), and Vytlacil and Yildiz (2007), among others). Data constraints in the present context limit the availability of valid exogenous identifying instruments typically required to estimate such models.

24. In addition, it might be the case that the proclivity of individual firms to innovate is persistent so that recent innovation is indicative of past innovation that led to past growth and the present larger sizes of the innovating firms.

25. While Ayyagari *et al*. (2007) find that the presence of a foreign competitor matters for innovation, their specification is quite different from ours: they test for the correlation of different business environment variables separately rather than controlling for a number of key variables simultaneously as we do.

26. This result is not driven by a positive correlation in the data between age and size: our finding of faster growth for young firms holds within size categories, with micro-sized young firms growing faster than micro-sized mature and old firms, and small-sized young firms growing faster than small-sized mature and old firms, with the differences in means between young and mature firms' growth rates statistically significant at the 1% level for both non-OECD and OECD countries.

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Chapter 8

Policy debate: How do you make growth more inclusive?

William R. White*

Introduction

Let me begin with an awkward confession. I am a macroeconomist. Macroeconomics is difficult but, as you are aware from reading the news, we have done a splendid job regardless. In contrast, I always thought microeconomics and recipes for structural reform were inherently easier. However, after two years of chairing the Economic and Development Review Committee, which does country reviews at the OECD, I have begun to realise that this is not so. This conference on "Promoting Inclusive Growth" (not just growth, but inclusive growth) has confirmed my earlier misgivings. Unfortunately, my overwhelming impression from yesterday's discussion was that achieving growth with inclusion is going to be very difficult. There are number of reasons to believe this. Fortunately some of the discussion today has left me with a much more positive impression. Let me say a few words both about yesterday's discussion and what we heard earlier this morning. To cut to the bottom line, I am now "still pessimistic but more hopeful".

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Some reasons to be pessimistic

First, as Tom Peters, the management consultant, once said: "If you don't know where you're going, you're going to wind up somewhere else". Yesterday, I heard at least six different definitions of what we are trying to achieve. Variously, "inclusiveness" was said to mean:

- More equal income distribution,
- A reduction in absolute poverty,
- The need to internalise externalities in measuring growth,
- A lowering the North-South income gap,
- More equal opportunities, especially access to services such as education, finance, the judicial system etc., and
- The inclusion of Emerging Market Economies (EMEs) in the governance of IFIs.

Furthermore, no one even mentioned the issue of the urban-rural divide and regional divisions in many countries. This absence of clarity about objectives is not helpful for policy makers.

Second, some of what we are trying to achieve has both an objective and subjective component. For example, what *is* happening to inequality is different from what people *believe* is happening to inequality. Think of Brazil where the Gini Coefficient is declining but where public opinion surveys indicate a general perception that inequality is increasing. Moreover, achievement of absolute advances in inclusiveness can still lead to explosive results if even a "kernel" of unfairness remains. Think of Tunisia, where absolute advances in inclusiveness have been very great but where the still-privileged position of the President's family led to an outright revolution.

Since even a three-year-old will tell you "it's not fair", this mental notion of "fairness" seems hardwired into our brains. The Canadian author Margaret Atwood has recently written a book about debt (a remarkable work called Payback) in which she contends that the whole infrastructure of both finance and justice rests on this fundamental psychological concept. From a policy perspective, however, this reality creates difficulties in that it is hard to assess how much inclusiveness is either necessary or desirable.

Third, with respect to some elements of inclusiveness, history seems to be going in the wrong direction almost everywhere. In recent decades, income inequality in most Advanced Market Economies (AMEs) has increased sharply - no more so than in the United States and the United Kingdom. Excessive bankers' pay has been a particularly egregious outcome; however, even after the crisis we have not managed to do much about it. In other AMEs (Germany and Japan for example) similar trends, albeit more moderate, have also emerged. With the exception of Brazil, existing inequalities in the larger EMEs are either stable at high rates (Mexico) or rising sharply (as in China, India and Russia). In contrast, there has been a sharp reduction in absolute poverty in many countries in recent years. Nevertheless, the crisis experience of 2008-9 indicates that even these advances might be more fragile than many think.

Fourth, when one considers the various sets of structural reforms, which were discussed in the successive sessions of this conference, a number of them seem as likely to make life harder for the poor and unskilled as likely to make life easier. For example:

- Innovation could lead to (short-term) increases in productivity with the unskilled being hardest hit.

- Green growth must begin with cuts to energy subsidies. Virtually all of the poor will be affected, even if the largest proportion of such subsidies goes to the rich.

- Financial deepening, if badly done, can hurt the poor as well as help them. Think of the recent subprime experience in the United States.

- Fiscal restraint does seem to hurt growth, at least in the short run. Indeed, as indicated by recent work at the IMF, the poor ("outsiders" in the work place, often without permanent contracts) tend to be the first ones to be laid off in a downturn.

Fifth, the political economy of inclusiveness is not going to be easy to apply. We learned yesterday that the power/political structure is highly informal in EMEs (reflecting the importance of the informal economy), and its primary purpose is to divide up pure rents and quasi-rents amongst the ruling elite. It was suggested that in such economies, you actually need a very significant increase in output and incomes before there would be enough left over to "trickle down" to the poor. I would add, moreover, that the power/political structures in some AMEs seem to share some of these characteristics as well. This morning it was also noted that "entitlements" in AMEs are absorbing more and more of government resources. As a result, the

fiscal room for discretionary manoeuvre to help the poor is, in many countries, becoming more and more constrained.

Sixth, even success stories like Brazil pose difficulties. Yesterday, we heard that the falling Gini Coefficient in Brazil is due to some combination of higher employment rates, a drop in fertility, increases in school enrolment, less discrimination in labour markets and cash transfers (Bolsa Familia). The problem, however, is that all of these suggested causes are interdependent. For example: more education leads to more employment; more employment and education lead to lower fertility; lower fertility allows more women to work and better education for fewer children. So the bottom line is that we are not even sure what has been crucial to the Brazilian outcome. Given this uncertainty, can we then be sure about the lessons to be drawn for others?

Some reasons to be optimistic

In this morning's discussion, some points emerged that might help dispel the pessimism. In particular, we were reminded that, although analytical uncertainties remain, we do seem to have learned something about what works to increase growth and inclusive growth, and what doesn't. The challenge now is to identify programmes that seem to have been successful somewhere, and then try to introduce them elsewhere. With time, such experiments will make clear whether the apparent secret of success has in fact been identified, and if it can also work in different cultures.

A number of such programmes were identified. In education, Finland is consistently one of the highest achieving countries in PISA scores. This is due in large part to the special attention paid to those students in the lowest quintile of achievers. Raising their standard both raises the average score and substantially reduces its dispersion. In labour market reforms, the Danish example of "active flexicurity" also seems worth replicating. This involves reducing job security (especially employment protection legislation) for permanent employees, providing better support for the unemployed and actively helping people find work through training and placement. This was referred to by one participant as a combination of "state intervention" and "radical individualism".

There was also a sense in the meeting that conditional cash transfers (conditional on children going to school or attending health clinics) seem to have significant promise and at a relatively low cost as a proportion of GDP. Moreover, advances in technology are making it increasingly possible to monitor the "conditionality" aspect of these programmes. Finally, it is clear that many countries would derive significant economic benefits from removing impediments to women and young people working, as well as

implementing measures to keep older workers in the workforce. Note that all of the reforms suggested above (education, labour markets, etc.) would raise both growth and inclusivity.

A second piece of good news is that even macroeconomists are now starting to focus on issues of distribution and inclusion. One reason for this is the hypothesis that the current crisis (in the United States at least) has its roots in distributional issues. One is reminded of the old joke that "even an economist, when he sees something happen, will admit that it is possible".

The argument behind this hypothesis is that globalisation (via factor price equalisation) and technological progress have primarily hurt the unskilled and the uneducated. In particular, jobs in manufacturing have been under serious threat. Instead of adjusting to this reality, the USA and others tried to paper over the problem using credit expansion. Poor people were thus able to "keep up with the Joneses" by borrowing in order to consume. This tendency was encouraged by low policy rates, financial innovation and by the implicit subsidies provided by Fanny Mae, Freddie Mac and other government-sponsored enterprises. Unfortunately, the associated build-up of household debt meant this "fix" was temporary rather than permanent. Thus, when the market began to suspect that some loans would never be repaid, the crisis erupted. Sadly, it may not be over yet.

Conclusion

The EDRC process of country review at the OECD has, in recent years, put a lot of emphasis on structural changes to promote growth. Inclusiveness and distributional issues have thus far been treated as matters of only secondary importance. Going forward, these issues should now be given higher priority. This conclusion reflects not only the insights from this valuable conference but also the recognition that inclusiveness and distributional issues can have significant implications for both longer-term growth and macroeconomic stability.

Discussants and panellists

Jean-Eric Aubert, the World Bank.

Gordon Boissonneault, the Canadian Department of Finance.

François Bourguignon, Director, the Paris School of Economics.

Carlos Braga, Special Representative and Director for Europe, External Affairs (EXT) Vice-Presidency, World Bank.

Otaviano Canuto, Vice President of the Poverty Reduction and Economic Management (PREM) Network, World Bank.

Christian de Boissieu, the "Conseil d'analyse économique", Paris.

Luiz de Mello, Economic Counsellor to the Chief Economist, OECD.

Asli Demirgüç-Kunt, Director, Development Policy Development Economics Vice Presidency (DEC), and Chief Economist, Financial and Private Sector Network (FPD), World Bank.

Jørgen Elmeskov, Deputy Chief Economist, OECD.

Federico Giammusso, Economic Counsellor, Delegation of Italy to the OECD.

Sanjeev Gupta, Deputy Director, Fiscal Affairs Department, International Monetary Fund.

Kyung Wook Hur, Ambassador, Republic of Korea to the OECD and former First Vice-Minister, Strategy and Finance, Republic of Korea.

Mallika Ishwaran, Deputy Director, Environment and Growth Economics, UK Department for Environment, Food and Rural Affairs (DEFRA).

Eduardo Ley, the World Bank.

Rory O'Donnell, Director, National Economic and Social Council (NESC) and Chief Officer, Irish National Economic and Social Development Office (NESDO).

Pier Carlo Padoan, Deputy Secretary General and Chief Economist of the OECD.

Dirk Pilat, Head, Structural Policy Division, Science, Technology and Industry, OECD.

Sarquis J.B. Sarquis, Economic Counsellor, OECD Liaison Office, the Brazilian Embassy, Paris.

Ajay Shah, the National Institute for Public Finance and Policy, New Delhi.

William Tompson, Head, Regional Economics and Governance Unit, Public Governance, OECD.

Simon Upton, Director, Environment, OECD.

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