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The Heterogeneous Growth Effects of the Business Environment

Firm-Level Evidence for a Global Sample of Cities

José-Daniel Reyes
Mark Roberts
Lixin Colin Xu

WORLD BANK GROUP
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Finance and Private Sector Development Team
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Abstract

Using firm-level data covering 709 cities in 128 countries, this paper examines the role of a comprehensive list of business environment variables at the subnational level in explaining firm employment and productivity growth. The analysis finds basic protection, access to finance and infrastructure, and the existence of a strong agglomeration environment to be critically important. By contrast, human capital and a list of refined business environment variables related to labor regulations, tax, and land access are found to be relatively unimportant. The analysis also finds that the effects of the business environment vary according to firm size, age, sector affiliation, and the host country's level of development. The research suggests that it pays to be comprehensive about the business environment and that attention to heterogeneity is important.

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The authors may be contacted at lxu1@worldbank.org.

The Heterogeneous Growth Effects of the Business Environment: Firm-Level Evidence for a Global Sample of Cities[1]

José-Daniel Reyes

Mark Roberts

Lixin Colin Xu

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1. Introduction

There are many alternative views about how a country develops. Some authors view institutions as the key determinant (North, 1990; Knack and Keefer, 1995; La Porta et al. 1998; Acemoglu et al. 2001; Engerman and Sololoff, 1997; Rodrik, Subramanian, and Trebbi, 2004), while others emphasize the critical importance of human capital (Lucas, 1986, 1988; Romer, 1990; Gennioli et al., 2013). Still other authors highlight the importance of basic infrastructure (World Bank, 1994; Roller and Waverman, 2001), while international organizations such as the World Bank have argued for the critical importance of improving the overall business environment (BE) in which firms operate (Stern, 2002; World Bank, 2005, 2010). Finally, a more recent strand of the literature has emphasized the importance of agglomeration economies as a source of innovation and, therefore, long-term growth (World Bank, 2008; Glaeser and Gottlieb, 2009; Jones and Romer, 2010; Clarke, Li and Xu, 2015; Li, Long and Xu, 2017).

What, however, is the relative explanatory power of these alternative, though not necessarily mutually exclusive, views? And are their effects specific to the context such as the level of development, the sector in which a firm operates, firm size and age? Answering these questions is important because governments only have limited resources with which to deal with key challenges. If there are bottlenecks to a country's development, it is important to diagnose these in order to provide a sounder basis for policy (Kremer 1993; Hausman, Rodrik and Velasco, 2005; Li et al., 2011).

In recent decades, there has been an extensive cross-country literature that seeks to explore the determinants of long-run growth. However, a consensus has emerged that it is difficult to distinguish between different determinants using cross-country data alone. To see this, consider the debate over whether institutions or human capital are the key for long term development. The influential study of Acemoglu et al. (2001) uses settler mortality in early colonial periods as the instrument for current institutions, and, based on this, finds that institutions significantly and importantly affect current development. However, this interpretation has been challenged by Glaeser et al. (2004) on two grounds. First, there is potential reverse causality, that is, the outcome variable of income can reverse-cause institutions. Second, settler mortality lacks validity as an instrument since it captures the ratio of colonists to the indigenous population, which is correlated with human capital (in the error term). If we have trouble distinguishing between the importance of human capital and institutions for long-term development, how are we supposed to distinguish

between the relative impacts on growth of institutions, human capital, and infrastructure, not to mention a country's business and agglomeration environments? Indeed, using *sub-national regional* data for a global sample of 110 countries, Gennaioli et al. (2013) show that human capital tends to out-perform institutions in accounting for regional development. In contrast, also using sub-national regional data, albeit limited to the Americas, Acemoglu and Dell (2010) offer evidence that institutions are likely key reasons for sub-national disparities that cannot be explained by observed human capital.

To complicate matters further, firms within countries at different stages of development may also differ in the constraints, or development "bottlenecks," that they face. Similarly, different types of firms – e.g. old versus young firms – may differ in the factors that are constraining them. Kremer (1993) describes development bottlenecks most vividly by invoking the image of the failure of the space shuttle Challenger: with tens of thousands of components, it "exploded because it was launched at a temperature that caused one of those components, the O-rings, to malfunction". Indeed, when production technologies feature strong complementarities between different inputs or elements of the operating environment, a bottleneck such as power supply or government corruption could make other factors much less useful, which, in turn, further dampens the incentives for investment and innovation, resulting in a low-growth equilibrium. In India, for instance, empirical evidence suggests that infrastructure and labor inflexibility are both key bottlenecks (Li, Mengistae and Xu, 2011). Do countries at different levels of development face distinct development bottlenecks? Do different types of firms (i.e., in terms of size, age, and sector) face unique bottlenecks? Do high-performing firms face constraints which differ from those experienced by other firms?

In order to overcome the difficulties associated with purely cross-country data and better distinguish between different potential determinants of growth, we follow Acemoglu and Dell (2010) and Gennaioli et al. (2013) by relying on sub-national variations across countries. In particular, we draw on World Bank Enterprise Survey (WBES) data for a sample which consists of up to 80,000 firm-year observations covering 709 cities in 128 different countries. We use these data to investigate how variations in the business environment (BE) across cities within countries are associated with both firm employment and productivity growth. In doing so, we adopt a broad category of the BE which encompasses many of the alternative explanations of long-run development that we mentioned at the outset of the paper.

Figure 1 shows the specific types of BE we examine. First, we examine *Basic BE,* that is, those aspects often viewed as basic and fundamental for development. It includes basic functions of government protection, which include containing corruption and providing basic safety ("Government Protection"). It also includes a good supply of human capital and the availability of infrastructure (e.g. power supply and internet technology), as well as access to finance, which is widely viewed as a key BE element by a large literature (Levine, 1997; Demirguc-Kunt and Maksimovic, 1998; La Porta et al., 2000; Beck et al., 2005; Bloom et al., 2010). Second, we investigate the *Refined BE*, which includes, *inter alia*, the barriers to entry and exit (such as access to land) and labor regulations that firms face, as well as the tax environment within which firms operate. The third, and final, dimension that we examine is the *Agglomeration Environment*. This incorporates whether or not a firm is located in a large city, defined here as a city which is either a national capital or which has in excess of a million residents. It also includes what we refer to as "capacity agglomeration," which refers to the extent to which a firm is surrounded by "capable" firms.

The firms within the WBES data that we use are randomly selected and are representative of the non-agricultural private sector in each economy. Unlike purely cross-country studies, the size of our sample is such that we are able to more confidently disentangle the role of the different elements of the BE in driving firm growth. Unlike the Doing Business (DB) project in which the indicators are *de jure* measures based on the answers of a few mid-sized firms (with the same firm size across the world), the BE measures in our data set are *de facto*, measuring actual experiences of firms. Since enforcement is a big issue in developing countries, *de facto* BE measures are likely to be more relevant for understanding the relationship between the BE and firm performance. Because the sample is random, there are plenty of small and young firms, to which we shall pay particular attention.

There are further advantages of using our micro data to answer questions of how the broadly-defined BE affects development. First, a key endogeneity issue that faces cross-country studies is that of reverse causality from growth and other development outcomes to the factors, such as institutions, being investigated. Using firm-level data mitigates these concerns because it is less likely that an individual firm's growth influences the overall BE. Second, by exploiting the extensive city-industry-level variation in the BE measures that exists in our data, we are able to vastly alleviate the multicollinearity concerns that would have existed had we instead chosen to

focus on cross-country variations in the BE. Third, and even more importantly, in focusing on the city-industry level BE, we are able to control for both country and industry fixed effects. This allows us to hold constant all time-invariant country-specific and industry-specific heterogeneity which arises from, for example, differences in legal systems, culture and so forth at the national level, or differences in technology and market structure at the industry level. Our identification of the impacts of the various dimensions of the BE thus comes from comparing firm performance across city-industry cells within countries. Fourth, and finally, the GDP per capita levels (in 2000 constant U.S. dollars) of our sample countries range from less than US$ 500 to more than US$ 24,000. This allows us to investigate how the marginal impacts of various BE elements differ with a country's level of development.

Our empirical investigation yields many new findings. First, Basic BE – such as the availability of modern infrastructure (internet), access to finance, and government protection – and the agglomeration environment are especially important BE determinants for firm growth. Second, we document novel evidence of significant heterogeneity of BE effects across different types of firms. To begin with, the environment which is amenable to the growth of high-growth firms is quite different to that for other firms. While, for the latter group, basic government protection and capacity agglomeration are important, high-growth firms benefit relatively more from modern infrastructure, access to finance, lower Land Access Obstacle and lower Tax Burden Obstacle, and from being located in big cities. High-productivity-growth firms benefit significantly more from the trade credit network.

We also find that the BE effects depend on firm size, age and sector. To begin with, with a few exceptions, small firms tend to need a stronger Basic and Refined BE than large and medium enterprises (LMEs). For example, in terms of effects on employment growth, LMEs benefit relatively more from the existence of labor flexibility and a strong environment in terms of both linkages between firms (e.g., access to trade credit finance) and agglomeration. Furthermore, mature firms benefit relatively more when corruption is contained, while young firms benefit more from modern infrastructure and Refined BE (i.e., ease in entry, labor flexibility). Interestingly, relative to those in manufacturing, firms in the service sector are much more sensitive to most elements of the BE. An exception is that manufacturing firms benefit relatively more from access to bank finance.

A novel finding is that the key ingredients for a good BE also differ according to the level of development of the country in which a firm is located. Access to bank financing and capacity agglomeration are more important for facilitating firm productivity growth in lower-income countries. Interestingly, trade credit access plays a positive role only in middle and lower-middle-income countries. However, most BE elements prove to be income-invariant in terms of facilitating both employment and labor productivity growth.

Our paper is closely related to two literatures. The first related literature examines how the institutional and business environments affect firm performance.[2] Early studies use smaller samples and focus on a few specific factors such as infrastructure, including the internet (Clarke et al., 2015), property rights, and corruption (see, for example, Dollar et al., 2005, 2006; Hallward-Driemeier et al., 2006; Cai et al. 2011, Clarke and Xu, 2004; Cull and Xu, 2005).[3] Some recent studies, including an urban economics literature, investigate how various aspects of the agglomeration environment – i.e., capacity agglomeration, as in this paper, or the size and/or density of the city in which a firm is located – matter for job creation (Clarke et al. 2016) or levels of sub-national productivity within specific countries (Li et al., 2015; Combes and Gobillon, 2015). The second related literature uses sub-national regional data to shed light on key determinants of economic development. Acemoglu and Dell (2010) show that institutions are likely key reasons for sub-national disparities in earnings in the Americas that cannot be explained by observed variations in human capital. Gennaioli et al. (2013) provide evidence that human capital plays a prominent role in accounting for sub-national differences in development and firm performance.

We differ from the above literature in many aspects. Most importantly, we employ a comprehensive list of key factors that encompass basic institutions, quality of human capital, infrastructure, access to finance, access to land, labor regulation, tax burdens, and agglomeration. As a consequence, we are able to reduce possible omitted variable bias and, thereby, more convincingly identify the relative impacts of different BE elements on firm performance. The literature on key determinants of development has focused heavily on the importance of institutions (Knack and Keefer, 1995; Acemoglu et al., 2001; Rodrik et all, 2004), finance (Levine, 1997; Rajan and Zingales, 1998; Demirguc-Kunt and Maksimovic, 1998; King and Levine, 1998),

[2] See Xu (2011) for a recent survey of this literature.
[3] See also Demirguc-Kunt et al. (2006) for a study of the impacts of BE variables on incorporation decisions. Fernandes (2008), meanwhile, studies the impacts of the BE in Bangladesh using WBES data.

the relative importance of human capital versus institutions (Glaeser et al., 2004; Acemoglu and Dell, 2010; Gennaioli et al., 2013), and the relative importance of finance versus property rights (Johnson et al., 2002; Cull and Xu, 2005). By controlling for all of these factors, our research suggests that access to finance and infrastructure could be more important than institutions and human capital, and that it is important to add the category of the agglomeration environment. The large global sample on which our results are based adds to the credibility of our study. To our knowledge, our paper is also the first that allows the BE effects to differ by income categories.

The remainder of the paper is structured as follows. Section 2 describes the data and our empirical methodology. Section 3 presents our baseline results based on the full global sample of firms. Section 4 analyzes differences between high-growth and other firms. Section 5 examines the heterogeneous effects of the BE across firm types, country income levels and industries. Finally, Section 6 concludes.

2. Data and Methodology

The main data sources for this paper are the World Bank's Enterprise Surveys (WBES) in 709 cities of 128 countries.[4] The WBES data are collected by the World Bank to benchmark the business climate in developing (and a few developed) countries across the world and to understand the determinants of firm performance. The richest country in the sample is Sweden with a GDP per capita of 46,000 U.S. dollars, and the poorest countries (i.e., Burundi, Liberia, Malawi, Ethiopia) have a GDP per capita around 200 U.S. dollars. The country population ranges from 52 thousand in St. Kitts and Nevis to 1.3 billion in China. In each country, the survey is based on the universe of eligible firms obtained from the country's statistical office with stratified random sampling with replacement, and the result is a representative sample of the non-agricultural private economy in the country.[5] Stratification is based on two criteria: the sector of activity and firm size. Typically, the stratified sampling yields between 100 and 1,000 firms per country, with 108 firms for the median city. Industries range from manufacturing and construction to services and retail and wholesale trade.[6] Each survey is largely a cross-sectional data set. However, firms are asked

[4] The number of cities with BE information is around 650.
[5] Thus wholly state-owned firms are not in the sample.
[6] See http:\\www.enterprisesurveys.org for a more detailed description of the WBES.

about their sales and employment for both the survey year and three years prior to it, which allows us to construct annualized growth rates.

We include data collected after 2006, although some WBES were conducted earlier. Prior to that year, there was considerable heterogeneity across countries in terms of the questionnaire format, sectors covered, and sampling methodology. Moreover, the samples for surveys conducted before 2006 were not generally representative. A complete list of variables and data sources is shown in Table 1; the summary statistics for our key variables are in Table 2. Our final sample consists of up to approximately 80,000 firms covering 709 cities in 128 countries.[7]

Empirical specification and estimation strategy

We focus on firm growth, including both employment and labor productivity growth, for two reasons. First, individual firm growth provides a key source of overall national economic growth, and a country in which firms are failing to grow is unlikely to develop. Second, focusing on firm growth allows us to more cleanly identify the contribution of the BE to growth. Static measures of performance such as labor productivity or total factor productivity (TFP) are more likely to be subject to persistent sources of measurement error and to be influenced by firm-specific market power than are measures of firm growth. By using firm growth and taking a difference of static firm performance, we essentially filter out time-invariant measurement errors. Our base estimation equation is:

$$Y_{ickjt} = FIRM_{ickjt}\theta + E_{ckt}\beta + \sigma_c + u_j + v_t + \epsilon_{icjt} \qquad (1)$$

Here, *i, c, k, j,* and *t* index firms, countries, cities, industries, and year respectively. We examine two different outcome variables (Y_{ickjt}), namely, a firm's employment growth and its labor productivity growth, where labor productivity is measured as sales over the number of employees expressed in constant U.S. dollars. Since growth rates are heavily influenced by outlier issues,[8] we follow Davis and Haltiwanger (1999) by calculating mid-point growth rates by dividing the change in employment (or labor productivity) between the survey year and three years earlier by

[7] For each dependent variable, the number of observations differs, and the figure of 80,000 is for the dependent variable of employment growth which has fewer missing observations. The 709 cities in 128 countries refers to the sample where the missing data issue does not arise.

[8] To see this, consider a firm whose employment grows from 10 to 100 workers compared to one whose employment grows from 100 to 200 workers. Both firms increase employment by 100 workers. However, whereas the former shows a growth rate of 900 percent, the latter shows a growth rate of only 100 percent.

the simple average of employment (or labor productivity) in the beginning and ending years. This bounds the resulting growth rate between – 2 and +2, thereby significantly reducing the influence of outliers.[9] We cluster the heteroskedasticity-corrected errors at the city level.

Among the control variables, *FIRM* is a vector of firm-level controls, including the share of foreign ownership, the ownership share of the largest shareholder, and dummies for both the size and age of the firm.[10] One function of these dummy variables is to help control for the sorting of firms across cities based on their observable characteristics – the possibility that firms with characteristics that are favorable to fast growth may systematically sort into, for example, big cities.[11]

E_{kt} is a vector of the underlying BE at the city level. While firm-level BE indicators are available from WBES, we do not directly use individual answers because they reflect choices made by firms and that are, therefore, endogenous. We instead follow the literature by using the local average across firms of the BE indicators at the city-industry level as a proxy for the local BE (Dollar et al. 2005; Hallward-Dreimeier et al. 2006; Aterido et al., 2011; Xu 2011).[12] In total, there are slightly more than 6,000 unique city-industry cells. This approach of constructing the BE

[9] Since the dependent variables are bound between -2 and +2, non-linear Tobit estimation of equation (1) may be used. However, it is not necessary when one is mainly interested in the marginal effect. The Tobit model requires "commitment to functional form and distributional assumptions, about which we do not usually feel strongly" (p 197-198, Angrist and Pischke, 2009), while the OLS has the virtue of "simplicity, automation, and comparability across studies" (p197, Angrist and Pischke, 2009). We have experimented with estimation using the Tobit model, finding qualitatively similar results to those which are based on OLS.

[10] We include two firm-size dummies. The first is for firms which initially employ between 20 and 100 workers, and the second for firms that initially employ more than 100 workers. We also employ two firm-age dummies – one for firms aged between 6 and 10 years, and the other for firms that are older than 10 years.

[11] A concern in the urban economics literature is that firms with good unobservable characteristics may sort into big cities. That is, there is a sorting of, say, more capable firms, or more technologically-advantaged firms, into large cities. To investigate whether this may be the case, we use the affiliation of high-tech industries by firms as a proxy of firm quality or technology, and see if firms located in big cities are more likely to be in high-tech industries. High-tech industries are those in metals and machinery, electronics, chemicals and pharmaceuticals, non-metallic and plastic materials, auto and auto components. The remaining manufacturing firms are engaged in relatively low-tech activities, such as textiles, leather, garments, food, wood and furniture, and other manufacturing. This exercise is only feasible for manufacturing firms, and for this exercise we thus only use the manufacturing firms. The regression results that relate the high-tech dummy with the In Big City dummy while controlling for country dummies show clearly there is no statistically significant correlation between a firm's tech status and whether or not it is located in a big city; and the magnitude is small. We thus proceed to interpret the In Big City as likely representing the benefits of agglomeration.

[12] In computing the mean for a firm, the observation for the firm itself is excluded to avoid endogeneity. We allow the BE to vary at the industry level since, for instance, regulatory harassment and entry/exit barriers tend to differ across industries as well as across cities. In terms of the number of firms, the median city-industry cell has eight firms.

is similar to that of cross-country indicators, which are often based on survey averages at the country-year level.

For some aspects of the local BE, there are no good objective measures, and researchers rely on subjective assessment of various BE aspects. Typically, the survey asks, "to what extent is XX (i.e., a generic name for a specific BE area) an obstacle to the development of the firm?" and the answer is scaled from 0 to 4, where a higher number implies a more severe constraint. To aid interpretation, for each obstacle question, we construct the dummy variable of moderate or severe obstacles for that area (i.e., the values of 3 and 4), and call it XX Obstacles. We then calculate the city-average of XX Obstacles, and view it as the local BE indicator on this XX aspect.

We control for country fixed effects, which capture unobservable differences across countries that are important for firm performance. Therefore, our identification derives from linking differences in firm performances across different city-industry cells to the city-industry-level BE, while holding country-, industry- and year-level factors constant. Though we have gone perhaps further than others in the BE literature in controlling for omitted factors while employing a global sample, we still face the issue of potential city-industry-level omitted variables. It is conceivable that firms with favorable omitted characteristics may be sorted into cities with particular types of BE, which, as a result, may cause inconsistent estimates.

By relying on observational data, we acknowledge that endogeneity concerns—especially in the context of a horse race between various alternative explanations—can never be completely eliminated. Since many conventional instruments proposed for a particular variable (such as institutions) are often correlated with other channels in the residual of the performance equation (Bazzi and Clemens 2010; Morck and Yeung 2011), and in our context, we try to run a horse race between a long list of potential factors in determining firm performance, we do not believe the instrumental variable approach is feasible here. We thus instead aim to offer a coherent story to tie various findings together (Rosenbaum 2010).

Classifying Key Indicators

As discussed earlier, we classify our key BE indicators into three distinct categories for ease of interpretation: Basic BE, Refined BE, and Agglomeration Environment (see Figure 1).

Basic BE includes several subcategories: Basic Protection (i.e., protection against government expropriation and against crime), human capital, infrastructure, and access to finance. Often thought to be essential government responsibilities for a productive BE, Basic Protection is measured by Corruption Obstacle (i.e. the extent to which corruption is viewed as an obstacle by firms in the city-industry cell)[13] and Security Cost (i.e., city-industry average of a firm's expenditure on security as a share of its sales).[14] Human capital is measured using Skill Obstacles (i.e., the extent to which skill shortage is viewed as an obstacle by firms in a city-industry cell). Infrastructure is captured by two indicators: one for traditional infrastructure, Power Outage (i.e., city-industry share of firms that experienced a power outage in the survey year), and another for modern infrastructure, Web Intensity (i.e., city-industry share of firms that answer that they use websites to conduct business). Access to finance, widely viewed as a key element of the BE by a large literature (Demirguc-Kunt and Maksimovic, 1998; Levine, 1997; La Porta et al., 2000; Beck et al., 2005; Bloom et al., 2010), is measured by Overdraft Facility (i.e. city-industry share of firms with overdraft facility), which captures access to formal finance, and Trade Credit (i.e. city-industry average of the proportion of total annual sales of goods and services that are paid for after delivery), which captures access to informal finance. Trade Credit is also a useful measure of the strength of a firm's production network linkages with other firms.

Refined BE includes, *inter alia*, the barriers to entry and exit (such as access to land) and labor regulations that firms face, as well as the tax environment. Entry and exit regulations are proxied by Land Access Obstacle. Labor regulation is captured by Labor Regulation Obstacle. The tax environment is measured by Tax Rate Obstacles.

Agglomeration Environment includes In Big City, Informal Competition, and Capacity Agglomeration. In Big City is a binary dummy variable which takes the value 1 if a firm is located in a city which had a population in excess of one million in the survey year and/or is located in a national capital. The underlying rationale for the inclusion of this variable is that large cities are more likely to benefit from dynamic agglomeration economies generated by spillovers of knowledge between firms, either in the same industry or in different industries (see, for example, Rosenthal and Strange, 2004, and Combes and Gobillon, 2015, on this point).

[13] Other "Obstacles" variables are similarly defined.
[14] See Table 1 for definitions and sources of all key variables.

The data allow us to potentially delve more deeply into how city size affects firm growth. In particular, we are able to identify whether a firm is located in a "town" (population less than 50,000), a small city (i.e., population between 50,000 and 250,000), a medium-sized city (i.e. population between 250,000 and one million), a large city (population in excess of one million), and/or a capital city. In empirical explorations, we found that being located in a medium-sized city or a small city does not have statistically significant different effects from being located in a town. We thus kept only being located in a big city and being located in a capital city, and tested whether the coefficients are the same for these two groups of cities. Since we cannot reject the null hypothesis that these two coefficients are identical for both employment and labor productivity growth,[15] and given that capital cities tend to be relatively large in any case, we bundle these two categories together in our final specification to be parsimonious.

Informal Competition, meanwhile, is measured by the share of firms in a city that self-report as competing with informal firms. Since informal firms tend to unproductive and have lower managerial skills along with little organizational complexity and related know-how (La Porta and Shleifer, 2014), firms facing higher informal competition are likely to benefit less from positive spillover effects from their industry.

Finally, Capacity Agglomeration is defined as the concentration of firms within a city that possess high capacity either in terms of technology, management or their ability to adapt to a changing competitive environment. Following Li *et al*. (2017) and Clarke *et al*. (2015), we proxy Capacity Agglomeration by the share of firms in a city that employ more than 50 workers. The use of this proxy is consistent with evidence from many studies which have shown that (reasonably) large firms have stronger capacity than other firms in developing countries. For example, large firms are more productive and export more (Bernard and others, 2007; Melitz and Ottaviano, 2008), conduct R&D more efficiently (Cohen and Klepper, 1996), and, very much related, are also more innovative (Cohen and Levin, 1989). Perhaps because the R&D centers of large firms provide key spillovers for small firms (Acs et al., 1994), large firms are associated with higher industrial agglomeration (Barrios et al., 2006; Holmes and Stevens, 2002). Indeed, exogenous re-location of a large firm positively affects incumbent firms' TFP (Greenstone et al., 2010), while firms are more likely to become large when they are co-located with other large firms (Li et al., 2012). Using

[15] The t-value for the null are 1.26 and 0.7 for employment and labor productivity growth, respectively.

the same proxy for Capacity Agglomeration, Li et al. (2017) find that this measure helps explain China's productivity advantage over India in a quantitatively important way, while Clarke et al. (2015) find that it has predictive power for firm-level job growth using WBES data similar to that on which we rely.

3. Baseline Results

We present our baseline results for both the growth of employment (Lgrowth) and the growth of labor productivity (LPgrowth) in Table 3. As can be seen, the firm level controls tend to perform as we might expect *a priori*. To begin with, foreign ownership is strongly associated with better firm performance. Based on the estimate, a one standard deviation (SD) increase in the share of foreign ownership (0.25) is associated with increases in Lgrowth and LPgrowth of 0.5 percentage points and 1.3 percentage points, respectively. In addition, firms whose ownership is more dominated by a single owner (as reflected in a higher ownership share for the largest shareholder) suffer from both lower Lgrowth and LPgrowth. This likely reflects the effect of family ownership of firms, which tends to result in a lower quality of management, and perhaps worse aspects in other areas as well, such as lower levels of investment in the human capital of employees. A one-SD increase in family ownership is associated with reductions of 0.3 and 0.7 percentage points in Lgrowth and LPgrowth, respectively.

Relative to firms with the smallest initial size (i.e., employing 20 or fewer workers), those firms that initially employ 20-100 workers have higher Lgrowth (by 2.6 percentage points) and LPgrowth (by 3.6 percentage points). Those employing more than 100 workers grow even faster: Lgrowth by 8.7 percentage points and LPgrowth by 4.6 percentage points.

Consistent with the literature (Ayyagari et al., 2011), older firms experience slower Lgrowth as reflected by the negative coefficient on the variables Age 6-10 and Age 10+. However, accompanying this, older firms do experience faster LPgrowth.

Turning to the main variables of interest, the critical importance of Basic Protection is evident. First, Corruption Obstacle proves to be damaging for employment, but not LP, growth. A one SD increase in this variable is associated with a drop in Lgrowth of 0.4 percentage points. By contrast, it has no significant impact on LPgrowth. The negative estimated impact on Lgrowth is consistent with Freund et al.'s (2016) finding that heightened corruption promotes increased management harassment, which should contribute to lower firm growth. Second, a lack of basic

safety, as measured by the city average of share of sales that firms spend on security staff, is negatively (though statistically insignificantly) associated with Lgrowth (with a t-statistic of 1.59).

Perhaps surprisingly, Human Capital, as captured by Skill Obstacles, proves to be un-important for either Lgrowth or LPgrowth: the estimated coefficients on this variable are both statistically insignificant and small. This finding differs from Gennaioli et al. (2013), who provide evidence that human capital plays a prominent role in accounting for variations in sub-national regional development for a large sample of countries.[16]

The two measures of infrastructure – Power Outage and Web Intensity – have quite distinct effects. Power Outage is not associated with firm growth. Thus, conditional on other variables, power outages within a city do not matter much for either Lgrowth or LPgrowth in our pooled sample. In contrast, our measure of modern technology, Web, proves to be much more important. Hence, a one SD increase in Web is associated with an increase in Lgrowth of 0.4 percentage points, and an increase in LP growth of 0.8 percentage points. This finding is consistent with the notion that the internet is a general-purpose technology with widespread impacts for many facets of the economy (Roller and Waveman, 2001; Basu and Fernald, 2008; Clarke et al., 2015). Electricity, the old general-purpose technology, has lost its importance in our pooled sample in this modern era.

Access to both formal and informal finance matters. Increasing access to formal finance (i.e., Overdraft Facility) by one SD (0.26) is associated with raising Lgrowth by 0.4 percentage points, and LPgrowth by 0.9 percentage points. Similarly, increasing access to informal finance (i.e., Trade Credit) by one SD (0.2) is associated with raising LPgrowth by 0.7 percentage points.

Turing to Refined BEs, we find that Land Access Obstacle, which we use as a proxy for entry and exit regulations more generally, does not matter at all.[17] Likewise, there is no significant association between Labor Regulation Obstacles and growth. Thus, labor regulation in general entails neither great benefits nor grave dangers across our global sample of, mainly, developing-

[16] One possibility is that our measure of human capital is not as good as that which Gennaiola *et al* use in their paper. Another possibility, at least for the firm performance part, is that we have a much larger sample of WBES data: while they only have thousands of observations, we have almost 60,000 observations for our baseline regression of Lgrowth. We also control for many more aspects of the BE than do Gennaiola *et al*.

[17] This is consistent with Bruhn and McKenzie's (2014) survey of literature on the effects of entry reforms and related policy actions to promote firm formalization in developing countries. In particular, they report that there is little evidence in the literature that entry reforms impact on micro firms' formalization decisions.

country cities. Similarly, onerous tax burdens and procedures are not significantly associated with firm growth.

In stark contrast to Refined BEs, Agglomeration Environment matters greatly for Lgrowth. First, being located in a one-million-plus-population city or a national capital ("big city"), is associated with an Lgrowth increase of 0.6 percentage points. Second, Capacity Agglomeration is also associated with faster employment growth – a one SD increase in Capacity Agglomeration (0.15) is associated with Lgrowth that is 0.7 percentage points higher. Third, reducing Informal Competition, which can also be taken as an indication of higher capacity agglomeration, by one SD is associated with increased Lgrowth of 0.2 percentage points. Interestingly, however, while the positive association of Agglomeration Environment with Lgrowth is strong, its association with LPgrowth is weak. Hence, for our global sample of cities, whether or not a firm is located in a big city seems not to matter for its labor productivity growth. *Prima facie*, this would seem to suggest a general absence of dynamic agglomeration economies, although it may be the case that our simple binary dummy variable is too crude a measure of city size to pick-up such effects. The absence of evidence of dynamic agglomeration economies also does not rule out the possible presence of static agglomeration economies, which would tend to manifest themselves in levels, rather than growth rates, of productivity. [18]

As a robustness check, and to shed light on the extent to which each category of BE variables explains the observed variations in outcomes, we re-do the analysis of Table 3 in Table 4, but using the city-industry level observations only. In other words, we aggregate both the outcome and the explanatory variables into their city-industry means.[19] This specification has the added advantage of being unlikely to over-state estimation precision. Moreover, we can report the additional contribution of a specific BE category to explaining the within and the between R squared to indicate the relative importance of that category for explaining the outcome (Gennaioli et al., 2013): the larger is the change in the R squared, the more important a category is.

Overall, the qualitative results tend to be quite similar with a couple of exceptions. First, Security Costs, previously insignificant for explaining Lgrowth, become highly significant and

[18] In exploratory runs, we have also examined the association between a firm's level of total factor productivity and the agglomeration environment, and we find positive associations with both Capacity Agglomeration (significant at the X percent level) and In Big City (significantly at 10 percent level).

[19] We tried both the unweighted (as reported here) and the weighted (using firm employment) version, and the qualitative results on estimates tend to be similar. However, with not many observations for each cell, the weighted results can easily be overwhelmed by the presence of a single large firm, and is therefore probably less meaningful.

with a slightly larger magnitude (and the same sign). Second, In Big City becomes insignificant (with the same sign) for explaining Lgrowth.

In terms of explaining both within and between variations for both Lgrowth and LPgrowth, and focusing on the three big categories (i.e., Basic BE, Refined BE, and Agglomeration Environment), Basic BE emerges as the most important, especially in terms of explaining within variations. Agglomeration Environment explains relatively more within variations than Refined BE, while Refined BE explains more between variations than Agglomeration Environment.

Looking into specific components of the Basic BE, both in terms of explaining the within and the between variations, access to finance emerges as the most important, followed by infrastructure. The order of importance between human capital and Basic Protection (roughly corresponding to "institutions" in the literature) depends on if it is within or between variations: Basic Protection is slightly more effective in explaining the within variations, while human capital is more effective in explaining the between variations.

To state briefly, Basic Protection, modern infrastructure (i.e., internet), and access to finance are all important for firm growth, so too, at least for employment growth, is the Agglomeration Environment. Less important are electricity, human capital, and Refined BE.

4. **High-Growth Firms**

Recent research has shown that high-growth firms account for a disproportionate share of jobs, productivity, and output growth in most countries (Haltiwanger et al., 2013, 2016; Coad et al., 2014). From a policy point of view, it is thus critically important to understand the drivers of high-growth firms. To this end, we examine how the BE affects firm performance for both high- and non-high growth firms. In examining high-growth firms, we differ from the existing literature in this area in two main ways (Coad and Tamvada, 2008; Gupta et al.; 2013; Hampel-Milagrosa et al., 2015; Haltiwanger et al., 2016). First, we make use of a much more comprehensive list of BE variables than the previous literature. Second, we examine both employment growth and productivity growth by quantile regressions systematically. In particular, we estimate simultaneous-quantile regressions for 5, 25, 50, 75, 95 percentiles, with bootstrapped standard errors (based on 100 replications). The differences in results (in Table 5) across quantiles sheds light on how the BE effects differ between high- (i.e., top quantiles) and non-high growth firms

(i.e., low quantiles). For exposition convenience, we call the 75th percentile high-growth firms; the 95th percentile very-high-growth firms.[20]

Higher growth firms behave differently from other firms in relation to Basic Protection and to human capital. Corruption obstacle, for instance, is negatively associated with Lgrowth for firms in the bottom half of the Lgrowth distribution, but positively associated with LPgrowth for high-growth firms and especially very-high-growth firms, perhaps indicating the importance of politically connected firms in developing countries. This is consistent with the notion that privileged (high- and very-high growth) firms are able to evade normal constraints imposed by the government (Hallward-Dreimeier and Pritchett, 2015), or even benefit from such constraints because they, in effect, act as entry barriers for non-privileged firms (Acemoglu, 2010). Similarly, higher Security Costs tend to be associated with lower Lgrowth and LPgrowth for non-high-growth firms (for the bottom quartile), but higher LPgrowth for high-growth firms.

Neither human capital (i.e., Skill Obstacle) nor electricity outage have a distinct and significant association with growth at the specified percentiles. In contrast, modern infrastructure (i.e. Web) has an increasingly positive association with both Lgrowth and LPgrowth at higher percentiles. The positive association of Web with growth begins at the 25th percentile for Lgrowth, with a coefficient of 0.006, and the magnitude increases 7-fold for very high-growth firms. In contrast, the positive and significant association of Web with LPgrowth is observed only for high-growth firms with a coefficient of 0.017, and though the coefficient increases to 0.026 for very-high-growth firms, it is no longer statistically significant. Modern infrastructure is thus crucial for job creation for all but the lowest growth firms, while it is also important to the productivity growth of high, although not necessarily very-high, growth firms.

Overall, access to finance seems to benefit higher-growth firms more than it does other firms. Bank finance (i.e., Overdraft Facility) tends to benefit faster-growth firms more in Lgrowth. Its positive association with Lgrowth kicks in at the 25th percentile with a coefficient of 0.002, and it rises to 0.006 at the median, 0.017 for high-growth firms, and 0.024 for very-high-growth firms. Interestingly, access to bank finance benefits tail firms more than firms in the middle in terms of effects on LPgrowth: the co-efficient on Overdraft Facility is roughly twice as large at the 5th and 95th percentiles as it is for the percentiles in-between. Trade credit, meanwhile, is associated with

[20] When summarizing the overall results, we sometimes bundle these two categories as higher growth firms just to simplify.

lower Lgrowth at the 5th and 25th percentiles, and higher LPgrowth at above median percentiles, with an especially large magnitude for very-high-growth firms—its magnitude is five-fold that at the median.

Among Refined BE, tax burdens and land access seem to matter much more for higher-growth firms. While Labor Regulation Obstacle does not seem to matter at any percentile, Land Access Obstacle is associated with lower Lgrowth and LPgrowth for high-growth firms. Thus, land access difficulties hurt high- but not very-high-growth firms. In contrast, Tax Obstacles clearly hurt both high-, and especially very-high-, growth firms. While not systematically associated with Lgrowth for the majority of low-percentile firms, it is negative and significant for high-growth firms (i.e., -0.008) but especially so (i.e., -0.022) for very-high-growth firms.

The effects of Agglomeration Environment also differ greatly by quantiles. In Big City is associated with higher Lgrowth for all firms at the 25th percentile or above, with the coefficient rising from 0.001 (25th) to 0.004 (50th), 0.007 (75th), and ending up at 0.008 (95th). Thus higher-growth firms gain more momentum in expansion from being located in big cities. Somewhat surprisingly, In Big City is associated with lower LPgrowth (by 0.5 percentage points) for high-growth firms (but not other firms). In sharp contrast, the results of both Capacity Agglomeration and Informal Competition indicate that low-growth firms benefit the most from capacity agglomeration. For instance, Capacity Agglomeration is associated with higher Lgrowth only for the bottom 25 percentile firms (with a coefficient of 0.005), but especially for the bottom 5th percentile (with a coefficient of 0.086). Similarly, informal competition is associated with less negative effect on Lgrowth, and more positive effects on LPgrowth for bottom-percentile firms.

To summarize, non-high-growth firms benefit more from Basic Protection and capacity agglomeration. High- and very-high-growth firms benefit more from modern infrastructure, access to finance, lower Land Access Obstacle and lower Tax Burden Obstacle, and affiliation with big cities. High-productivity-growth firms benefit significantly more from the trade credit network.

5. Heterogeneous Effects across Firm Types, Industries and Income Levels

We now explore how the effects of cross-city variations in the BE differ depending on the size of the firm, the age of the firm, whether the firm is operating in the manufacturing or service sector, and the level of development of the country in which the firm is located.

Small vs Large and Medium Firms

Of particular interest to researchers and policy makers is how small firms differ from large and medium enterprises (LMEs) in terms of the BE that can best facilitate their performance. Since small firms are typically defined to be those with fewer than 50 employees (Beck et al., 2008), we classify firms into small firms (i.e., those hiring fewer than 50 employees, "SMALL") and LMEs (i.e., those with 50 or more employees, LMEs), and interact SMALL with our key BE variables.[21] As before, in our final specification, we do not include those interaction terms that are never statistically significant (at the five percent level) in any of the outcome regressions. Table 6 reports the results. Since those BE elements without significant interaction terms tend to have very similar coefficients to those reported in earlier tables, we do not report such BE elements in this table in order to simplify presentation.[22]

Different elements of Basic Protection have differential relative benefits for small firms. Corruption obstacles are particularly taxing for small firms in terms of Lgrowth,[23] but do not seem to hinder LMEs. This is perhaps because small firms do not have sufficient resources to facilitate relationships with regulators and tax collectors, and thus are more vulnerable to government expropriation (Cai et al., 2011). Relatedly, Security Cost has a negative effect on Lgrowth for small firms (but not for other firms). Thus, lack of basic safety is particularly taxing for small firms, while LMEs are better able to circumvent such challenges using their own resources.

There is evidence that obstacles to acquiring skilled workers favor LMEs in terms of Lgrowth. The obstacle on skilled workers has a positive association with Lgrowth for LMEs, perhaps reflecting a change in labor strategy of using more unskilled workers and thus a higher Lgrowth. Alternatively, LMEs might be able to capture a larger share of skilled workers in local labor markets where skilled workers are scarce, thereby allowing them to gain a competitive advantage over small firms, which, in turn, allows them to grow faster. In contrast, the net effect of Skill Obstacle on Lgrowth is essentially zero for small firms.

[21] Since we have a large number of variables, we only interact SMALL with the key business and agglomeration environmental variables.
[22] We follow these presentation principles for the interaction exercises in the remainder of this paper.
[23] Cai et al. (2011) find similar results for firms in China.

Infrastructure issues hurt both types of firms, but especially small firms. First, Outage has a negative association with Lgrowth for small firms (but not for LMEs). Second, a lower Web is associated with lower Lgrowth for both types of firms. For LMEs, reducing Web by one SD (0.24) is associated with lower Lgrowth of 0.9 percentage points, but it is not significantly associated with LPgrowth. For small firms, reducing Web by one SD (0.24) is associated with lower Lgrowth by 0.2 percentage points, and LPgrowth by 1.2 percentage points. For small firms, the lack of modern infrastructure is thus particularly damaging for productivity improvement; while the lack of traditional electricity infrastructure is particularly damaging for employment growth.

Land Access Obstacle has a negative association with Lgrowth for small firms, whereas the association for LMEs is statistically insignificant. This could be because small firms find the fixed costs of accessing land (i.e., licensing, legal procedures, and so on) significantly less affordable than LMEs, which, as a result, constrains their ability to expand over time.

Access to trade credit seems to benefit LMEs more than small firms. First, trade credit access (Trade Credit) seems to shift the competitive balance and dynamic potential within cities to LMEs at the expense of small firms. Hence, in the LPgrowth regression, Trade Credit has a positive coefficient on LPgrowth for LMEs that is around twice as large as that for small firms. Moreover, in cities with better trade credit access, small firms have lower Lgrowth. Our interpretation is that the reliance on trade credit reflects the existence of more intricate production network structures among firms, and small firms are ill-equipped to benefit from such complex relationships. As a result, they suffer in their size expansion.

Tax Rate Obstacles has no significant association with either Lgrowth or LPgrowth for LMEs. By contrast, for small firms, it is negatively associated with Lgrowth, while simultaneously positively associated with LPgrowth.

Labor regulation seems to hurt LMEs more than small firms. Labor regulation obstacles have a negative association with Lgrowth, but only for LMEs. A one SD (0.2) increase in this variable is associated with a 0.7 percentage point reduction in Lgrowth for LMEs. In contrast, for small firms, labor regulation obstacle has no meaningful association with LPgrowth, and a slight positive association with Lgrowth. For small firms, a one SD increase in labor regulation obstacle is associated with a 0.3 percentage point increase in Lgrowth. This likely reflects small firms' comparative advantage in evading labor regulation, and they grow relatively faster as a result. Labor inflexibility implies lower Lgrowth for relatively large firms, perhaps because small firms

are more likely to operate below the employment threshold for labor regulation, as is often observed in developing countries such as India (Li, Long and Xu, 2017), which, in turn, allows small firms to acquire market share at the expense of larger firms, indicating a general equilibrium composition effect (Acemoglu, 2010).

At least in terms of Lgrowth, LMEs benefit significantly more from agglomeration. First, the Lgrowth benefits for a small firm of being in a big city are much smaller than for a LME. The effect on Lgrowth for small firms of being in such a city is only a quarter of that for LMEs. Second, the net effect of Capacity Agglomeration on Lgrowth is negative for small firms, but positive for LMEs, indicating a general equilibrium size composition effect (Acemoglu 2010). However, Capacity Agglomeration is positively and significantly associated with LPgrowth only for small firms. Finally, the prevalence of informal competition (Informal Competition) hurts Lgrowth for small firms, but not for LMEs. This is not surprising since informal firms tend to be closer competitors for small formal firms than do for LMEs. Interestingly, competition from informal firms is statistically significantly associated with higher LPgrowth for LMEs.

To summarize, small firms benefit in Lgrowth relatively more than LMEs when there are: better Basic Protection, adequate human capital, good basic infrastructure (i.e., electricity), better Refined BE (i.e., land access obstacles, tax obstacles). In LPgrowth, small firms benefit more from modern infrastructure (i.e., web) and capacity agglomeration. However, in terms of effects on Lgrowth, LMEs benefit more from labor flexibility, access to trade credit finance, and agglomeration.

Young vs. Old Firms

Young firms may benefit from the BE differently relative to older, more established, firms in many ways. For instance, they may have a shorter credit history and worse access to finance. They may also have less well-developed relationships with government officials, thereby making them more vulnerable to various regulations. To investigate how the employment and productivity growth of young and old firms differ in their relationships with the BE, we create a dummy variable, YOUNG, which takes the value 1 if a firm was established less than 10 years ago. Table 7 suggests that the effects of the underlying BE on young firms differ in several areas from those on more mature firms.

Corruption Obstacle is taxing for both old and young firms, but especially for old firms. Based on our estimates, a one SD increase in Corruption Obstacle is associated with a 0.5 percentage point reduction in Lgrowth for old firms, but only a 0.2 percentage point reduction for young firms. The stronger detrimental effect on old firms is perhaps because the performance of such firms is subject to less uncertainty than is the performance of young firms and their higher available rents expose them to more regulatory or bureaucratic harassment (Clarke and Xu, 2014).

Modern technology (i.e., Web) proves to be a means for young firms to catch-up with older firms. This follows from the finding on Lgrowth that Web has a significantly stronger effect on young firms than on old firms. Moreover, in terms of magnitude, the estimated effect is more than twice as strong for young firms than it is for old firms.[24] The effect of Web on LPgrowth is also stronger for young firms than it is for old firms without the difference being statistically significant.

Young firms benefit from Skill Obstacle in terms of Lgrowth. This is not surprising since young firms are likely better positioned to take advantage of skill shortages.[25]

Young firms benefit more from lower Land Access Obstacle. For these firms, a one SD (0.21) reduction in Land Access Obstacle is associated with an increase in Lgrowth of 0.4 percentage points. This result is intuitive: the acquisition of land tends to be concentrated in the early years of a firm.

Access to bank finance is associated with higher Lgrowth and LPgrowth for both old and young firms, with an effect that is slightly more muted in LPgrowth for young firms. For old firms, a one SD increase in access to bank finance is associated with a 0.4 percentage points increase in Lgrowth and 1 percentage point increase in LPgrowth. For young firms, the effects on Lgrowth and LPgrowth are roughly half those for old firms. Access to trade credit is positively associated with LPgrowth (but not Lgrowth) for both old and young firms.

Labor Regulation Obstacle is negatively and statistically significantly associated with Lgrowth only for the young. This is not surprising since young firms grow much faster and adjust their labor more often, and labor regulations thus hurts them more.

Interestingly, in terms of Lgrowth, young firms seem to benefit less from capacity agglomeration than old firms, although both benefit significantly. Based on the regression, a one

[24] The result on Lgrowth is significant at the 10-5% level.

[25] It is perhaps useful to point that being young and being small is not strongly correlated. The correlation coefficient of being young and being SMEs is only 0.16.

SD increase in capacity agglomeration is associated with higher Lgrowth of 0.9 percentage points for old firms, but only 0.3 percentage points for young firms. Relatedly, young firms suffer in terms of LPgrowth from being located in a "big city." This could be because such firms particularly feel the impacts of the severe congestion costs that are often a characteristic feature of larger cities. In contrast, they benefit more than old firms from capacity agglomeration in terms of LPgrowth.

To summarize, old firms benefit more from containing corruption, while young firms benefit more from Refined BE (i.e., ease of entry and exit, and labor flexibility) and modern web technology. Both young and old firms benefit from capacity agglomeration, but young firms benefit more from capacity agglomeration in LPgrowth, while old firms benefit more in Lgrowth.

Manufacturing vs Service Sector Firms

How does the effectiveness of various BE variables hinge on the sector affiliation of the firm? Answering this question may allow us to offer policy insights based on a location's sector structure. A first step towards answering this question can be made by examining how the BE effects differ between manufacturing and service firms, which differ fundamentally with regards to, for example, the tradability of their products. We thus interact SERVICE, a dummy variable indicating that a firm belongs to the service sector, with our key BE variables in Table 8.

Corruption Obstacles and reliable power supply affect manufacturing and service firms very differently. Corruption Obstacles has no strong relationship with growth outcomes for manufacturing. By contrast, for service-sector firms, a higher value of Corruption Obstacle is associated with lower Lgrowth. Corruption thus has a stronger deterrent effect for firm growth in the service than in the manufacturing sector. Similarly, reliable power supply is more important for service firms: reducing Power Outage by one SD (0.27) is associated with increasing LPgrowth by 1.1 percentage points.

Land access is also more important for service firms. A one SD drop in Land Access Obstacle (0.21) is associated with increasing Lgrowth by 0.5 percentage points for service firms (but not for manufacturing firms). This is not surprising since entry and exits tend to be more prevalent for services than for manufacturing, causing stronger demand for land access and sales.

Manufacturing firms benefit relatively more from bank financing, while service firms benefit relatively more from trade credit. Local access to bank finance is important for both

manufacturing and service firms, but especially for manufacturing firms. For manufacturing (service) firms, its one-SD increase of 0.26 is associated with raising LPgrowth by 1 (0.3) percentage points. In contrast, service (but not manufacturing) firms benefit from a local environment that allows for better access to trade credit. Increasing it by one SD (0.2) is associated with an increase in LPgrowth of 1.2 percentage points.

Labor Regulation Obstacle, in contrast, is positively associated with Lgrowth—only for service firms. This could reflect the general equilibrium composition effect: service firms are likely better able to evade labor regulation, and thus able to grow relatively faster.

Service firms benefit more from being located in a big city. While being located in such a city confers no growth benefits for manufacturing firms, for service firms it is associated with raising Lgrowth by 0.9 percentage points and LPgrowth by 1.4 percentage points, both large effects.

To summarize, service-industry firms benefit more from Basic Protection, ease of land access, availability of trade credit, labor regulation, and being in a big city. Manufacturing firms benefit more from bank financing.

By the Stage of Development

It is plausible that the BE that is most conducive to strong firm performance differs according to the stage of development of the country in which a firm is located. For instance, some argue that formal finance is not needed when a country is at a relatively early stage of development. This is because, at such a stage, alternative mechanisms such as reputation and trade credit may suffice for development (Allen, Qian and Qian 2015). One may also imagine that some elements of the BE, such as protection of intellectual property rights, may be best complemented with legal enforcement, which is better in richer countries (McMillan and Woodruff, 2002). Financial constraints may be particularly relevant for countries when they reach the stage of development that, for example, allows them to graduate from International Development Assistance (IDA) status – i.e. as they pass from low to lower middle-income status (Galiani et al., 2017). To aim for policy prescriptions specific to countries at various stages of development, we interact our key BE variables with two dummy variables. The first dummy, POOR, adopts a value of one when a country's level of GDP per capita in the survey year is less than 1000 constant U.S. dollars (in 2005 value). Meanwhile, the second dummy, UPPER MIDDLE, is set equal to one when a country's GDP per capita exceeds 3500 U.S. dollars in the survey year. These thresholds roughly

correspond to the transition from low to lower middle and then to upper middle income status by World Bank classification. The results are in Table 9. To show the results compactly, we do not explicitly report those BE elements that do not have significant interactions with either of our two income threshold dummies. But since those income-invariant elements are also relevant in this story of the stage of development, we still discuss those results.

The income-category-invariant BE factors include Basic Protection, human capital, entry and exit barriers (i.e., land access obstacles), labor regulation obstacles, tax rate burden obstacles, and two indicators of agglomeration including Being In Big City and Informal Competition. In contrast, the income-dependence properties of basic and modern infrastructure are quite different. Basic power supply (i.e., Power Outage) is not significantly associated with firm growth in non-poor (i.e. upper middle-income or above) countries. However, in low-income countries, power outage is, counter-intuitively, actually positively and significantly associated with LPgrowth (but not Lgrowth). In sharp contrast, the effect of internet technology prevalence (Web) is income-invariant.

Access to bank finance (i.e. Overdraft Facility) is positively associated with higher Lgrowth for sample countries of all income levels. However, while it is positively associated with LPgrowth for low- and lower-middle countries, it has an effect that is close to zero in upper-middle-and-above income countries. Access to bank finance thus has the most positive effect in lower-income countries.

The effect of access to trade credit proves to be income-dependent. Trade Credit Access has a positive association with LPgrowth in lower-middle-income countries. By contrast, the effects are close to zero for low- and upper-middle-and-high-income countries. These results make sense: when income is too low, inter-firm linkages may not be important; when it is sufficiently high, reliance on informal financing may be less critical to firms in meeting their financing needs.

Also income-invariant are various forces of economic agglomeration, with one exception. The effect of being in a big city is income invariant, as is the effect of informal competition. The effect of Capacity Agglomeration, however, proves to be income dependent. In middle-income countries, Capacity Agglomeration is positively associated with Lgrowth. However, it is only in low-income countries that we find a positive and significant relationship with LPgrowth with a one-SD increase (0.15) being associated with raising LPgrowth by 2.2 percentage points, a huge effect. Thus (and assuming causality), for poor countries, it is critically important to facilitate clustering of reasonably sized firms for productivity growth to take place.

To summarize, the effects of Basic Protection, human capital, modern infrastructure, Refined BE, some aspects of the agglomeration environment (i.e., being in a big city, informal competition) tend to have effects on firm growth that are invariant to a country's level of development. The effect of bank financing on Lgrowth is also income-invariant. Some BE elements work better in lower-income countries: access to bank financing has a positive association with LPgrowth, but only in low- and lower-middle-income countries; capacity agglomeration has a pronounced effect on LPgrowth only in low-income countries. Interestingly, trade credit access plays a positive role only in lower-middle-income countries.

6. Conclusions

In this paper we have used comprehensive firm-level data which cover 709 cities in 128 countries to investigate the association between the business environment (BE) and firm growth, both in terms of employment growth and labor productivity growth. Unlike previous literature, we mainly focus on the city-industry-level BE with the advantage of being able to control for country and industry fixed effects. We examine a relatively comprehensive list of factors, including Basic BE (consisting of Basic Protection, human capital, infrastructure, and access to finance), Refined BE (consisting of entry and exit barriers, labor regulation, and tax burdens), and the agglomeration environment, which has been largely ignored by the BE literature.

When assuming homogeneous effects using the globally pooled data, Basic Protection, modern infrastructure (i.e., the internet), and access to finance prove to be important for firm growth, as does the agglomeration environment. Less important are electricity and Refined BE. Further investigations, however, reveal strong heterogeneity of the BE effects.

To begin with, the environment which is amenable to the growth of high-growth firms is dramatically different to that for other firms. For the latter group, Basic Protection and capacity agglomeration are important. In contrast, high-growth firms benefit relatively more from modern infrastructure, access to finance, lower Land Access Obstacle and lower Tax Burden Obstacle, and from being in big cities. High-productivity-growth firms also benefit significantly more from trade credit networks.

Small firms tend to need a stronger Basic and Refined BE than large and medium-sized enterprises, with some exceptions. Small firms benefit relatively more in terms of employment growth than larger firms when there are better Basic Protection, adequate availability of human

capital, good basic infrastructure (i.e., electricity), and better Refined BE (i.e., few land access and tax obstacles). With respect to labor productivity growth, small firms benefit more from modern infrastructure (i.e., the internet) and capacity agglomeration. However, in terms of effects on employment growth, large and medium enterprises (LMEs) benefit from both stronger labor flexibility and a more developed inter-firm-linkage environment (i.e., access to trade credit finance, and agglomeration).

The key environments required for young and old firms to thrive also differ. Old firms benefit more from containing corruption. Young firms benefit more from modern infrastructure and Refined BE (i.e., ease of entry, labor flexibility). Both types of firms benefit from capacity agglomeration: the young in labor productivity growth, and the mature in employment growth.

The key ingredients for a good BE also differ by a country's income level. Access to bank financing and capacity agglomeration are more important for facilitating firm labor productivity growth in lower-income countries.[26] Interestingly, trade credit access uniquely plays a positive role only in lower-middle-income countries. However, most typical elements of the BE prove to be income-invariant in terms of facilitating growth: Basic Protection, human capital, modern infrastructure, Refined BE, and some aspects of agglomeration (i.e., being in a big city, and informal competition). The effect of bank financing on Lgrowth is also income-invariant.

Relative to manufacturing firms, service-industry firms are much more sensitive to the BE: they benefit more from Basic Protection, ease of land access, availability of trade credit, labor regulation, and being located in a big city. Manufacturing firms, in contrast, benefit more from bank financing.

Our research yields several key implications. *First*, it is important to consider heterogeneous effects of the BE. Small firms (vs. LMEs) and services firms (vs. manufacturing firms) tend to be more sensitive to the soundness of the Basic BE and the Refined BE. Larger firms and high-growth firms tend to require stronger labor flexibility. Manufacturing firms (vs. service firms) tend to benefit more from access to bank financing. Small firms (vs. LMEs) and low-growth firms benefit more from a good agglomeration environment. Young firms (vs. old firms) benefit more from modern infrastructure and Other Refined BE (i.e., ease in entry, labor flexibility). For lower-income countries, access to bank financing and capacity agglomeration are more important

[26] In particular, access to bank financing has a positive association with LPgrowth only for low- and lower-middle-income countries; capacity agglomeration has a pronounced effect on LPgrowth only in low-income countries.

for facilitating firm labor productivity growth. *Second*, though we observe important heterogeneity of the BE effects, we do find several key elements to be critically important in most contexts: access to bank finance, modern infrastructure, and agglomeration (especially capacity agglomeration and being located in a big city). Thus, it is important to add the agglomeration environment to the list of key BE ingredients. This category has emerged as a key determinant of firm growth across countries, perhaps as important as many of the traditional BE elements that we emphasize such as human capital, institutions, access to finance, and so on; moreover, it is a key element that facilitates productivity growth in low-income countries, thus allowing them to catch up.

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Figure 1. Classification of the business environment

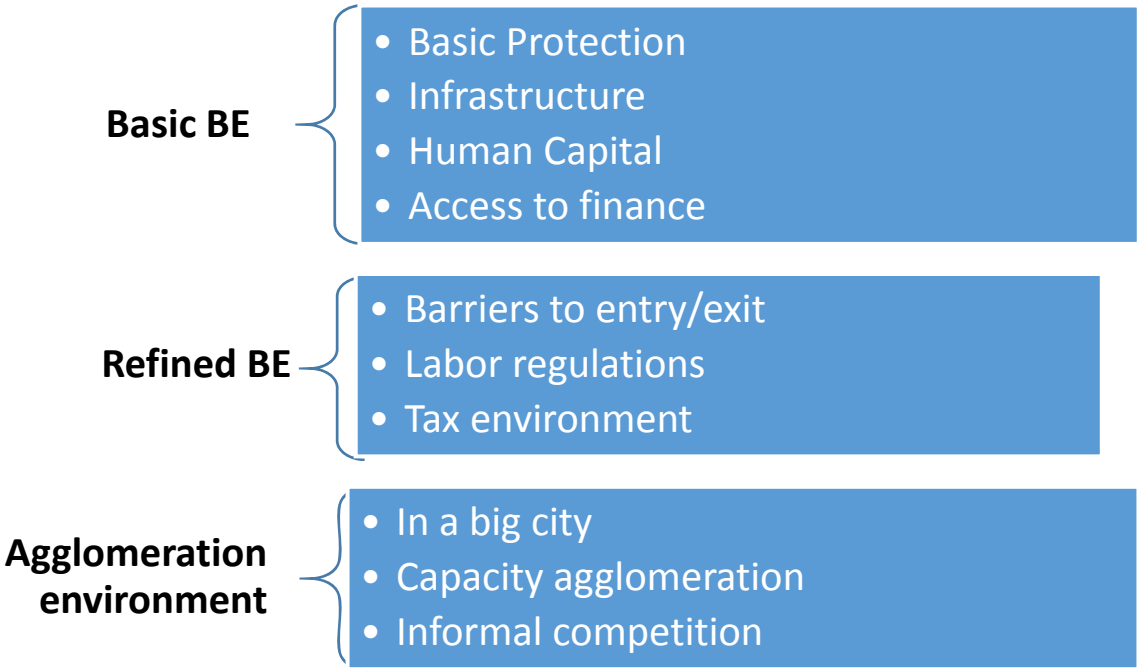

Table 1. Variable definitions and Sources

Variables	Definition and source
Lgrowth	One-year employment growth rate. First calculate 3-year growth rate as the change in permanent employees in 3 years divided by initial number of permanent employees. Then convert it to one-year growth rate (g1). The Lgrowth = 2*g1/(2+g1), which is the Haltiwanger measure of labor growth, bound by -2 and 2 to avoid the typical extreme outlier problem associated with the un-transformed g1.
lnLP	The logarithm of labor productivity (LP). LP is measured as sales over the number of permanent employees. Winsorized at tail 2 percent to avoid the outlier issue.
LPgrowth	The annualized (Haltiwanger) LP growth rate. The procedure is the same with Lgrowth except that the basic building block is LP instead of L.
TFP	Total factor productivity, estimated as the residual from industry-specific production function with log value added as the dependent variable and log capital and log labor as the independent variables. K is replacement cost of land and machine. L is the number of permanent employees plus 0.5 times the number of temporary employees.
Foreign	The share of foreign ownership of the firm.
OwnBiggest	The ownership share of the largest owner.
L_0 20-100 (100+)	The firm's number of employees three years ago was 20-100 (more than 100).
Age 6-10 (10+)	The firm's age is between 6 and 10 years (or 10 or more years).
In Big City	The firm is located in a city of a million residents or the capital. This variable has 20.5% of missing, and to avoid loss of sample, we impute the missing with we impute the missing with World Bank income group dummies, regional dummies (LAC, MNA, SAR, ECA, EAP, Africa), service industry dummy, size dummies (10-20 employees, 20-60 employees, 60+ employees), age dummies (firm age between 6 and 10 years old; 10 years plus).
Small	The firm is a small enterprises, that is, employing fewer than 50 employees.
Young	The firm's age is younger than 10 years.
Rich	The firm is located in a country that is below the medium GDP per capita in the sample.
Exporter	The firm is an exporter.
$lnPop_{t-1}$	Log(once-lagged population level)
$lnGDPPC_{t-1}$	Log(once-lagged GDP per capita in real US dollars).
$lnPopDen_{t-1}$	Log(once-lagged population density)
XX $Obstacle_c$	City-industry-level average of the firm's answer on whether "XX' constitutes an obstacle, ranking from 0 to 4 (with 4 being more severe obstracles). XX is one of the following: corruption, skilled labor availability, labor regulation, tax rate burdens, land acquisition. The subscript c for these variables indicate that it is based on city-industry-level average rather than a firm's answer.
Overdraft $Facility_c$	City share of firms with overdraft facility. Based on WBES calculation.
Trade $Credit_c$	City average of the proportion of total annual sales of goods and services that are paid for after delivery. Based on WBES calculation.
Inf $Competititon_c$	City share of firms who say that they directly compete with informal firms. It is a measure of the importance of the informal sector and its competition with the formal sector. Based on WBES calculation.
$Outage_c$	City-industry share of firms that experienced a power outage in the survey year. Based on WBES.
Web_c	City-industry share of firms that answer that they use websites to conduct business.
Security $Cost_c$	City-industry average of the share of a firm's sales paid for security. Based on WBES.
Capacity $Agglomeration_c$	The share of firms whose number of employees exceeding 50, as a proxy of capacity agglomeration. Computed based on sample firms.

Table 2. Summary Statistics

	N	mean	sd	p10	p25	p50	p75	p90
Lgrowth	97669	0.041	0.143	-0.084	0.000	0.007	0.096	0.179
LPgrowth	70068	-0.026	0.299	-0.270	-0.126	-0.040	0.051	0.199
TFP	33288	-0.133	1.351	-1.856	-1.032	-0.137	0.709	1.549
lnLP	85803	9.534	1.554	7.431	8.496	9.632	10.635	11.517
Export share	106384	0.100	0.253	0.000	0.000	0.000	0.000	0.400
Foreign share	106284	0.075	0.246	0.000	0.000	0.000	0.000	0.030
OwnLargest	103061	0.795	0.264	0.400	0.510	1.000	1.000	1.000
L0 20-100	97930	0.300	0.458	0.000	0.000	0.000	1.000	1.000
L0 100+	97930	0.153	0.360	0.000	0.000	0.000	0.000	1.000
Age 6-10	106338	0.221	0.415	0.000	0.000	0.000	0.000	1.000
age 10+	106338	0.635	0.481	0.000	0.000	1.000	1.000	1.000
In Big City	107777	0.481	0.450	0.000	0.000	0.474	1.000	1.000
Small	107777	0.714	0.452	0.000	0.000	1.000	1.000	1.000
young	106338	0.365	0.481	0.000	0.000	0.000	1.000	1.000
rich	102222	0.488	0.500	0.000	0.000	0.000	1.000	1.000
In Big City	85700	0.476	0.499	0.000	0.000	0.000	1.000	1.000
service	107777	0.446	0.497	0.000	0.000	0.000	1.000	1.000
exporter	106384	0.219	0.413	0.000	0.000	0.000	0.000	1.000
Country level								
$lnPop_{t-1}$	122	15.764	2.001	12.779	14.802	15.999	17.111	18.260
$lnGDPPC_{t-1}$	121	7.583	1.264	5.920	6.596	7.666	8.578	9.277
$lnPopDen_{t-1}$	122	4.084	1.260	2.418	3.446	4.240	4.867	5.660
City level variables								
Corruption obstacle	638	0.489	0.276	0.092	0.279	0.493	0.697	0.878
Overdraft facility	636	0.377	0.263	0.070	0.146	0.325	0.585	0.771
Trade credit	638	0.427	0.198	0.178	0.272	0.414	0.574	0.706
Inf competition	633	0.499	0.208	0.246	0.338	0.478	0.659	0.783
Skilled labor obstacle	642	0.408	0.223	0.125	0.224	0.388	0.567	0.712
Labor regulation obstacle	638	0.282	0.200	0.058	0.140	0.243	0.402	0.554
Tax rate obstacle	642	0.582	0.224	0.267	0.446	0.594	0.757	0.870
Land access obstacle	638	0.334	0.212	0.100	0.177	0.284	0.469	0.664
Outage	638	0.575	0.269	0.220	0.340	0.578	0.832	0.933
Web	642	0.440	0.239	0.114	0.241	0.448	0.618	0.766
Security Cost	642	0.018	0.018	0.004	0.008	0.014	0.022	0.037
Capacity agglomeration	648	0.268	0.146	0.077	0.161	0.260	0.354	0.456

Table 3. Base Specification

	Lgrow		LPgrow	
	coef	**se**	**coef**	**se**
Foreign	0.020**	0.003	0.054**	0.007
OwnLargest	-0.012**	0.003	-0.026**	0.006
L_0: 20-100	0.026**	0.004	0.036**	0.004
L_0: 100+	0.087**	0.008	0.046**	0.005
Age 6-10	-0.027**	0.003	-0.007	0.005
Age 10+	-0.041**	0.003	-0.006	0.005
Corruption Obstacle$_c$	-0.016*	0.006	0.017	0.013
Security Cost$_c$	-0.078	0.049	-0.130	0.111
Outage$_c$	-0.001	0.007	-0.002	0.013
Web$_c$	0.017**	0.006	0.035**	0.013
Skill Obstacle$_c$	0.005	0.006	-0.010	0.013
Overdraft Facility$_c$	0.014*	0.006	0.033*	0.014
Trade Credit$_c$	-0.008	0.008	0.034*	0.016
L Regu Obstacle$_c$	0.002	0.007	0.003	0.015
Tax Rate Obstacle$_c$	-0.007	0.007	0.008	0.015
Land Access Obstacle$_c$	-0.007	0.007	-0.004	0.014
In Big City	0.006*	0.003	-0.000	0.005
Capacity Agglomeration$_c$	0.046**	0.015	0.015	0.026
Inf Competition$_c$	-0.012*	0.005	0.006	0.011
Country, industry, year FEs	Yes		Yes	
N	57,455		44,279	

*, ** represent statistical significance at the 5 and 1 percent levels. Heteroskedasticity-corrected standard errors clustered at the country level in columns indicated by "se".

Table 4. Base Specification, City-Industry Mean Specification

	Lgrow		LPgrow	
	coef	**se**	**coef**	**se**
Corruption Obstacle$_c$	-0.012	0.006	0.001	0.017
Security Cost$_c$	-0.109**	0.038	-0.329	0.214
Outage$_c$	-0.004	0.006	0.000	0.012
Web$_c$	0.036**	0.007	0.054*	0.022
Skill Obstacle$_c$	0.013	0.007	0.015	0.017
Overdraft Facility$_c$	0.033**	0.009	0.040*	0.016
Trade Credit$_c$	-0.001	0.007	0.075**	0.019
L Regu Obstacle$_c$	0.002	0.007	-0.003	0.018
Tax Rate Obstacle$_c$	-0.002	0.006	-0.025	0.019
Land Access Obstacle$_c$	-0.005	0.009	0.018	0.018
In Big City	0.002	0.005	-0.002	0.010
Capacity Agglomeration$_c$	0.066**	0.022	0.015	0.030
Inf Competition$_c$	-0.016**	0.006	-0.009	0.011
Other averages of firm controls	Yes		Yes	
country, industry, year FEs	Yes		Yes	
N	4,219		3,695	
R^2 Within: all BE variables	15.6%		37.9%	
R^2 Within: excluding AE	14.8%		37.8%	
R^2 Within: excluding Refined BE	15.6%		37.8%	
R^2 Within: excluding Basic BE	13.0%		36.6%	
R^2 Within: excluding Basic Protection	15.3%		37.7%	
R^2 Within: excluding Human Capital	15.5%		37.8%	
R^2 Within: excluding Infrastructure	14.5%		37.5%	
R^2 Within: excluding Finance	14.3%		37.1%	
R^2 Between: all BE variables	3.6%		10.8%	
R^2 Between: excluding AE	5.0%		11.1%	
R^2 Between: excluding Refined BE	4.0%		10.6%	
R^2 Between: excluding Basic BE	3.1%		5.8%	
R^2 Between: excluding Basic Protection	4.2%		11.4%	
R^2 Between: excluding Human Capital	3.8%		10.7%	
R^2 Between: excluding Infrastructure	3.7%		8.0%	
R^2 Between: excluding Finance	2.5%		7.7%	

*, ** represent statistical significance at the 5 and 1 percent levels. Heteroskedasticity-corrected standard errors reported.

The unit of observation is an country-city-industry cell.

Table 5. BE effects on growth by quantiles

	Dependent variable: Lgrowth									
	5 percentile		25th percentile		Median		75th percentile High-growth		95th percentile Very-high growth	
	coef	se	coef	se	coef	se	coef	se	coef	se
Corruption Obstacle$_c$	-0.034**	0.010	-0.005**	0.001	-0.009**	0.002	-0.007	0.004	-0.019	0.011
Security Cost$_c$	-0.414**	0.139	-0.038*	0.017	0.012	0.024	0.066	0.042	0.020	0.132
Outage$_c$	0.002	0.006	0.000	0.001	0.002	0.001	-0.002	0.003	-0.012	0.009
Web$_c$	0.011	0.009	0.006**	0.001	0.009**	0.002	0.019**	0.004	0.044**	0.009
Skill Obstacle$_c$	-0.020	0.011	-0.002	0.001	0.002	0.002	0.004	0.004	0.016	0.015
Overdraft Facility$_c$	0.001	0.010	0.002*	0.001	0.006**	0.002	0.017**	0.004	0.024*	0.009
Trade Credit$_c$	-0.016	0.009	-0.005**	0.001	-0.003	0.002	-0.006	0.005	0.004	0.011
L Regu Obstacle$_c$	0.012	0.013	0.001	0.002	0.002	0.002	-0.004	0.005	-0.001	0.013
Tax Rate Obstacle$_c$	0.002	0.009	0.002	0.001	-0.003	0.002	-0.008*	0.004	-0.022*	0.009
Land Access Obstacle$_c$	0.013	0.010	-0.000	0.001	-0.003	0.002	-0.008*	0.004	-0.006	0.011
In Big City	0.000	0.003	0.001**	0.000	0.004**	0.001	0.007**	0.002	0.008*	0.004
Capacity Agglomeration$_c$	0.086**	0.014	0.005*	0.002	0.001	0.003	0.008	0.008	0.030	0.025
Inf Competition$_c$	-0.001	0.006	-0.003**	0.001	-0.007**	0.002	-0.010**	0.003	-0.019*	0.009
Other firm controls	Yes		Yes		Yes		Yes		Yes	
Country FE	Yes		Yes		Yes		Yes		Yes	
	Dependent variable: LPgrowth									
Corruption Obstacle$_c$	0.017	0.017	0.004	0.006	0.006	0.005	0.019*	0.008	0.050*	0.022
Security Cost$_c$	-0.525	0.318	-0.282**	0.080	-0.011	0.051	0.187**	0.070	0.008	0.235
Outage$_c$	-0.008	0.010	-0.002	0.004	-0.003	0.003	-0.009	0.005	-0.019	0.015
Web$_c$	0.008	0.015	0.004	0.005	0.005	0.005	0.017**	0.006	0.026	0.020
Skill Obstacle$_c$	-0.010	0.019	-0.000	0.006	-0.007	0.005	-0.001	0.007	-0.009	0.022
Overdraft Facility$_c$	0.048**	0.012	0.027**	0.005	0.026**	0.004	0.022**	0.006	0.049**	0.018
Trade Credit$_c$	-0.009	0.016	0.004	0.006	0.015**	0.004	0.040**	0.006	0.070**	0.022
L Regu Obstacle$_c$	-0.017	0.022	0.007	0.007	0.020**	0.005	0.009	0.009	0.024	0.025
Tax Rate Obstacle$_c$	0.008	0.012	0.003	0.004	0.003	0.004	0.003	0.006	-0.042**	0.016
Land Access Obstacle$_c$	0.015	0.016	0.002	0.006	-0.006	0.005	-0.019*	0.008	-0.028	0.021
In Big City	-0.010	0.006	-0.001	0.002	-0.002	0.002	-0.005*	0.002	-0.002	0.007
Capacity Agglomeration$_c$	-0.005	0.031	0.016	0.011	0.032**	0.009	0.022	0.013	0.026	0.033
Inf Competition$_c$	0.029*	0.012	0.016**	0.004	0.014**	0.004	0.005	0.005	-0.001	0.014
Other firm controls	Yes		Yes		Yes		Yes		Yes	
Country FE	Yes		Yes		Yes		Yes		Yes	

*, ** represent statistical significance at the 5 and 1 percent levels. Standard errors bootstrapped (with replications of 100) in columns indicated by "se". The number of observations for Lgrowth is 57,455; that for LPgrowth is 44,279.

Table 6. Results with Small Interactions

	Lgrowth		LPgrowth	
Corruption obstacle	**0.011**	0.008	**0.019**	0.016
Corruption obstacle * Small	**-0.035****	0.007	**-0.003**	0.014
Security Cost	**0.404****	0.107	**0.026**	0.202
Security Cost * Small	**-0.630****	0.116	**-0.215**	0.240
Skilled labor obstacle	**0.018***	0.009	**-0.022**	0.016
Skilled labor obstacle * Small	**-0.021***	0.010	**0.018**	0.016
Outage	**0.008**	0.008	**0.005**	0.015
Outage * Small	**-0.019****	0.007	**-0.010**	0.012
Web Intensity	**0.038****	0.009	**0.001**	0.016
Web Intensity * Small	**-0.029****	0.008	**0.050****	0.015
Land access obstacle	**0.018**	0.011	**0.009**	0.020
Land access obstacle * Small	**-0.035****	0.010	**-0.018**	0.017
Trade credit	**0.016**	0.013	**0.042***	0.019
Trade credit * Small	**-0.027***	0.011	**-0.018**	0.016
Labor regulation obstacle	**-0.033****	0.011	**0.012**	0.020
Labor regu. obstacle * Small	**0.047****	0.012	**-0.014**	0.019
Tax rate obstacle	**0.013**	0.009	**-0.013**	0.018
Tax rate obstacle * Small	**-0.036****	0.009	**0.035***	0.015
In Big City	**0.016****	0.004	**-0.001**	0.006
In Big City * Small	**-0.012****	0.004	**-0.001**	0.007
Inf competition	**0.011**	0.008	**0.024***	0.012
Inf competition * Small	**-0.036****	0.008	**-0.025**	0.013
Capacity agglomeration	**0.075****	0.023	**-0.016**	0.030
Capacity agglomeration * Small	**-0.083****	0.019	**0.059***	0.026
N	57,455		44,279	
Country, industry, year FEs	Yes		Yes	
adjusted R-squared	0.225		0.287	

*, **: significance at the 5 and 1 percent. Heteroskedasticity-corrected standard errors clustered at the country level in columns indicated by “se”.

Table 7. Results for old and young firms

	Lgrowth		LPgrowth	
	coef	**se**	**coef**	**se**
Corruption obstacle	**-0.019****	0.007	**0.019**	0.014
Corruption obstacle * Young	**0.012***	0.006	**-0.002**	0.011
Skilled labor obstacle	**-0.003**	0.007	**-0.019**	0.013
Skilled labor obstacle * Young	**0.019***	0.009	**0.025**	0.015
Web Intensity	**0.012**	0.006	**0.030***	0.013
Web Intensity * Young	**0.017***	0.007	**0.017**	0.012
Land access obstacle	**0.000**	0.007	**0.003**	0.015
Land access obstacle * Young	**-0.020***	0.009	**-0.020**	0.015
Overdraft facility	**0.016***	0.007	**0.042****	0.015
Overdraft facility * Young	**-0.006**	0.007	**-0.027***	0.012
Trade credit	**-0.011**	0.009	**0.035***	0.017
Trade credit * Young	**0.009**	0.009	**-0.002**	0.015
Labor regulation obstacle	**0.013**	0.008	**0.012**	0.015
Labor regulation obstacle * Young	**-0.035****	0.011	**-0.028**	0.020
Tax rate obstacle	**-0.014**	0.008	**0.002**	0.016
Tax rate obstacle * Young	**0.020***	0.009	**0.022**	0.014
In Big City	**0.006**	0.003	**0.004**	0.005
In Big City * Young	**-0.000**	0.003	**-0.012***	0.006
Inf competition	**-0.010**	0.005	**0.016**	0.012
Inf competition * Young	**-0.004**	0.006	**-0.029***	0.012
Capacity agglomeration	**0.060****	0.016	**-0.007**	0.026
Capacity agglomeration * Young	**-0.038****	0.014	**0.064***	0.026
controls in panel B of Table 4	Yes		Yes	
N	51,685		38,120	
Country, industry, year FEs	Yes		Yes	
adjusted R-squared	0.117		0.272	

*, ** represent statistical significance at the 5 and 1 percent levels. Heteroskedasticity-corrected standard errors clustered at the country level in columns indicated by "se".

Those variables without significant interaction terms with Young have similar coefficients as in Table 5 and are not reported.

Table 8. Effects for manufacturing and services firms

	Lgrowth		LPgrowth	
	Coef	**se**	**coef**	**se**
Corruption obstacle	**-0.010**	0.007	**0.014**	0.015
Corruption obstacle * service	**-0.012***	0.006	**-0.003**	0.012
Outage	**-0.002**	0.007	**0.014**	0.015
Outage * service	**0.001**	0.006	**-0.039****	0.014
Land access obstacle	**0.003**	0.008	**-0.006**	0.016
Land access obstacle * service	**-0.023***	0.009	**0.005**	0.019
Overdraft facility	**0.009**	0.006	**0.041****	0.014
Overdraft facility * service	**0.012**	0.006	**-0.029***	0.013
Trade credit	**-0.006**	0.009	**0.009**	0.016
Trade credit * service	**0.000**	0.009	**0.059****	0.017
Labor regulation obstacle	**-0.010**	0.008	**0.011**	0.016
Labor regulation obstacle * service	**0.029****	0.009	**-0.026**	0.018
In Big City	**0.002**	0.003	**-0.005**	0.005
In Big City * service	**0.009****	0.003	**0.014***	0.006
Other controls as in Table 4 panel B	Yes		Yes	
N	51,685		38,120	
Country, industry, year FEs	Yes		Yes	
adjusted R-squared	0.117		0.271	

*, ** represent statistical significance at the 5 and 1 percent levels.
Heteroskedasticity-corrected standard errors clustered at the country level in columns indicated by "se".

Those variables without significant interaction terms with the two income dummies have similar coefficients as in Table 5 and are not reported.

Table 9. Development stage and environmental effects

	Lgrowth		LPgrowth	
	Coef	**se**	**coef**	**se**
Outage	**-0.0004**	0.007	**-0.015**	0.014
Outage * Poor (i.e., low-income countries)	**0.001**	0.015	**0.106***	0.042
Overdraft facility	**0.017***	0.008	**0.048****	0.016
Overdraft facility * Upper Middle (i.e., upper-middle and above)	**-0.015**	0.012	**-0.059***	0.023
Trade credit	**-0.011**	0.013	**0.071****	0.023
Trade credit * Upper Middle	**0.0004**	0.015	**-0.062***	0.027
Trade credit * Poor	**0.018**	0.019	**-0.090***	0.039
Capacity agglomeration	**0.044***	0.018	**-0.010**	0.028
Capacity agglomeration * Poor	**-0.007**	0.033	**0.144***	0.062
Controls in Table 4 panel B				
N	54,960		44,279	
Country, industry, year FEs	Yes		Yes	
adjusted R-squared	0.131		0.286	

*, ** represent statistical significance at the 5 and 1 percent levels. Heteroskedasticity-corrected standard errors clustered at the country level in columns indicated by "se".

Those variables without significant interaction terms with the two income dummies have similar coefficients as in Table 5 and are not reported.