Fostering Entrepreneurship in Armenia

Smita Kuriakose, Editor

THE WORLD BANK
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Abbreviations

ECA  Europe and Central Asia
GDP  gross domestic product
OECD Organisation for Economic Co-operation and Development
R&D research and development
SME small and medium enterprise
VC  venture capital

All dollar amounts are U.S. dollars unless otherwise indicated.
Overview

A dynamic and vibrant private sector is crucial to economic growth, with firms making new investments, creating jobs, improving productivity, and promoting growth. Entrepreneurial activity is pivotal to the continued dynamism of the private sector, with the generation of new businesses fostering competition and economic growth. This is particularly relevant for Armenia, whose government aims to find new sources of long-term economic growth to become an upper-middle-income country.

This study uses data from the new 2012 World Bank Entrepreneurship Survey conducted to gauge new firm growth in the formal sector in Armenia and data from World Bank Enterprise Surveys to analyze innovative activity in existing firms. It includes detailed case study analyses to complement these findings and to highlight the determinants of high-growth entrepreneurs.

Entrepreneurship in Armenia

Survey results indicated the following information about Armenian entrepreneurs:

- **Founder Characteristics.** The majority (57 percent) of surveyed firms had only one founder; 4 percent had three or four founders. About 25 percent of founders were women. The most common education level among founders was a postgraduate degree (75 percent), in contrast to their counterparts in Georgia, where the most common education level was a bachelor’s degree (44 percent). In contrast to Georgia, where firms in high-tech sectors had a larger share of founders with a postgraduate degree or a doctoral degree, in Armenia founders of firms in both high-tech and non-high-tech firms had similar education characteristics.

- **Founders’ Motivation.** The top two reasons cited for founding a business were sensing an opportunity to make more money and wanting to be one’s own boss. Not finding a suitable job was cited as an important reason for starting a business by more than half of business owners in Armenia. Fearing loss of one’s
job was the least common reason. These patterns are in line with trends in the rest of the developing world and in Europe and Central Asia (ECA).

- **Firm Characteristics and Strategy.** The average size of surveyed firms was 27 full-time employees. The largest firm in the sample had 990 employees, and 51 percent had less than 10 employees. Nearly 50 percent of the surveyed firms conducted some form of research and development (R&D) in the past five years, and 55 percent of surveyed firms envisioned spending on R&D in the next two years. This was in sharp contrast to the sample of firms surveyed in Georgia, where 90 percent of surveyed firms spent nothing on R&D in the past five years and did not envision spending on R&D in the next two years.
  - Some 60 percent of products or services produced at firm inception were modifications of existing products or services; the remaining 40 percent were new products or services in the market. In Georgia only 10 percent of products or services produced at firm inception were new to the market. Almost 92 percent of Armenian firms drew funding from founders' own savings, and 18 percent also draw on funds from banks.

- **Market Environment.** Some 53 percent of the surveyed firms cited having many business competitors. Armenian respondents reported lower levels of competition than did their Georgian counterparts. This could reflect the fact that Georgian entrepreneurs are producing products that are slight modifications of existing products—implying that more firms sell the same kinds of products with slight modifications—while Armenian firms are spending more on R&D, trying more innovative products to differentiate themselves from their potential competitors.

- **Perceived Obstacles.** The top three cited obstacles in setting up or operating a firm were difficulty recruiting highly skilled employees, market risk/uncertainty, and difficulty finding necessary funding. The most commonly cited legal and regulatory constraints were continually changing taxation regulations and favoritism by government officials for well-connected individuals.

- **Innovative Activity.** Some 67 percent of respondents indicated that they had introduced a new or substantially improved product or service in the previous three years. This was in sharp contrast with the respondents in Georgia, where only 7 percent of surveyed firms indicated that they had. More than 80 percent of the new products and services in Armenia were new to the market, and 3 percent were new to the world. By contrast, in Georgia no goods or services were new to the world, and 50 percent of were new to the market.

- **Sources of Knowledge.** The most important sources of knowledge for business opportunities were clients or customers, market research on sales in the domestic market, and R&D conducted in-house and by other competitors. Universities, technical institutes, R&D firms, and external commercial labs were among the
least important sources of knowledge, indicating the lack of industry-relevant research in these enterprises. However, unlike Georgia, in-house R&D was an important source of knowledge. This was further corroborated in the detailed case studies.

Policy Recommendations

Armenia has by far the highest level of entrepreneurial activity among the three South Caucuses countries that were studied. Armenia’s entrepreneurial culture is built largely on the very strong math and science foundation established during the Soviet era. However, several factors hinder business growth and entrepreneurship. The government could remove bottlenecks from the general business environment that impede able entrepreneurs with good ideas from starting a new venture and creating jobs. This would include strengthening the business environment to allow failure and company exit as a necessary part of entrepreneurial learning, company incentives that favor entrepreneurs with good ideas, instruments that enable entrepreneurs to access capital for startups, and flexible labor market policies that enable firms to expand by attracting the best talent from outside the firm or the country.

Simplifying the Tax System

The ease of paying taxes index and other business surveys continue to cite weaknesses in the country’s tax administration, and arbitrary, corrupt behavior by tax officials is a major impediment to the formation and success of small and medium enterprises (SMEs). The surveyed entrepreneurs cited continuously changing tax regulations as the most important legal and regulatory constraint on operating their business.

Tax policy must be simplified, and tax administration must be completely revamped.

Increasing Government Efficiency and Transparency

A closely related factor is the increased transparency and government efficiency required to facilitate business growth. The second most cited legal and regulatory constraint among surveyed entrepreneurs was government officials favoring well connected individuals.

Various e-government initiatives must be continued to increase government efficiency.

Several other agencies in Armenia are involved in SME strategy implementation. Better coordination among these institutions is needed to avoid duplicating scarce resources.

Increasing Access to Finance

As in other countries in the region, in Armenia access to finance remains difficult, particularly for SMEs. Most firms use equity, owners’ contributions, or stock sales to finance their investments.

SME support programs for startups should be robustly evaluated to determine their efficacy and identify ways to strengthen them.
Secured Transactions. Secured transactions, particularly for movables, are important for SMEs, which have more trouble accessing credit. In Armenia a security interest created in immovable property must be perfected through registration. Not all security interests in movable property are required to be registered—only charges over intellectual property, motor vehicles, and agricultural equipment. However, because registration gives a creditor priority over unregistered and unsecured creditors, it is worthwhile to register pledges on other movable property, though the registry cannot be considered an accurate source of other pledges that may encumber the property.

Security interests in all types of movable property should be allowed to be registered, and an electronically searchable collateral registry should be created for both movable and immovable assets. The registry should be authoritative—that is, parties should not be able to circumvent registry priority.

Access to Risk Capital. Armenia has a large proportion of knowledge-intensive startups, which have historically been a major source of innovations and job growth in the industrial world. These startups are responsible for an outsized share of innovation in developed economies compared with their small size and relative weight in research and in the economy as a whole. Though they have the potential to be highly successful, they also have a high rate of failure and are thus considered high-risk investments. Given the risks associated with these startups, it is rare to find one investor who will fund a new startup from beginning to end. Each step in developing a new product—from idea, to research, to prototype, to a marketable product—requires larger amounts of capital, which programs developed by Small and Medium Enterprises Development National Centre of Armenia cannot fund.

The initial funds for the very early stages of developing a concept into a business (known as the seed stage) will likely come from an individual’s own finances or from a group of closely related people. To get beyond the seed stage, entrepreneurs require outside investors who are willing to make small investments in volatile early-stage companies. The government can establish favorable financing programs for SMEs by developing early-stage risk capital.

Innocative firms that receive venture capital tend to bring products to market more quickly. An initiative in Armenia aims to link aspiring entrepreneurs with venture capitalists through the business partnership grant competition and venture conference organized by the Enterprise Incubation Foundation and Civilian Research and Development Foundation Global. This is an excellent initiative that can be further developed in both scope and scale. To further develop the venture capital industry, clear regulations for protecting intellectual property are needed, such that private investors do not face any additional risks on that count. Further, concerted efforts to tap into the Armenian diaspora could help establish links to venture capitalists in the United States and Europe.

Developing Skills
Stakeholders repeatedly cited inadequate skills as a key hindrance to developing local industry. The largest group among the unemployed are those with secondary
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Overview

general education and no technical skills, although many possess secondary technical and tertiary education. This suggests that unemployment has two dimensions: those with no job-specific skills and those who have skills but are still jobless, indicating a skills mismatch. This reflects the course curriculum’s being heavily focused on theory and almost fully removed from the market, with little practical education.

Medium- to long-term policies need to reorient the education system to produce more industry-relevant skills.

First, priority should be given to technical skills at higher education institutions, where course curriculum has industry inputs, so that skills produced are relevant to industry. Collaborating with overseas universities (for example, in Australia and the United Kingdom) could be an additional channel for effective human resources development. Foreign universities can help develop and upgrade curricula and teaching materials as well as provide teaching staff.

Second, Armenia has a vast diaspora (about 6 million people) who are highly skilled. There needs to be a concerted effort to tap into their knowledge and skills both in short-term measures as well as longer term engagements with industry, research organizations, and higher education institutions.

Third, more emphasis is needed on industry-relevant vocational training and education courses that cater to the technical needs of the various priority sectors identified by the government. In this process, a feedback mechanism between firms and the government is necessary, with feedback being provided to the design and development of those new courses that are responding to the skills needs of industry.

Increasing Industry-Research Collaboration

Universities and industry require each other to be successful; however, they infrequently work together in Armenia. In-house R&D among firms is very prevalent, but there is virtually no interaction between industry and research communities. Synergies need to be built between these two communities in the priority areas identified by the government. The government can provide incentives for industry and researchers to effectively collaborate. One possible way is to support the development of technology transfer organizations, which can facilitate the transfer of knowledge from research institutions to SMEs through collaborative research and technology programs and provide training and skill development programs, staff exchanges, and secondments (placing researchers and engineers in firms). The Science and Technology Entrepreneurship Program does this in the information technology sector and needs to be replicated in other emerging sectors as well.

Facilitating Firm Exit and Restructuring

Lowering barriers to exit and enabling restructuring of viable firms are important means of fostering entrepreneurship. It must facilitate the orderly and efficient exit of failed firms from the market, allowing the assets of these firms to be
redeployed to more productive uses as soon as possible and for creditors of failed firms to recover as much as possible of what is owed to them.

Restructuring. Armenia has no mechanism to incentivize post-petition financing, a crucial gap in the framework for reorganizing viable businesses. Nothing requires that creditors be provided sufficient material information to enable them to make an informed decision on a proposed rescue plan. And no provision requires a reorganization plan to be independently analyzed by creditors.

The law should be improved to allow post-petition ongoing finance and include a requirement that creditors be provided sufficient material information to enable them to make an informed decision on a proposed rescue plan.

Personal Insolvency. Entrepreneurship in a country has been shown to increase when the insolvency regime provides businesses a way to mitigate losses to personal fortunes through an effective bankruptcy system that discharges debt and protects a certain level of assets.

The Armenian Law on Bankruptcy prohibits a bankrupt natural person from starting or partnering in a new business for five years, thus hampering the fresh start that should be the goal of a personal insolvency regime. Further, it requires the bankrupt debtor and “affiliated persons” to submit property and income statements for three years, according to a regulation to be issued, which can serve as a disincentive to follow through with an insolvency proceeding.

The law should allow bankrupt debtors to return to economically productive activity immediately. The ability to start again immediately is an essential component of the “fresh start” that is provided by successful personal bankruptcy systems such as those in the United Kingdom and the United States.

Raising Awareness
Governments have a key role in raising awareness of the private benefits of undertaking entrepreneurial activities. An example of this was the efforts of the Thatcher government, which came into power in the United Kingdom in 1979 with the clear objective to create an “enterprise culture.” The idea was to change the social attitudes of the U.K. population away from what the government perceived as a “dependency culture,” in which workers relied on large organizations and the state for employment, to an attitude in which individuals strived to start their own business and created jobs as part of an “enterprise culture.”

School curriculum in Armenia needs to factor in prerequisites that encourage innovative thinking. Showcasing successful entrepreneurs could go a long way in fostering the entrepreneurship culture in society.

Summary of policy recommendations and timelines

<table>
<thead>
<tr>
<th>Policy measure</th>
<th>Timeline</th>
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<tr>
<td>Facilitating business entry and increasing business environment efficiency</td>
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<tr>
<td>Simplify tax policy and revamp tax administration.</td>
<td>3–6 months</td>
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<tr>
<td>Continue and strengthen various e-government initiatives to increase government efficiency.</td>
<td>0–3 months</td>
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Summary of policy recommendations and timelines *(continued)*

<table>
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<tr>
<th>Policy measure</th>
<th>Timeline</th>
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<tr>
<td>Coordinate better among the various institutions involved in SME development to avoid duplicating scarce resources.</td>
<td>0–3 months</td>
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<tr>
<td><strong>Increased access to finance</strong></td>
<td></td>
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<tr>
<td>Evaluate existing financial support programs to determine their efficacy and identify ways to strengthen them.</td>
<td>0–3 months</td>
</tr>
<tr>
<td>Allow security interests in all types of movable property to be registered and create an electronically searchable collateral registry for both movable and immovable assets.</td>
<td>6–12 months</td>
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<tr>
<td>Establish financial programs that support the development of early-stage risk capital.</td>
<td>6–12 months</td>
</tr>
<tr>
<td>Strengthen intellectual property regulations to help further develop the venture capital industry.</td>
<td>6–12 months</td>
</tr>
<tr>
<td>Develop programs to systematically tap into the Armenian diaspora that could help establish links to venture capitalists in the United States and Europe.</td>
<td>3–6 months</td>
</tr>
<tr>
<td><strong>Developing skills</strong></td>
<td></td>
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<tr>
<td>Reorient higher education programs toward industry needs.</td>
<td>Greater than 1 year</td>
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<tr>
<td>Introduce industry-relevant vocational training programs.</td>
<td>6–12 months</td>
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<tr>
<td><strong>Increasing industry-research linkages</strong></td>
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<tr>
<td>Develop short-term and longer term engagements with the Armenian diaspora in industry, research organizations, and higher education institutions.</td>
<td>3–6 months</td>
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<tr>
<td>Introduce programs and policies to incentivize researchers to undertake industry-relevant research and to strengthen collaborations between industry and researchers.</td>
<td>3–6 months</td>
</tr>
<tr>
<td><strong>Facilitating firm exit and restructuring</strong></td>
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<tr>
<td>Improve the insolvency law by allowing post-petition ongoing finance and requiring that creditors be provided sufficient material information to enable them to make an informed decision on a proposed rescue plan.</td>
<td>3–6 months</td>
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<tr>
<td>Amend the insolvency law to allow a bankrupt debtor to return to economically productive activity immediately.</td>
<td>3–6 months</td>
</tr>
<tr>
<td><strong>Raising awareness</strong></td>
<td></td>
</tr>
<tr>
<td>Showcase successful entrepreneurs to increase awareness of entrepreneurship.</td>
<td>0–3 months</td>
</tr>
<tr>
<td>Introduce changes to the school curricula that encourage innovative thinking.</td>
<td>6–12 months</td>
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**Note**

1. Chemical industry, manufacture of basic pharmaceutical products, manufacture of computer and other electronic equipment, manufacture of electrical equipment, and information and communication.
What Drives Entrepreneurship and Economic Growth?

Introduction
Job creation and productivity growth are at the forefront of today’s global development agenda. The 2013 *World Development Report* on jobs identified entrepreneurship as an important tool in addressing these dual goals. Increased productivity occurs due to the reallocation of new products and services entering markets toward profitable uses. The Organisation for Economic Co-operation and Development (OECD)–Eurostat Entrepreneurship Indicator Program (OECD 2009) established the following definitions building on past theoretical contributions in the literature:

- *Entrepreneurs* are those persons (business owners) who seek to generate value through the creation or expansion of economic activity by identifying and exploiting new products, processes, or markets.
- *Entrepreneurial activity* is an enterprising human action in pursuit of the generation of value through the creation or expansion of economic activity by identifying and exploiting new products, processes, or markets.
- *Entrepreneurship* is the phenomenon associated with entrepreneurial activity.

These definitions take into consideration several important issues. First, by distinguishing between entrepreneurs and entrepreneurial activity, these definitions recognize that while entrepreneurs engage in entrepreneurial activity, such activity does not necessarily require the actions of entrepreneurs. That is to say, the definitions recognize the possibility of entrepreneurial activity within extant businesses by individuals who do not have a stake in the company (employees). Second, not all businesses—in fact, not all new businesses—are entrepreneurial in the sense of identifying or creating new products, processes, or markets. Third, rather than concentrating on entrepreneurial individuals or companies that succeed, the definitions broaden the scope of analysis to those that seek to generate value through such activity. Fourth, the notion of value is left open to include the
traditional objective of economic growth as well as other objectives such as increasing employment, decreasing inequality, and tackling environmental problems. But the importance of entrepreneurship goes beyond firm entry and relates to the introduction of new products and process innovation, which enables firms to enter new markets.

This study uses the entrepreneurship model put forth in the OECD-Eurostat Entrepreneurship Indicator Program (OECD 2009), with minor modifications (figure 1.1). The model comprises various determinants that policy can affect and that in turn influence entrepreneurial performance, or the amount and type of entrepreneurship that take place. The model then refers to the impact of entrepreneurship on higher level goals such as economic growth, job creation, and poverty reduction. This study focuses on determining the level of entrepreneurship in Armenia and analyzes the role of each determinant in both fostering and constraining entrepreneurial activity.

**Motivations for Entrepreneurs**

Entrepreneurs view opportunities in the economy by measuring their profit-making potential; that is their first motivation. Entrepreneurs will not pursue a societal need unless they can successfully make a profit. They are motivated by the accumulation of wealth but also by the need to achieve (Shane, Locke, and...
Collins 2003). Despite being risk takers, they may not seek out the riskiest opportunities, but they are willing to take on some risk. Entrepreneurs evaluate opportunities in the marketplace differently depending on how they perceive the level of risk and assess the capacity for mitigating it. Several external factors influence the level of risk, such as environmental regulations, political attitudes, industry regulation, industry health, state of technology, market size, and availability of resources, including venture capital and skilled labor (Hayter 2011).

Entrepreneurs may be pushed into self-employment and starting a business by necessity—that is, the lack of other employment options and the need for income. Alternatively, they may be pulled into starting a business because they recognize opportunities and choose to pursue them. Necessity-driven entrepreneurship is expected to be more prevalent in less developed and developing (factor-driven) economies. The importance of necessity as a motivator gradually decreases with greater economic development, while that of opportunity increases (Kelley, Singer, and Herrington 2012).

**Determinants of Entrepreneurship**

As the conceptual framework in figure 1.1 shows, a host of factors determine the propensity of an individual or a firm to engage in entrepreneurial activities. It must be recognized at the outset that the determinants highlighted in this framework are in no way independent of each other.

The overall regulatory framework encompasses numerous elements, including the number of days required to start a business, insolvency and bankruptcy laws that determine firm survival and exit, and factors such as the extent of red tape. The overall regulatory framework thus impacts both firm entry and firm exit. Klapper and Love (2012) analyzed the World Bank Entrepreneurship database (World Bank 2008a), which collects data on total and newly registered businesses in more than 100 industrial and developing countries. Their analysis shows that a strong business and regulatory environment can encourage entrepreneurial activity. Capture and corruption also determine the level of productive entrepreneurial activity, as they directly influence the expected payoffs associated with undertaking entrepreneurial activities.

Lowering bankruptcy costs is another important step in enabling new firms to enter the market, especially in industries with naturally high entry rates (Klapper, Laeven, and Rajan 2006). Bankruptcy law and reform deeply affect entrepreneurs who are subjected to external risks when starting and running their businesses. An effective bankruptcy system can provide the possibility of a “fresh start” if the first effort fails and can limit entrepreneurs’ losses in bankruptcy. A forgiving personal bankruptcy law and ready availability of limited liability can stimulate entry by “latent” entrepreneurs who would otherwise be too risk-averse to start their own business (Armour and Cumming 2008). Countries with high or unlimited exemptions in personal bankruptcy law attract 25 percent more entrepreneurial activity than those with low exemptions (Fan and White 2003; Mathur 2009), although increasing the cost of credit (Berkowitz and White 2002).
Access to finance is an important determinant of innovative activity for both new and existing firms. Impediments to accessing finance are often larger for small and medium enterprises (SMEs) and stem partly from the demand side of financial markets. Credit is more readily available to businesses that have immovable property (land and buildings) to be used as collateral than to those having movable assets, as banks strongly prefer immovable property to secure a loan. Insufficient suitable collateral is often cited among the top reasons for difficulty accessing credit, especially for small firms. Other obstacles to expanding access to finance include insufficient or inadequate financial and other information on SMEs available to bankers, who therefore find it difficult to make an informed credit decision. In addition to finance from banks, venture capitalists and angel investors can foster entrepreneurial activity.

Market conditions, which are determined largely by the overall regulatory framework, include such factors as the level of competition in factor and product markets. Market structure and competition are likely to affect a firm’s ability to innovate or undertake other entrepreneurial activities. In theory, the relationship between competition and innovation by incumbent firms is ambiguous (Aghion and others 2005). On the one hand, firms that are far behind the technological frontier may reduce investment in innovation in the face of competition from new entrants, because innovation is very costly to them and competition would erode rents obtained from innovating. On the other hand, firms that are close to the technological frontier need to spend relatively little to stay ahead of new entrants; competition, therefore, would create greater incentives for them to spend on innovation. The level of competition is in turn influenced by an economy’s openness to trade and foreign direct investment, which increase exposure to foreign competition and induce the adoption of more advanced technologies in both export- and import-competing firms (see Schiff and Wang 2006). Furthermore, participation in export markets enables firms to become more productive, a phenomenon referred to as “learning through exporting.” Firms can absorb technology by exporting to customers who will provide signals in meeting standards and requirements to access global markets. Lederman (2009), using firm-level data from enterprise surveys in several countries, finds that a firm’s exporting status (that is, whether it exports more than 10 percent of its sales) is positively correlated with the probability that it innovates. Historical accounts of the rise of East Asian export industries stress the role of advanced country buyers as conduits of technological and managerial know-how to developing country firms (Pack and Westphal 1986).

Research and development (R&D) capacity is a crucial determinant of a firm’s ability to innovate. Lederman (2009), using firm-level data, finds evidence that R&D is significantly and positively correlated with the probability that a firm innovates. R&D has a role in developing a firm’s ability to identify, assimilate, and exploit knowledge from the environment—that is, to enhance the entrepreneurial capacity of the economy. Here it is important to employ a broad definition of R&D: the inclusion of improvements in existing processes or products as well as the imitation and adoption of knowledge. Hence R&D is not restricted to original?
innovation. While R&D investment oriented toward "new-to-the-world" innovations predominates in developed economies, developing economies need R&D to be able to absorb new technologies and keep up with existing global technological trends, a phenomenon that Cohen and Levinthal (1989) refer to as the “second face of R&D.”

A vital determinant of entrepreneurial activity is the accumulation of human capital and the skill level of the workforce. An educated workforce can be considered a precondition for a country to have the capacity for knowledge acquisition and adaptation, especially in an environment in which firms face competitive pressures that call for frequent changes in product mix and production technology (Kuriakose, Goldberg, and Zhang 2011). In addition to education levels, evidence suggests a relationship between the level of training and technological adaptation. Higher levels of training and skills typically lead firms to identify new technologies that need to be mastered to increase competitiveness. Yet the firm’s decision to acquire a certain technical competency often necessitates training and changes in the workforce’s skill composition. For example, training in Russian enterprises is highly correlated with indicators of innovativeness such as R&D or licensing of patents and know-how, introduction of new production technologies, and high-technology exports (Tan and others 2007). Diaspora and other networks can serve as a source of skills, entrepreneurial ability, and business and marketing expertise. The diaspora can also contribute to entrepreneurship by strengthening trade and investment links (World Bank 2008b).

Entrepreneurship also depends on various social and individual characteristics of gender and culture. It involves taking risks, and potential entrepreneurs cannot be risk-averse. The recent European Bank for Reconstruction and Development’s (2011) Life in Transition Report suggests that despite the fact that women in transition economies have similar levels of education, training, and skills as men, they are less likely to become entrepreneurs, with one of the reasons cited being the fact that women are more risk-averse.

Rather than an inborn skill, entrepreneurship is largely a product of environment. It involves a complex of economic and social behaviors. Entrepreneurship can flourish only in the right environment. Social values, culture, government policies, the political system, technology, economic conditions, customs, and laws influence entrepreneurship. Iyer and Schoar (2010) explored the importance of culture in determining contractual outcomes through field experiments in India and found that entrepreneurs from different communities vary in how they conduct business and negotiate contracts.

Cultural values deeply affect entrepreneurship and economic development. Culture affects the entrepreneurial process and focuses on the discovery and interpretation of opportunities. It trains people along particular lines. It nurtures enterprising and risk-bearing behavior. Starting with Max Weber, sociologists have argued that entrepreneurship is most likely to emerge in a specific social culture. According to them, social sanctions, cultural values, and role expectations are responsible for the emergence of entrepreneurship. Some cultures are enormously supportive of entrepreneurship. Others may not regard it so favorably.
These differences go a long way toward explaining why some societies are vibrant and progressive and others stagnate.

**High-Growth Entrepreneurship**

An important distinguishing factor among SMEs is their rate of growth. The OECD defines “high-growth enterprises” as firms that have annualized growth in their number of employees above 20 percent over a three-year period and have at least 10 employees at the beginning of the measurement period (OECD 2009). Analysts see high-growth enterprises as a source of entrepreneurial vitality that are promoted as important drivers of economic growth and job creation. An especially important subset of high-growth enterprises is firms that are less than five years old. These young high-growth firms—often referred to as “gazelles”—account for less than 1 percent of all firms in most countries throughout the world, but are responsible for a much larger percentage of new jobs and economic growth.

Recent studies have alerted policy makers to the importance of high-growth firms as job creators. Henrekson and Johansson’s (2010) review of the literature finds that, despite many differences in measures of growth, time periods, industries, firm sizes, firm ages, methods of analysis, and geographical coverage, there is agreement on several facts:

- A few rapidly growing firms—gazelles—generate a disproportionately large share of all new net jobs compared with non-high-growth firms. This is more pronounced in a recession, when gazelles continue to grow.
- Gazelles tend to be younger than average. Age seems to be the most important differentiating factor, more important than size.
- Gazelles are of all sizes. Small firms dominate in terms of numbers, but larger gazelles are important contributors of jobs, especially a small subgroup called supergazelles. Supergazelles are both large firms and major net job creators.
- Gazelles are spread over all industries. They are not overrepresented in high-technology sectors as is sometimes hypothesized. If anything, they appear to be overrepresented in service sectors.

Regarding the “mice against gazelles” debate—whether the entry of many new firms (mice) or the rapid growth of a few firms (gazelles) generates employment growth—the literature suggests that the two views are complementary. The continuous entry of new firms is required for net job creation. The evidence indicates that a high inflow of new firms increases the likelihood of generating young gazelles, which tend to contribute more to employment than do older gazelles.

Finally, Henrekson and Johansson (2010) argue strongly that net employment growth must be viewed in the perspective of Schumpeterian creative destruction, in which net employment growth is the result of considerable churning and restructuring in a dynamic process of firm entry, expansion, decline, and exit. While some firms may be more important than others in creative destruction, a prerequisite for their growth is that creative destruction works so that efficient,
new, and expanding firms attract resources from inefficient firms released through contraction and exit. In other words, turbulence in the sense of firm entry and exit is necessary to boost job creation. An employment-enhancing policy should lower the barriers for firm entry and exit, thus supporting the experimental process that allows repeated trials and increases the chances of establishing new gazelles.

**Role of Government**

A fundamental question stemming from analyzing these determinants of entrepreneurship is how to design effective public policy that promotes innovative firm creation and enables existing firms to catch up, improve productivity, and grow. Experiences from Asian countries and developed economies have shown that innovative SMEs and knowledge-based firm creation have played a major role in the development of new national economic advantages. In this context public policy is pivotal in creating an enabling environment that helps alleviate the market failures that inhibit firm growth.

Emerging markets have other environmental conditions that are not present (or are less prevalent) in developed markets, and investors considering investing in emerging markets will face added risk as a result. Given the increased risk (or even uncertainty) that investors may face when taking a stake in a company in an emerging market, the government may need to intervene by subsidizing financing or by absorbing some of the investment risk. Its possible actions include:

- Supporting companies at the seed stage, when market-based mechanisms for funding tend to fail.
- Mitigating the costs of failure so that entrepreneurs can recover from a failed business.
- Ensuring that everyone plays by the same rules.
- Training competent business managers and tying government support to requirements for monitoring and management assistance.
- Being selective and using meritocratic criteria in choosing which companies to fund.
- Systematizing seed and venture capital financing.

**References**


What Drives Entrepreneurship and Economic Growth?


Armenia’s Economic Structure and the Role of Entrepreneurship

Motivation

Armenia aims to find new sources of long-term economic growth to become an upper-middle-income country, with a view to experiencing a substantial transformation of its economic structure to one that is resilient to external shocks in the medium term. To absorb excess labor in rural areas and address low labor productivity, it is necessary to move labor from low-paying and low-productivity jobs to high-productivity jobs, while shifting the economy toward the tradable sectors (World Bank 2012). Armenia is undertaking reforms to improve the investment climate and private sector productivity and competitiveness. These include, among others, streamlining procedures for business registration and licensing and improving cross-border trade (World Bank 2012). The government also aims to deepen and broaden reforms for greater private sector development (World Bank 2011a).

Recent Economic Performance

Prior to the global economic crisis, Armenia had seen moderate growth. Its compound annual growth rate of real gross domestic product (GDP) from 1995 to 2009 (7.3 percent) exceeded that of its neighbors, including Georgia (6.1 percent), the Russian Federation (3.7 percent), and Turkey (3.6 percent) (World Bank 2012). But in 2009 Armenia experienced a deep economic recession, greater than many of its neighbors did. It is only recently beginning to show signs of recovery, with 2011 GDP growth at 4.6 percent. Precrisis growth was achieved primarily based on strong capital inflows, mainly from remittances (close to 20 percent of GDP in 2007) and the development of the nontradable sector. During this time, the tradable sector either stagnated or shrank, except for tourism and more recently mining and information and communication technology (World Bank 2012).
The country’s value added comes primarily from the services sectors (figure 2.1). In particular, the information and communication technology service sector has developed as a driver of the economy (box 2.1). Industry grew 14.1 percent in 2011. The sectors with the highest productivity growth are manufacturing, trade, transport, communication, financial intermediation, and mining. However, the manufacturing sector remains small, especially when compared with that of global leaders such as Germany or other regional comparators, including Russia and Turkey.

As a result, Armenia’s competitiveness has consistently been below that of its comparators. According to the World Economic Forum’s (2011) Global Competitiveness Report 2011–2012, Armenia’s competitiveness ranking decreased steadily over the previous five years (2007–12), only recently reversing in 2011 when it increased to a ranking of 92 (EV Consulting 2012). By comparison, Russia ranked 66, Turkey 59, and Georgia 88. Investment in fixed capital, a crucial factor for growth, is quite strong in Armenia. Foreign direct investment accounts for a substantial share of the country’s gross capital formation. In 2009 foreign direct investment had reached 9 percent of GDP. Despite a drop in investment following the global economic crises crisis (down from 6.4 percent of GDP in 2011), foreign direct investment remains high, with the information and communication sector receiving a consistently high share. But recently, foreign direct investment has also been directed toward new nontraditional investment sectors, such as energy supply and land transport infrastructure.
Armenia’s trade performance has progressively improved since 2001, with a steady positive trend in both exports and imports, interrupted only by the 2008 global financial crisis. The structure of exports has not changed much over the last decade (figure 2.2). In terms of technology embodied in the products exported (see appendix B for a description), exports of raw materials and low-tech products have progressively increased at the expense of medium- and high-tech manufactured products, thus revealing that Armenia has failed to shift upward along the value chain of the country’s production and exports. In fact, from 2005 to 2011 non-oil commodities increased 65 percent and low-technology-embodied manufacturing 13 percent.

Armenia could speed up growth and greatly improve its trade balance by diversifying its export basket and facilitating a wider range of industrial sectors and production. Exports of services in 2010 were mainly concentrated in travel (54 percent of total services exports) and transportation (21 percent). Communications and information and communication technology also had a substantial share (about 8 percent of total services exports; figure 2.3).

Armenia’s trade—unlike Georgia’s—is concentrated with two main export partners: Russia and the European Union, which together receive nearly 50 percent of total exports.

**Employment**

Most employment in Armenia is in low-productivity activities. The highest productive sectors in Armenia (financial intermediation, mining, and construction) account for only 9 percent of total employment. Meanwhile, 50 percent of...
Figure 2.2 Composition of Exports by Level of Technology, 1994–2011


Figure 2.3 Exports of Services, 2010

the labor force is engaged in the three sectors with the lowest productivity levels—agriculture, wholesale and retail trade and construction (figure 2.4). Close to 60 percent of the labor force is employed in the agriculture sector (EV Consulting 2012).

Armenia has unemployment (figure 2.5). And 21 percent of the unemployed have tertiary education, indicating a skills mismatch in the economy. Unemployment is especially high among young people (38.9 percent), particularly in urban areas (48.6 percent; World Bank 2012).

High unemployment has resulted in a large informal sector. In 2009 the share of the informal sector in total gross value added was 11.2 percent, contributing primarily to agricultural gross value added (22.3 percent), followed by services (16.6 percent), construction (15.4 percent), and wholesale and retail trade (14.8 percent).

In 2009, 52.1 percent of total employment was informal. Some 55 percent of those working informally were employees, 26.3 percent were own-account
workers, and 17.8 percent were contributing (unpaid) family workers. Formal enterprises supplied 52.4 percent of informal jobs, informal enterprises 37.9 percent, and subsistence household production 9.8 percent. Informality was widely prevalent in rural areas (82.1 percent) due to its domination of the agriculture sector. Informal employment is estimated at 40 percent of agricultural employment (World Bank 2012) and 20 percent of nonagricultural employment, especially in the construction (34.2 percent), wholesale and retail trade, and repairs sector (26.9 percent), and manufacturing (11.8 percent; ADB 2011).

Armenia’s enterprise sector comprises mostly small and micro-firms. A representative survey of the economy found that, on average, 60 percent of companies have 20 or fewer employees, and 38 percent have 10 or fewer employees. Moreover, small and medium enterprises (SMEs) have played an important role in the country’s growth. In 2009 SMEs’ share in GDP was 42.5 percent, twice as much as in 1999. SMEs operate mostly in the trade, services, and construction sectors. However, despite the prevalence of SMEs, true entrepreneurship remains low and largely informalized and consists mainly of own-account workers and subsistence workers. These types of entrepreneurship offer limited opportunities for high growth and do not have a large impact on overall economic growth.

**Empirical Analysis**

This study analyzes both entrepreneurial activity by individuals (measured by the creation of a new legal entity in the formal sector) and entrepreneurial activity by existing firms (measured by the introduction of new products or new processes or by entrance into new export markets).

For entrepreneurial activity by existing firms, the study looks at “new-to-the-world” innovative activity, which is the development and commercialization of new unproven technologies and untested processes and products and “new to the country/market” innovative activity, which is the application of existing

![Figure 2.5 Unemployment Rates by Country, 2008](image)
technologies, processes, and products in a new environment in which the processes have not yet been tested and the markets and commercial applications are not fully known. For developing countries, most technological progress originates from the adoption of technologies first discovered elsewhere, with firms adapting to local market conditions (Goldberg and others 2008).

Notes

1. Largely as a result of its natural resource base, Georgia experienced a more moderate downturn.
3. Also encouraged by the free trade agreement among the countries of the Commonwealth of Independent States, of which Armenia, Russia, and Ukraine are members.
5. CIPE and AFIC 2011.

References


CHAPTER 3

Entrepreneurship and New Firm Growth

Entrepreneurship Landscape
This chapter describes entrepreneurial activity by individuals as measured by the creation of a new legal entity in the formal sector. The analysis uses an existing dataset, the Gallup World Poll Dataset, and a new survey covering 300 entrepreneurs, which was conducted specifically for this study. In addition, case studies highlight the evolution of many entrepreneurial endeavors and the characteristics important in the formation of these enterprises and their subsequent growth.

Firm Entry Density
The World Bank Entrepreneurship database provides data on formal firm entry density. “Entry density” is the number of newly registered companies per 1,000 working-age (ages 15–64) population. The database does not account for informal firms and measures only private, formal companies with limited liability. Firm entry density varies across Armenia, Georgia, and Europe and Central Asia (ECA) as a whole. Georgia stands out with a mostly increasing trend over time, sharply since 2009 and well above the ECA average since 2007 (figure 3.1). Entry density in Armenia remains below the ECA average.

General Trends in Entrepreneurship
Business ownership in both Armenia and Georgia remains lower than the ECA and developing country averages (figure 3.2). According to the 2011 Gallup World Poll, 15 percent of individuals in developing countries reported owning a business, compared with 6 percent in ECA, 4 percent in Georgia, and 2 percent in Armenia. One potential reason for the discrepancy between the high business entry rate and the low business ownership rate could be the different sample of firms: the Gallup World Poll data cover firms in the informal sector, while the Entrepreneurship database looks only at formally registered firms.
Latent Entrepreneurship

Another measure of interest is the pool of potential entrepreneurs known as “latent entrepreneurs”—those who are not actual entrepreneurs but want to be. Data from the 2010 Life in Transition Survey is used to analyze this pool of entrepreneurs.

Armenia compares unfavorably with other ECA countries. Only about 17 percent of the labor force and a similar share of the wage-employed can be considered latent entrepreneurs, far below the ECA average of 27 percent of the labor force and 22 percent of the wage-employed.

Econometric analysis of latent entrepreneurs suggests that a few individual characteristics are important; women are less likely to be latent entrepreneurs, consistent with gender patterns of actual entrepreneurial activities. Among men, latent entrepreneurs tend to be married and have larger households, which...
suggests that preference for self-employment may partly reflect a desire for the
greater flexibility afforded by entrepreneurship and self-employment. At the
same time, higher per capita income, which may serve as a proxy for wealth, is
associated with a greater likelihood of latent entrepreneurship, consistent with
the literature. The literature on entrepreneurship has explained low rates of
entrepreneurship as a function of social values and attitudinal characteristics, and
at least one dimension of trust (trust in foreign investors) is strongly related to
latent entrepreneurship for the sample as a whole and for the separate samples
of men and women. But trust in people is a statistically significant correlate of
latent entrepreneurship only among women. Meanwhile, there are no discernible
statistical links with educational attainment.

The 2010 Life in Transition Survey data also provide information on previous
attempts to start a business. In Armenia nearly half of those who attempted to
start a business succeeded. Although this is lower than the ECA average (about
two-thirds), it compares favorably with many other countries.

The correlates of such successful attempts are instructive: per capita income
and general satisfaction with one’s financial situation play a role. Access to
finance—as proxied by being able to borrow money—is a statistically significant
correlate of successful business startups. Interestingly, although women are less
likely to be latent entrepreneurs, when they attempt to start a business, they are
just as likely to succeed as men are.

Survey Results
This section is based on the 2012 World Bank Entrepreneurship Survey, which
was conducted for this study and is complemented by the findings from the
Gallup Survey where relevant. The survey aimed to capture the sources of
financing, education levels of the owners and managers of firms, the business
environment constraints that firms face, and whether firms have used govern-
ment programs to help startup and growth. The sample of firms consisted of 300
firms between 2 and 10 years old.

Founder Characteristics
Some 57 percent of the surveyed firms had only one founder. Only about
18 percent of the founders were women (figure 3.3). According to the Global
Entrepreneurship Monitor (2011), the ratio of female to male entrepreneurs
varies considerably across the global sample: from 1:5 in the Republic of Korea
to 6:5 in Ghana. The report also finds that across the 59 economies studied, only
one economy, namely Ghana, had proportionately more women than men entre-
preneurs, and only a handful had equal proportions of women and men. The vast
majority of economies had more men than women entrepreneurs. The most
common education level among Armenian firm founders was a postgraduate
degree (75 percent), which was in contrast to their counterparts in Georgia,
where the most common education level was a bachelor’s degree (44 percent).
Unlike Georgia, where firms in high-tech sectors4 had a larger share of founders
with a postgraduate degree or doctoral degree, in Armenia founders of both high-tech and non-high-tech firms had similar education characteristics (figure 3.4).

Most of the surveyed entrepreneurs had worked in the same industry where they founded their new firm. Founders averaged nine years of experience in the same sector, more than in Georgia (six years). But there are exceptions, as detailed in the case studies (see box 3.1). The majority of founders in the Armenian
sample were ages 30–39, younger than their Georgian counterparts, the majority of whom were older than age 40. Armenian entrepreneurs who founded high-tech firms were generally even younger, with nearly 11 percent age 18–29.

**Founders’ Motivation**
The Gallup World Poll asked business owners why they started a business. Business owners in Armenia reported the top two reasons as sensing an opportunity to make more money and wanting to be one’s own boss (figure 3.5). Not finding a suitable job was cited by more than half of business owners. Fearing loss of one’s job was the least common reason. These patterns are in line with trends in the rest of the developing world and in ECA. The desire to be self-employed is not driven by necessity or at least not by necessity alone (so-called survival entrepreneurship). In fact, many of those already in the labor force or already wage-employed prefer to run their own business. The survey data also show that men are considerably more likely than women to cite wanting to be one’s own boss as an important reason for starting a business. Respondents with tertiary education or higher are more likely than those with secondary education to cite having a great idea for a business.
Box 3.1 Case Study: 365 Wines—An Economist Turns Wine Producer

General information about the founder and formation
Edvag Group began as a small bottle production workshop that Mr. Vehagn established in 2004. In 2004, Mr. Vehagn designed a signature bottle in the shape of a pomegranate and aligned himself with the Ljevan wine factory. Vehagn’s company provided the bottles and the 365 Wines brand name, while Ljevan provided the wine. In 2008 Mr. Vehagn separated from Ljevan, establishing his own wine factory. With a background in economics, he knew little about winemaking. He underwent rigorous learning, enrolling himself in an intensive 15-day wine course in Italy, and hired an Italian winemaker for his company.

The company’s expansion was financed through an HSBC credit line that was supported by a World Bank project. In 2011 it signed an equity investment agreement with the Fund for Rural Economic Development in Armenia, supported by the International Fund for Agricultural Development. The Fund for Rural Economic Development investment was for AMD200 million ($480,000); in return, it received dividends on 23 percent of the company’s shares through 2016. Financing was used to expand production capacity through the acquisition of new equipment and financing of working capital. In addition, financing was used to increase grape storage for future production.

Market environment and company strategy
The company grew quickly, from 3 people in 2008 to 30 people in 2013. Edvag Group offers a range of premium quality fruit, grape, and fortified wines as well as brandy under the 365 Wines brand name. The company started with fruit wines, currently available in pomegranate, quince, and blackberry. Fruit wines lead its wines in sales. Following fruit wine, the company expanded into traditional grape wines, with the strategy being to utilize Armenian grapes to produce wine that could compete on the global market. The company is also famous for its production of Passion de Pineau, a fortified wine drink. The Pineau des Charentes is produced using the technology from French winemakers and is a combination of grape juice and barrel-aged brandy. The company sells primarily to the export market, namely to the Russian Federation and Europe, through Germany. Exports account for more than 70 percent of sales, and fruit wines are the primary export product.

In its short existence, 365 Wines has won several quality awards, gaining high brand awareness and loyalty in the domestic and international markets. Many of its brands, such as the fruit wine, have become best sellers in the Armenian duty-free and Western style retail stores. Edvag’s management is continuously learning, participating frequently in international training. The company has participated in a course at Scuola Enologica in Conegliano, which is Italy’s oldest winemaking school. It works in close collaboration with international specialists, including Italian and Georgian winemakers, and it has several joint projects in development. 365 Wines also participates in international exhibitions, including Green Week, which is an international expo in Berlin.

Innovation and business models
In addition to traditionally sized bottles, the company introduced souvenir-size bottles to be sold at duty-free shops. It is the only company in Armenia that bottles grape wine in...
The World Bank Entrepreneurship Surveys asked entrepreneurs to cite the importance of the following factors in the formation of their company:

- Work experience in the current activity field.
- Technical/engineering knowledge in the field.
- Design and software knowledge.
- Knowledge of the market.
- Availability of finance.
- Networks built during previous career.
- Opportunities in a public procurement initiative.
- Existence of a large enough customer base.

In Armenia work experience in the current activity field, knowledge of the market, and technical/engineering knowledge in the field were ranked the highest.
in importance. In Georgia existence of a large enough customer base, availability of finance, and knowledge of the market were ranked the most important.

**Firm Characteristics and Strategy**

The average size of surveyed firms was 27 full-time employees. The largest firm had 990 employees, and 51 percent had fewer than 10 employees. The largest share of firms was in the hotels, services, and restaurants category, followed by accounting services. Nearly 50 percent of the surveyed firms conducted some form of research and development (R&D) in the previous five years, and 55 percent envisioned spending on R&D in the next two years. This was in sharp contrast to the sample of firms surveyed in Georgia, where only 10 percent of surveyed firms had spent on R&D in the previous five years and envisioned spending on R&D in the next two years. About 90 percent were new firms and did not spin off from a larger parent firm. The small number of spinoffs was still related to the parent company as a partner. There were no spinoffs from universities.

In Armenia 60 percent of the products or services produced at firm inception were modifications of existing products or services, and 40 percent were new in the market. In Georgia only 10 percent of the products or services produced at firm inception were new in the market. Almost 92 percent of Armenian firms drew funding from the founders’ own savings; and 18 percent also drew on funds from banks. Firms that spun off from a preexisting organization had easier access to external sources of funding. Firms in high-tech sectors tended to have greater access to external funds than those in non-high-tech sectors (figure 3.6). Only 8 percent of adults in ECA reported having an outstanding loan or credit from a formal financial institution in the previous year. This was in line with the percentage of adults with formal credit in the developing world. Business owners had higher levels of savings than the adult population as a whole (figure 3.7), which is in line with findings from the Entrepreneurship Survey, in which a majority of them had financed their entrepreneurial activity using their own savings.

In Armenia the most important factors for firms to maintain their competitive advantages were capability to offer high-quality products/services, capacity to adapt products/services, and capability to offer new products/services (figure 3.8, box 3.2). The least important factors cited were marketing and promotion activities, and undertaking R&D activities. Georgian respondents pursued a price-based competition in standardized markets, in contrast to their Armenian counterparts, who more aggressively searched for niche markets by producing unique products through greater R&D investments.

**Market Environment**

Only 53 percent of surveyed firms cited having many business competitors. Armenian respondents reported lower levels of competition than their Georgian counterparts. This could reflect the fact that Georgian entrepreneurs are making products that are slight modifications of existing products, implying that there would be more Georgian firms selling very similar products, while Armenian firms are spending more on R&D, trying more innovative products
Box 3.2 Case Study: Akvatekhavtomatika CJSC—Fish-Breeding in a Landlocked Economy

General information about the founder and formation
Armenia produced 30 tons of trout in 1997, and it sold for $7.5 million. In 1996 Mr. Gevorgyan sensed a niche in fish-breeding and started Akvatekhavtomatika. His business plan showed that he could make a profit at a price lower than the average market price at that time. The first year he produced 24 tons of trout. Production increased gradually: by 2000 his company was producing 300 tons and was the market leader.

In 1998 Mr. Gevorgyan noted an international moratorium on the fishing of wild sturgeon. He obtained eggs from foreign countries, including Australia, Denmark, France, and Russia, and started breeding them in Armenia. Until 2004 his was the only company breeding sturgeon in Armenia. Sturgeon started becoming popular for consumption, and Armenia now produces approximately 40,000 tons of sturgeon, 10 percent of global production.

The global economic crisis in 2008–09 affected Armenia and Akvatekhavtomatika. The Russian market was also severely affected. In addition, the spread of an animal disease affected the fish market, and the Russian market closed for a while. Around that time Mr. Gevorgyan became president of the Armenian Association of Fish Breeders and started working with the government on several issues. An important one was the certification of his sturgeon production, as the fish was on the “red book,” that is, the list of endangered species. Akvatekhavtomatika received the needed certificate and negotiated with the Russian government, which also certified Akvatekhavtomatika’s production. The company reentered the Russian market.

Market environment
The company has grown fast. Its current challenge is to produce enough to meet increasing demand. Armenia produced 3,500 tons of trout and sturgeon in 2009, 6,500 tons in 2010, and 10,000 tons in 2011. Akvatekhavtomatika exported $2 million worth of fish in 2011 and around $3 million in 2012. The firm accounts for 25 percent of total Armenian fish exports to Russia. More than half the company’s production is exported, with more than 90 percent going to Russia and the rest spread among Georgia, Ukraine, the United Arab Emirates, and other countries.

While trout still accounts for the majority of Akvatekhavtomatika’s production today, Mr. Gevorgyan believes that sturgeon has a great future. Black caviar produced by this fish is expected to have much higher demand in the future and thus command good prices. That’s where Mr. Gevorgyan sees very important growth potential for his company. Akvatekhavtomatika is the only producer of river trout and golden trout in Armenia. It has 10 farms at Gyumri in the northern part of the country near Georgia.

The only recognized competition is from abroad, which is not surprising given that the majority of the product is exported. Recognized foreign competition is from producers in Norway, Russia, and Turkey.

Company strategy
Mr. Gevorgyan attributes part of Akvatekhavtomatika’s success to his ability to enter the market before his competitors and to predict market trends. His training as a mathematician
and specialization in multifactor analysis has allowed him to model complex market conditions, taking into account many factors. For instance, he expected prices for his fish to decrease. As a result, he largely halted sales of his fish stock and started selling fish that he bought from other producers (essentially reselling). He plans to sell his fish in the market once prices increase.

**Innovation and business models**

Mr. Gevorgyan is employing modern technology to increase production. Currently Akvatekhavtomatika is trying to reconstruct its fish farms under the realization that if it can provide more oxygen, it can produce more fish in the same facilities. It is testing a method seen in Denmark in which faster circulation of water through the tanks increases the number of fish that can be grown in a given amount of water. More fish in a tank also implies more waste (ammonia) which, in turn, requires bio-filters to clean the water.

Mr. Gevorgyan will introduce a greenhouse effect in his basins to raise the water temperature to 20–25 degrees centigrade, which will allow the sturgeon to produce more quickly. The optimal temperature is 22–24 degrees, at which the sturgeon even cleans itself, reportedly by eating ammonia. He is considering the use of biogas as heating fuel to heat the entire facility essentially for free. He thinks the technology he is experimenting with is very promising and will allow him to lower production cost and raise market share.

Unfortunately he cannot see the Armenian financial institutions as possible funders. He will need around $8 million–$15 million to be able to realize his planned operation, and he feels that the Armenian financial sector does not have instruments to cater to loans of this amount.

Moreover, Akvatekhavtomatika is trying to increase caviar production in response to the forecast of an increased demand from Russia and Canada. A new production technique in which caviar is “milked out” of the fish (to remove the caviar from the fish without killing it) has been invented by Russian researchers, and the company is currently trying it in a pilot program. In this method, hormones that stimulate caviar production are injected into the fish. Forty hours after the hormone is injected, the fish is stimulated, and with a small milking operation the caviar is obtained. No formal R&D department exists. However, research and experimentation are regularly undertaken, as evidenced by the examples above.

**Perceived role of the government**

Akvatekhavtomatika has not received support from public authorities. Mr. Gevorgyan appreciates the government’s role in helping the company at least twice in the past: first to get certified, and second to negotiate reopening the Russian market, which had closed for some time. He sees the role of the government as keeping important foreign markets open and protecting against big business interests.

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*a* Mr. Gevorgyan has also tested the system successfully with catfish.
to differentiate themselves from their potential competitors. Nearly 68 percent of firms sell to the domestic market, and around 30 percent sell internationally (figure 3.9). These firms sell about 36 percent of their products to the international market (figure 3.10). In Georgia only 11 percent of firms sell internationally; however, these firms sell nearly half their products internationally. Georgian small firms seem more domestically oriented in terms of markets than their Armenian counterparts, which are more open to national and international sales.
Figure 3.8 Contribution in Creating and Sustaining the Competitive Advantage of the Company

Note: R&D = research and development; 1 = no impact; 5 = huge impact.

Figure 3.9 Market Distribution of Sales

Perceived Obstacles

Entrepreneurial activity requires a degree of risk taking due to uncertainties. To obtain insights into the perceived obstacles facing entrepreneurs, the survey asked respondents to rate whether the following factors were obstacles in setting up or operating a firm:

- Technology risk/uncertainty.
- Market risk/uncertainty.
- A large initial investment.
- Difficulty finding the necessary funding.
- Difficulty finding business partners.
- Difficulty recruiting highly skilled employees.
- Lack of technological know-how.

The top three cited obstacles were difficulty recruiting highly skilled employees, market risk/uncertainty, and difficulty finding the necessary funding (see box 3.3).

The survey also asked respondents about their perceived legal and regulatory constraints, which included:

- Continually changing taxation regulations.
- High tax rates.
- Time-consuming regulatory requirements for issuing permits and licenses.
- Poorly enforced competition law to curb monopolistic practices.
- Poorly enforced property rights and copyright and patent protection.
- Strict property, copyright, and patent protection.
- Government officials favoring well connected individuals.
- Bankruptcy legislation making the cost of failure immense.
- Rigid labor market legislation.

Box 3.3 Case Study: Instigate CJSC—A Successful Information Technology Firm
Now Facing Increasing Competition for Scarce Skills

General information about the founder and formation
Instigate CJSC was founded in 2004 as a training and incubation center by Vahagn Boghosyan (brother of the chief executive officer) and Enno Wein, a German national. It was incorporated the next year as a design services company in electronic design automation, semiconductors, and embedded systems development. The two founders had become friends while working together for Monterey Design in Silicon Valley, California. Monterey was acquired by Synopsis, which went on to become one of the largest foreign investors in the early days of the Armenian information technology industry. The two friends decided to open up shop in the country that was known as the R&D center of the former Soviet Union, thus taking advantage of the existing skilled labor.

The Armenian education system produces good graduates with a strong work ethic. But they receive little hands-on experience at school. Instigate hired good graduates from any scientific field and took them through its own training center for approximately two months of full-time training in tools, methods, and software design by senior company employees.

With an initial capital of $15,000, the company started the training center with seven people. They were basically an informal group of trainers. The first real customer came in 2005, at which point the company was established with a focus on electronic design automation. Since then the company has expanded at a frenetic pace. From the 7 people that the firm started with in 2004, the company reached 35 in 2005 and approximately 120 in 2013.

Market environment
The company operates in three locations in Armenia and has five spinoffs in Armenia and Germany. It has partners, sales representatives, and local support in the European Union and the United States. It employs more than 100 engineers and has more than 30 customers and more than 200 projects with customers in Armenia, the European Union, and the United States.

The competition for Instigate’s business is both domestic and foreign. Domestic competition is defined mainly in terms of human resources, with firms competing for talent. For some time Instigate was insulated from this because it runs its own internal training school. The real competition for Instigate comes from abroad, primarily in the form of Indian outsourcing houses and German freelancers.

Company strategy, innovation, and business models
Instigate has been primarily a project-based outsourcing shop. Its products are based on open source software. In carrying out client projects, however, the founders have developed ideas for products for Instigate or for functions that then are spun off in new companies. The most prominent of these spinoffs is ProximusDA GmbH, which is based in Munich, Germany, but maintains its R&D in Yerevan.

The “outsource-form team-complete project-build trust-spin-off” model is very interesting. It also fits directly the way Instigate has tried to organize its labor force since day one. Pairs of engineers work together on projects, one leading and the other following, with the leadership changing hands as people move along various teams. Instigate trains horizontally and

box continues next page
Entrepreneurship and New Firm Growth

Box 3.3 Case Study: Instigate CJSC—A Successful Information Technology Firm Now Facing Increasing Competition for Scarce Skills (continued)

develops strong "universal engineers"—engineers who are familiar with all functions of the company, all aspects of running the company, all aspects of training, and all R&D efforts. Such employees build capabilities that are invaluable for Instigate, which is willing to invest in them, but also builds capabilities that are extremely useful to them as employees of Instigate and much less valuable to other companies. The system of transparency, employee involvement in all aspects of the company, and continuous feedback and career improvement builds employees who are highly motivated and involved.

The average age of employees throughout the company is estimated at 27 years. The company avoids hiring "experts" but uses them on an ad hoc basis. They are considered to be very expensive, to have set views about how things work, and thus to be less flexible.

Perceived role of the government
The government is considered more business-friendly than ever before. Instigate has not had much dealings with the banking sector. It has used a credit line for small sums. Bigger loans, however, require serious collateral that the company does not have, since the premises in which it operates are rented and the company's products are not entirely tangible. Unfortunately, there is no formal venture capital company in Armenia that Instigate could tap into. The government is trying to fill that gap by establishing such a fund with public money.

In addition to venture capital, the founders felt the government had an important role in education. The higher education system still focuses on producing very good theoreticians but is weak in providing practical skills, a situation that needs to change. Moreover, graduates with business and marketing skills are needed. Currently, due to the lack of available skills, the company has been training people on its own in its four training centers. It also partners with some polytechnic schools around the country. Currently the Information Technology Union (an industry association) is working with the government to set up strong labs in polytechnic schools in collaboration with National Instruments, which would be a very useful development.

Finally, an important issue for the government is setting up an effective intellectual property rights framework to foster greater innovative activity. Instigate has not been disadvantaged greatly from this omission yet, as it is basically an outsourcing organization. But it can see this problem in the future. Both of its original entrepreneurs hold multiple patents abroad.

In Armenia the most commonly cited constraints were continually changing taxation regulations and government officials favoring well connected individuals. In Georgia the two most cited constraints were continually changing taxation regulations and high tax rates.

Innovative Activity
To gauge the level of innovative activity by firms, the survey asked respondents whether they had introduced a new or substantially improved product or service.
in the previous three years. Some 67 percent of Armenian respondents indicated they had. This was in sharp contrast to the Georgian respondents (7 percent). In Armenia more than 80 percent of the new products and services were new to the market, and 3 percent were new to the world. In Georgia 50 percent were new to the market, and none were new to the world. The main objective of introducing the new products or services for respondents in Armenia was to increase domestic sales in market segments in which the firm was already operating, diversifying the firm’s product mix for the domestic market, and keeping up with innovations introduced by other domestic or foreign competitors. The most common areas for introducing new products or services were in improved knowledge management systems; changes in the management structure; maintenance systems; and purchasing, accounting, and computing operations.

The most important sources of knowledge for new business opportunities were clients or customers, market research from sales in the domestic market, and R&D by competitors and in-house (figure 3.11). Universities, technical institutes, R&D firms, and external commercial labs were among the least important sources of knowledge, indicating both the nature of innovative activities in these enterprises and the lack of industry-relevant information from research and training institutions. This was further corroborated in the detailed case studies.

Figure 3.11 Importance of the Following Sources of Knowledge for Exploring New Business Opportunities for the Company

![Figure 3.11](image-url)

Note: R&D = research and development. 1 = not important; 5 = extremely important.
Testing Hypotheses

Using the survey data collected, two models were used to understand the relationship between firm growth and various founder and market characteristics. The first model used an ordinary least squares regression to look at the determinants of firm growth as measured by average sales growth during the previous five years (see box C.1 in appendix C for details of the specification).

The following hypotheses were tested:

H1: Younger, smaller firms grow faster.
H2: Founders’ expertise at firm setup is very important for firm growth. Prior experience in industry, especially in the same sector, positively affects growth prospects. Moreover, founders’ education is positively related to firm growth.
H3: Firm innovative activity is strongly connected to growth prospects.
H4: A strategy of cost savings and unique product offerings in the market underwrites firm growth.
H5: An ability to access external capital is positively related to firm growth prospects.

Controls included market environment characteristics and growth trends of other companies in the same sector.

The results for the Armenian sample (see table C.1 in appendix C) show that firm characteristics, entrepreneur characteristics, innovative activity, and firm strategy have significant explanatory power over firm sales growth. Younger firms with younger founders grew faster. Founders’ prior industry experience was important for firm growth. The introduction of both innovative and unique products and services was positively associated with higher firm growth. A low-cost strategy was also associated with higher firm growth. Funding and market environment variables did not explain firm growth. Finally, the dynamism of the sector in which the company operates proved to be a significant explanatory factor.

The results for Georgia are mixed (see table C.1 in appendix C). Only three variables besides the control were statistically significant: firm size, industry experience of the firm founders, and ability to attract venture capital. All were positively related to firm growth. Fast-growing sectors were associated with fast-growing firms.

A second model to explain the determinants of firm innovation used a probit regression (see box C.2 in appendix C for the specifications).

The following hypotheses were tested:

H1: Younger, smaller firms innovate more.
H2: Firms in high-tech sectors and firms undertaking R&D innovate more.
H3: Founders’ expertise at firm setup is an important indicator of innovation propensity. Founders’ education background, especially in technical and engineering fields, is positively related to company innovativeness.
H4: Exposure to international markets is strongly connected to innovation propensity.

H5: Favorable outlook toward R&D and the formation of strategic partnerships with other organizations, including universities, research institutes, and private sector firms, are strong predictors of higher innovation propensity.

H6: Strategy to offer unique products and exploit opportunities in new market niches goes hand-in-hand with higher innovation propensity.

Regression results are shown in table C.2 in appendix C.

In Armenian general management expertise of founders, international sales, perceived importance of R&D activity, and a strategy to offer unique products/services or exploit new market niches positively affected innovation propensity. International sales were positively correlated with innovation propensity. There was a correlation between the founders’ perception of R&D being an important factor for competitive advantage and the level of innovative activity undertaken by the firm. A strategy to offer unique products/services or exploit new market niches was correlated to higher innovation propensity for the firm. Finally, pressure from competitors in more innovative sectors was correlated to the innovative propensity of the firm.

For the Georgian sample of firms, only three variables besides the control were statistically significant: R&D intensity, general management experience of the founders, and networking with research organizations. All were positively related to firm innovative propensity. There was a positive correlation between firm innovation and when R&D activity was considered an important factor in creating and sustaining competitive advantage. Similarly, there was a positive correlation between innovative activity and when firm founders considered partnerships with research organizations such as universities an important factor in creating and sustaining competitive advantage. And firm innovation was higher in sectors with higher average rates of innovation.

The next chapter looks at entrepreneurial activity in existing firms by analyzing the extent of innovation in the sample of surveyed firms in the World Bank Business Enterprise and Enterprise Performance Survey.

Notes

1. Details of data sources are described in appendix C.
2. This section is based on Atasoy and others (forthcoming). For details on the literature on and definition of latent entrepreneurship, see appendix A.
3. All the observations for the South Caucasus were analyzed as a pooled sample, rather than as separate country samples, to create a sufficiently large sample for analysis. Fixed country effects were incorporated into the analysis.
4. Chemical industry, manufacture of basic pharmaceutical products, manufacture of computers and other electronic equipment, manufacture of electrical equipment, information and communication.
References


Chapter 4

Entrepreneurship and Innovation

Introduction

This chapter uses data from the World Bank’s Enterprise Surveys to analyze entrepreneurial activity in existing firms as measured by their innovative activity. Four types of innovation activities are analyzed: introducing new products or services in the previous three years (product innovation), upgrading an existing product line or service in the previous three years (process innovation), investing in research and development (R&D), and licensing technology from a foreign-owned company.

In Armenia (and Georgia) nearly 400 firms were surveyed, and they were roughly evenly distributed across the manufacturing, retail, and services sectors. Almost half the sample was small firms, and a third was medium-size firms (see table D.1 in appendix D for the size and industrial sector distribution of the samples from each country).

Innovation activities in the South Caucasus countries are benchmarked against a group of 10 Europe and Central Asia (ECA) countries as well as all 25 ECA countries. The ECA-10 group includes eight members of the European Union (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, Slovenia) and two large ECA countries (the Russian Federation and Turkey).

Process innovation is the most common type of innovation activity across the South Caucasus countries and other ECA countries. In every ECA country except Romania and Uzbekistan, at least half of firms reported conducting process innovation. In ECA 70 percent of firms conducted process innovation. Spending on R&D and licensing technology from a foreign-owned company were seen in 20 percent of firms, half the proportion that engaged in product innovation. This is common in developing countries. Most innovation is through technology adoption and adaptation, usually described as non-R&D innovation. South Caucasus countries had similar levels of process innovation; roughly three-quarters of firms upgraded an existing product line or service in the previous three years (figure 4.1). Product innovation was much less common in the rest of ECA. Georgia (35 percent) had lower product innovation rates than
Armenian firms introduced more new product varieties and licensed more foreign technology than the average ECA-10 firm. In the Caucasus only Armenia had R&D spending rates comparable to those of the ECA-10 countries—23 percent in Armenia compared with 22 percent in ECA-10. This corroborates the evidence from the Entrepreneurship Survey as well as the case studies, in which Armenian firms undertook more innovative activity and spent more on R&D than their counterparts in Georgia.

Across all countries, large firms were consistently more likely than small firms to spend on R&D or to license foreign technology. But this difference was not reflected in innovation performance in Armenia (figure 4.2). Some 69 percent of large firms and 68 percent of small firms conducted product innovation. In Georgia there was a large gap in product innovation between large firms (61 percent) and small firms (24 percent). The disparity in R&D investment between large and small firms was wide in Georgia (57 percent compared with 7 percent). R&D investment levels and product innovation levels in Armenia at each size group were either on a par with or slightly higher than the EU-10 average.

Innovation rates also varied across major industries (figure 4.3). In most instances Armenia led in product innovation across the major sectors where at least 20 firms were sampled.
Figure 4.2 Innovation Rates by Firm Size, Armenia

- **Source:** World Bank Enterprise Surveys (database) 2013.
- **Note:** R&D = research and development.

Figure 4.3 Innovation Rates by Sector and Country

- **a. Chemicals**

- **Source:** World Bank Enterprise Surveys (database) 2013.
- **Note:** R&D = research and development.
Figure 4.3 Innovation Rates by Sector and Country (continued)

b. Retail

<table>
<thead>
<tr>
<th>Percent</th>
<th>% firms product innovators</th>
<th>% firms process innovators</th>
<th>% firms invested in R&amp;D</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
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<tr>
<td>20</td>
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<td>60</td>
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<table>
<thead>
<tr>
<th>Percent</th>
<th>% firms using technology licensed from a foreign-owned company</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>20</td>
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Armenia Georgia

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Innovative firms are likely to differ from noninnovative firms in characteristics and activities. For example, in both Armenia and Georgia innovative firms are much more likely to offer formal training.

In Armenia and Georgia innovative firms experienced more incidence of graft and corruption than noninnovative firms across a variety of measures (figure 4.4). Enterprise Surveys provide a wide range of corruption data from which several corruption indicators can be constructed. Only those indicators that are statistically different between innovators (firms that participate in either product or process innovation) and noninnovators are presented in figure 4.4.

In Georgia innovative firms were almost three times more likely to identify corruption as a major constraint to daily business operations than were noninnovative firms. In Armenia four Enterprise Survey corruption indicators were found to be statistically different between innovators and noninnovators. Innovative firms in Armenia were more likely to be expected to give informal gifts to get an operating license, “get things done,” and get a construction permit. The incidence of graft\(^1\) was also more than twice as high for innovative firms as for noninnovative firms. Moreover, the value of the graft given to government officials to secure a government contract was significantly higher for innovative than noninnovative firms.
In Armenia 39 percent of product innovators offered formal training compared with only 9 percent of noninnovative firms. Innovative firms were significantly more likely to export than noninnovative firms in Georgia, Poland, Russia, and Turkey (figure 4.5). These results also hold when considering only product innovators or process innovators in isolation. However, there were some differences in training among process innovators. In Armenia process innovators were four to five times more likely to offer formal training than non–process innovators. It makes sense that firms that introduce new methods of production are significantly more likely to offer training.
Who Are the Innovators?

The previous section showed that innovative and noninnovative firms differ across several characteristics. This section uses regression analysis to examine what firm characteristics are correlated with innovation activities. Probit regressions are estimated in which the dependent variable \( Y_{jc} \) is a dummy variable indicating whether firm \( j \) in country \( c \) conducted one of the four innovation activities \( (i) \) described above (equation 4.1). Regressions are run separately for each country, and estimation tables are shown in tables D.3–D.8 in appendix D.

\[
Y_{jc}^i = c + Z_{jc} \beta + \delta \text{Age}_{jc} + \varphi \text{Sector}_{jc} + \rho \text{Size}_{jc} + \varepsilon_{jc}^i
\]  

\[
Y_{jc}^i = \begin{cases} 
1 & \text{if } Y_{jc}^i > 0 \\
0 & \text{otherwise} 
\end{cases}
\]

Empirical evidence has shown that size and age are the most important observable characteristics of firms that affect their activities. In the probit regression outlined above, age and size controls are included in the baseline specification. In addition, sector fixed effects are included to account for the differences in factors that affect innovation, such as the nature of market activity, competition level, technology use, and demand. Explanatory variables of interest \( (Z) \) are included in the regression separately, one at a time. The set of key explanatory variables of interest includes variables for whether a firm is an exporter, has foreign ownership, and offers formal training; an indicator for skill intensity, measured as the percentage of unskilled manufacturing workers; and an indicator of capital intensity, measured as the log of the capital expenditures to workers ratio. Existing evidence shows that these factors can be related to why some firms innovate and others do not.

In Armenia innovation was common: 60 percent of firms were both product and process innovators. Two of the explanatory variables in the analysis were correlated with whether a firm was a product innovator. Firms that offered formal training were 26 percent more likely to be product innovators. Firm size was significantly correlated with a firm’s choice to spend on R&D. Medium-size firms were 16 percent more likely to spend on R&D than were small firms, and large firms were about 20 percent more likely. Firm size was also a significant predictor of R&D spending in most of the comparator countries. Old Armenian firms were less likely to license foreign technology (an increase of one year in age reduced licensing of foreign technology 1.1 percent).

The relationship between firm characteristics and innovation activity was weaker in Armenia than in Georgia. Exporting, foreign ownership, and firm training did not predict innovation activities among Armenian firms (see table D.3 in appendix D). Innovation activities in Georgia were more likely to differ across firm characteristics. In Georgia average innovation rates were lower, and innovation was more likely to occur among large firms and firms that export. Moreover, Georgian exporters were 36 percent more likely to introduce new products and
19 percent more likely to be process innovators (see tables D.3 and D.4 in appendix D). Yet trade activity did not differentiate innovation activity among other ECA countries.²

A major concern with country-specific regression analysis is the small sample size. To alleviate this problem, the same probit model is estimated with the samples of the three South Caucasus countries pooled together. Another motivation for this exercise is to see how the overall performances of Southern Caucasus countries differ from more developed ECA economies. To control for country differences we include country dummy variables (equation 4.2).

\[ Y_{ji}^i = c + Z_{ji} \beta + \delta \text{Age}_j + \varphi \text{Sector}_j + \rho \text{Size}_j + \theta \text{Country}_j + \epsilon_{ji} \] (4.2)

Regression results using the pooled sample of three countries show that firm size is positively correlated with conducting all four innovation activities (see table D.7 in appendix D).

The most significant correlates of product innovation in the region were exporting, offering formal training, and the capital expenditure to worker ratio. Firms that export were 21 percent more likely to be product innovators, firms that offer formal training were 31 percent more likely, and there is a significant positive relationship between capital expenditure to worker ratio and product innovation (table D.7 in appendix D).

The only significant correlate of process innovation was the proportion of unskilled manufacturing workers in a firm, and the magnitude of the correlation was very small. Firms that offer training were 0.3 percent more likely to be process innovators. Training is an integral part of firm strategy, as evidenced by the firms interviewed for the case studies, since firms need to equip staff with the required skills for the firm to keep their competitive advantage.

Foreign ownership predicts the licensing of technology from a foreign-owned company but not of any other type of innovation activity. Foreign-owned firms are 22 percent more likely to license foreign technology.

**Innovation and Firm Performance**

The annual real sales growth of innovative firms in Armenia and Georgia was twice as high as in comparator countries.⁴ The annual sales growth of innovative firms was significantly higher than that of noninnovative firms in Georgia (figure 4.6). In Georgia the revenues of noninnovative firms decreased more than 20 percent.

As with sales growth, employment growth rates were significantly higher for innovative firms in Armenia and Georgia than for firms in the comparator countries (figure 4.7). In all countries in the figure, innovative firms had higher employment growth, yet the difference was significant only in Georgia and the
Czech Republic. The high performance of innovative firms in Armenia and Georgia persisted in labor productivity growth, which is measured as total sales per number of workers (figure 4.8). The closest follower of Armenia and Georgia in the comparator country group was the Czech Republic. In Armenia, Poland, and Turkey innovative firms had lower productivity growth than noninnovative firms.

The link between innovation and firm performance was a key relationship of interest. A series of ordinary least squares regressions were estimated to examine this relationship more closely (equation 4.3). Regressions were estimated for each country separately. Three measures of firm performance ($G_{jc}$) were considered: annual real sales growth, annual employment growth, and

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**Figure 4.6 Average Annual Sales Growth**

Note: A firm is considered to be an innovator if it participated in either product or process innovation.
*Statistically significant difference in the means at the 0.01 level.

**Figure 4.7 Average Annual Employment Growth**

Note: A firm is considered to be an innovator if it participated in either product or process innovation.
*Statistically significant difference in the means at the 0.01 level.
annual real labor productivity growth. The main variable of interest in the regressions is a dummy variable set to 1 if the firm has engaged in an innovation activity (Innovation\textsubscript{jc}). In addition, there are controls for size, age, and the sector of the firm.

\[ G_{jc} = c + \gamma \text{Innovation}_{jc} + Z_{jc} \beta + \delta \text{Age}_{jc} + \varphi \text{Sector}_{jc} + \rho \text{Size}_{jc} + \epsilon_{jc} \]  

Product innovation and annual employment growth were significantly positively correlated in all three Caucasus countries (see table D.8 in appendix D). Product innovation predicted that employment growth would be about 6.6 percent higher for Armenian firms and 9 percent higher for Georgian firms. As for sales growth, only firms in Georgia had higher performance relative to other countries when conducting innovation. Firms that conducted product or process innovation, or spent on R&D, experienced sales growth that was 10–12 percentage points higher than firms that did not.

The analysis in this chapter shows that significant differences exist between firms that innovate and firms that do not in Armenia. However, the level of innovative activity was higher in Armenia than in the comparator countries. This is in line with Entrepreneurship Survey results as well as the in-depth case studies, which show a much higher level of innovative activity in terms of both the number of firms that undertake such activities and the degree of sophistication of these innovative activities. Product innovation and annual employment growth were significantly positively related in both Armenia and Georgia. These results further strengthen the link between innovation and firm growth as well as the role that government needs to play in fostering an environment conducive to innovative activity among existing firms and new high-growth entrepreneurship.
Notes

1. This indicator was the percentage of firms experiencing at least one bribe payment request across six public transactions dealing with utilities access, permits, licenses, and taxes.

2. A foreign-owned firm is defined as a firm with at least 10 percent ownership by a foreign individual or company.

3. When compared to Armenia, the Czech Republic, Poland, Russia, or Turkey.

4. The Czech Republic, Poland, Russia, and Turkey.

5. In another exercise the contribution of innovation to firm growth was compared in Southern Caucasus countries and ECA-10 countries. The equation is similar to equation 4.3 but with the addition of an interaction term between dummy variables for innovation activity $i$ and country $c$. The coefficient is the parameter of interest. A significantly positive coefficient signals that innovation activity $i$ contributes to higher growth when conducted by firms in country $c$. There were no significant estimates of the coefficient in this exercise.

Reference

How Can Government Policies Stimulate Entrepreneurship?

Introduction

Governments can support entrepreneurial activities in a variety of ways. At the most basic level, effective government policies can create an institutional context of openness to trade, a business environment for domestic and foreign investment, effective intellectual property rights regimes, and enhanced knowledge flows and learning. Beyond those general policies, many governments have also intervened at the industry and firm levels to address market failures.

Armenia has by far the highest level of entrepreneurial activity among the three Southern Caucasus countries that were studied. Armenia’s entrepreneurial culture is built largely on the very strong math and science foundation established during the Soviet era. However, several factors hinder business growth and entrepreneurship. Financial systems are not conducive to business development. Companies cite high interest rates and risk-averse lending policies (requiring high levels of collateral) as major hindrances to expansion. In addition, risk capital is lacking. Few surveyed entrepreneurs reported receiving funding from the domestic financial system; most relied instead on their own resources to develop their business.

The government of Armenia has identified small and medium enterprise (SME) development as a priority for the economy. The government’s SME policy is outlined in the “Concept for SME Development Policy and Strategy in Armenia,” adopted in August 2000, which specifies preconditions for adopting the Law of the Republic of Armenia on State Support of Small and Medium Entrepreneurship. It defines the criteria for SME units in Armenia and the basic directions of state support. Annual programs for state support of SMEs have been implemented since 2001.1 The Ministry of Trade and Economic Development is authorized to elaborate SME development policy and is considered the body responsible for the programs for development of state support of SMEs.

Ensuring sustainable economic growth through diversification to higher value added and knowledge-intensive sectors and increased global competitiveness has
become one of the government's top priorities in recent years. In 2011 the Export-led Industrial Strategy was adopted with the goal of increasing the international competitiveness of sectors with export development potential and targeting exports growth and diversification. Armenia’s export profile is anticipated to shift from resource-based industries toward skill- and knowledge-based sectors.

The strategy involves the highest levels of government, indicating the importance placed on it. An Industrial Board under the prime minister coordinates the work and ensures implementation of the decisions. The Ministry of Economy, working closely with the Industrial Board, implements industrial policy. The Armenian Development Agency implements the Export-led Industrial Strategy. In addition, several other agencies are involved in strategy implementation:

- The Enterprise Incubator Foundation coordinates initiatives for developing the innovation support system, namely, establishing a venture capital fund, introducing innovation grants, and establishing technology parks.
- Trade representative offices represent the interest of Armenian economic entities in foreign countries, establish business contacts, and support trade and economic agreements.
- The Small and Medium Entrepreneurship Development National Center of Armenia supports SMEs and startups to be efficiently integrated into the export value chain within the framework of sectoral strategies.
- The Pan-Armenian Bank will finance systemic initiatives and infrastructure projects under the Export-led Industrial Strategy.
- The SME Investments Universal Credit Organization complements private financial institutions through specific tools for financing SMEs on favorable terms.

Better coordination among these institutions is needed to avoid duplicating scarce resources.

The government could play an important role in providing high-quality framework conditions by removing bottlenecks in the general business environment that impede able entrepreneurs with good ideas from starting new ventures and creating jobs. These conditions include well-functioning institutions, competitive markets for inputs and outputs, and a predictable system of taxation and bankruptcy legislation that facilitates resource reallocation while protecting creditors (Nolan 2003). The government could thus help facilitate a conducive business environment that allows failure and company exit as a necessary part of entrepreneurial learning; provide company incentives that favor entrepreneurs with good ideas; and introduce instruments that enable entrepreneurs to access capital for startups and ensure flexible labor market policies that enable firms to expand by attracting the best-skilled talents from outside the firm or the country.

Over the past few years the government of Armenia has made considerable progress in addressing challenges to doing business through business environment reforms. Most recently, increasing competitiveness and diversifying exports have been its primary policy challenges. The country has made efforts to create
a better business environment, introducing several regulatory reforms, particularly in tax and customs administration. As a result of its efforts, Armenia improved its position in the World Bank’s Doing Business rankings by 18 points, moving to 32 of 185 economies in 2012 (World Bank 2013a).

**Simplifying the Tax System**

Tax reforms in Armenia have aimed at improving taxpayer compliance and broadening the tax base while enhancing the business climate through more efficient tax procedures that reduce compliance costs. In 2011 the government adopted a strategy document to guide tax administration reforms from 2011 to 2013, focusing on key elements, including simplification of procedures, incorporation of information technology systems, and database integration into the tax system. In addition, the State Revenue Commission was created as the unified revenue administration. Despite these efforts, Armenia still suffers from poor tax revenue performance. IFC (2012) ranks Armenia only 153 of 183 countries. The ease of paying taxes index and other business surveys continue to reflect weaknesses in the country’s tax administration and show that arbitrary, corrupt behavior by tax officials is a major impediment to SME formation and success.

The surveyed entrepreneurs cited continually changing tax regulations as the most important legal and regulatory constraint on operating their business.

*Tax policy must be simplified, and tax administration must be completely revamped.*

**Increasing Government Efficiency and Transparency**

A closely related factor is the increased transparency and government efficiency required to facilitate business growth. The second most cited legal and regulatory constraint among surveyed entrepreneurs was government officials favoring well connected individuals. World Bank (2012) argues that the tax administration should be revamped to make it neutral for compliance. Doing business has dramatically improved as a result of anticorruption efforts, including the 2011 Law on Public Services, which has new regulations to prevent and expose conflicts of interest. In 2012 the government’s Ethics Committee was put in charge of conflicts of interest and the disclosure of income and assets of high-level officials. A framework for implementing a national anticorruption strategy was devised and adopted in 2009, setting up an Anti-Corruption Council and an Anti-Corruption Strategy Implementation Monitoring Commission.

Various e-government initiatives must be continued to increase government efficiency.

**Increasing Access to Finance**

Access to finance remains an issue in Armenia, particularly for SMEs, which is similar to the situation in other countries in the region. Most firms use equity, owners’ contributions, or stock sales to finance their investments. World Bank
Enterprise Surveys show that 28 percent of investment is financed through equity or owners' contributions—which is the highest value in Europe and Central Asia (ECA). However, a positive point for access to credit is low collateral requirement, which average 96 percent of the loan value, the third lowest in ECA. The low collateral requirement is likely the result of several reforms, including the introduction of a public credit registry as well as private credit bureaus.

Some public programs facilitate access to finance. SME Investments Universal Credit Organization CJSC was established in 2009 to support SME enterprise development. SME Investments provides financial support in the form of business loan provisions. Equity financing of up to AMD20 million ($50,000) has also been offered to SMEs, and there have been large investments of AMD20 million–AMD150 million.

In addition, the Small and Medium Enterprises Development National Centre of Armenia offers several mechanisms to support SMEs with access to finance for startups at various stages of their development:

- The Start-up Businesses Support Program assists SMEs in receiving seed financing through loans provided by partner banks. The loans support the early stage of business development, namely, realization of business plans. The most competitive business plans receive lending with a 100 percent guarantee of credit liabilities. Loans are for a maximum of AMD3 million (around $7,000), with a 12 percent annual interest rate and up to three years of maturity date.

- The Loan Guarantees Provision Program allows entrepreneurs to qualify for loans by guaranteeing up to 70 percent of the principal of the loan and interest rates for up to three years. The maximum amount guaranteed cannot exceed AMD10 million (around $24,000). In addition, the annual interest rates for the loans provided by partner banks are below market rates. The program prioritizes SMEs in the manufacturing, services provision, and trade sectors, as well as those introducing new technologies and innovations. It also seeks to support SMEs with export potential. And it targets SMEs operating in regions with low levels of economic activity, particularly in the border regions of Armenia.

SME support programs for startups should be robustly evaluated to determine their efficacy.

**Facilitating Secured Lending Transactions**

Secured transactions, particularly for movables, are important for SMEs, which have more trouble accessing credit. When establishing rights to collateral or executing on collateral is difficult, lenders are reluctant to lend on that basis. By contrast, a well-functioning secured transactions regime can give lenders the confidence to lend to SMEs and collect in case of default by seizing and selling collateral. Therefore, a healthy secured transactions system should be seen as an important part of an investment climate that supports entrepreneurship.
The primary law on secured transactions in Armenia is the Civil Code, 1998. In addition, the Law on Registration of Property Rights, 1999, provides for the registration of security interests in immovable property. Registration of security interests in certain types of movable property is covered by other, more specific laws. In general, the secured transactions regime in Armenia is reasonably effective as regards immovable property but weak with regard to movable property.

In Armenia a security interest created in immovable property must be perfected through registration. Not all security interests in movable property are required to be registered—only charges over intellectual property, motor vehicles, and agricultural equipment. However, because registration gives a creditor priority over unregistered and unsecured creditors, it is worthwhile to register pledges on other movable property, though the registry cannot be considered an accurate source of other pledges that may encumber the property.

Security interests in all types of movable property should be allowed to be registered, and an electronically searchable collateral registry should be created for both movable and immovable assets. The registry should be authoritative—that is, parties should not be able to circumvent registry priority.

Access to Risk Capital
Armenia has a large proportion of knowledge-intensive startups, which have historically been a major source of innovations and job growth in the industrial world. These startups are responsible for an outsized share of innovation in developed economies compared with their small size and relative weight in research and in the economy as a whole. Though they have the potential to be highly successful, they also have a high rate of failure and are thus considered high-risk investments. Given the risks associated with these startups, it is rare to find one investor who will fund a new startup from beginning to end. Some corporations do this internally with new startups that are wholly owned by the corporation, but for individual entrepreneurs and small startups, new funding comes in stages. Entrepreneurs are also not limited to one type of funding. Some firms will mix and match equity and debt-based financing at different stages of development. Each step in developing a new product—from idea, to research, to prototype, to a marketable product—requires larger amounts of capital, which programs developed by the Small and Medium Enterprises Development National Centre of Armenia cannot fund.

The initial funds for the very early stages of developing a concept into a business (known as the seed stage) will likely come from an individual’s own finances or from a group of closely related people. To get beyond the seed stage, entrepreneurs require outside investors who are willing to make small investments in volatile early-stage companies. In most cases these investments come from wealthy individuals known as angel investors, who invest a small percentage of their wealth in high-risk ventures. Should the company prove successful, some angel investors will continue to fund it in the postseed startup stage. Once funding requirements reach the $1 million–$2 million stage, the investments start to
become large enough to attract the attention of venture capital funds, which do not prevail in Armenia. The government can establish favorable financing programs for SMEs by developing early-stage risk capital. The role of early-stage risk capital is highly relevant for innovative startups and SMEs. Startups lack access to adequate capital due to the high-risk nature of investments and the lack of access to bank credit due to their insufficient collateral.

Innovative firms that receive venture capital tend to bring products to market more quickly (Hellmann and Puri 2000). An initiative in Armenia aims to link aspiring entrepreneurs with venture capitalists through the business partnership grant competition and venture capital conference organized by the Enterprise Incubation Foundation and the Civilian Research and Development Foundation Global. The grant competition calls for applications from local scientists and technological professionals to submit applications jointly with company partners with at least 10 percent cash contribution. These applications are then reviewed by an independent panel of experts, both local and international, for commercial and technical merit. The semifinalists participate in training sessions that focus on the business aspects, such as preparing a business plan and improving presentation skills. The finalists then present their proposals to a panel of judges that include representatives of Armenian and U.S. venture capital experts, who pick five winners to receive prize rewards for a 12–month period. This is an excellent initiative that can be further developed in both scope and scale. To further develop the venture capital industry, clear regulations for protecting intellectual property are needed, such that private investors do not face any additional risks on that count. Further, concerted efforts to tap into the Armenian diaspora could help establish links to venture capitalists in the United States and Europe. Israel and Ireland have used its diaspora to strengthen the venture capital industry, which could provide some important lessons for Armenia (see box 5.1).

**Box 5.1 Role of Diaspora in Establishing Venture Capital**

Diaspora can play an important role in developing a knowledge-based home economy, providing a flow of venture capital and investment, establishing connections to trade and global innovation networks, and facilitating technology and knowledge transfers. Increasingly, governments are recognizing the pivotal role that diaspora communities can play and are developing policies and programs to leverage them. Israel and Ireland both provide interesting examples of how diaspora communities can be leveraged for investment in the local economy, specifically in developing venture capital.

The U.S.-based Israeli diaspora has played a strong role in developing Israel’s private sector, particularly Israel’s high-tech industry. Between the 1980s and 2000s, a number of Israelis migrated to the United States to pursue graduate degrees in engineering. Although a brain drain for Israel, this has created a strong Israeli network in the U.S. that since has proved a conduit of investment capital.
Box 5.1 Role of Diaspora in Establishing Venture Capital (continued)

The Yozma program, the basis for the establishment of Israel’s venture capital industry, tapped into Israel’s broad diaspora network in its development. Yozma was established in 1993 as a collection of 10 Venture Capital (VC) funds with leading foreign investors. The total capital of each fund was $20 million–$25 million, of which the government’s share was 40 percent and the foreign investors’ share was 60 percent. The program attracted major international venture investors and Israeli diaspora was heavily represented as managers and investors in these funds. A key attractive feature of the program was the option of the foreign investor to buy out the government’s share at a pre-arranged price for a period of five years. Nine of the 10 funds exercised their option and bought out the government’s share.

The initiative successfully led to a thriving venture capital industry, growing from one VC firm to over a hundred active VC firms in Israel, investing over $1 billion a year in startups. Israel today is the world’s third largest recipient of venture capital. More than half of the VC raised by Israeli companies since 2000 has come from foreign investors (Aikins, Sands, and White 2009). In addition, Israeli companies are the second most frequently listed companies on the NASDAQ exchange, indicating the dominance of U.S. investment in Israeli’s private sector.

Though less developed than in Israel, Ireland in the last years also strategically tapped into its global diaspora network to enable local private sector development. Diaspora involvement in Ireland started as remittances, and moved toward philanthropy investment through the Ireland Funds. Ireland’s engagement of its diaspora community is now moving into its next phase, engaging diaspora in the development of business networks, including the Irish International Business Network and the Irish Technology Leadership Group (ITLG), a group of Irish and Irish American senior executives and technology leaders headquartered in Silicon Valley, focused on helping Irish startup companies. The ITLG seeks to leverage both the U.S. market place and the U.S. technology investment communities for Irish companies. It also seeks to support U.S. technology companies based in Ireland to ensure that Ireland remains to be seen as a strategic area of real investment and opportunity. As part of its service offerings to Irish entrepreneurs, ITLG formed Irish Technology Capital, a $100 million venture capital fund providing seed and early-stage investments to Irish companies. The fund is headed by successful diaspora Irish entrepreneurs and seasoned U.S. venture capitalists.a

In designing new financial policy instruments to foster entrepreneurship and innovation, care should be taken in both designing and managing these instruments to prevent capture or corruption and to promote efficiency. The following elements are important:

- Clearly established goals and objectives at the outset.
- Constant monitoring and evaluation of performance against goals and objectives.
- Monitoring and evaluation performed externally to the administration and management of the instruments.
- Adjudication to approve applications, conducted by an independent panel consisting of external peer reviewers.

- An independent panel with significant private sector and export expertise.
- Adjudication based on pre-established, clear, and transparent criteria.

**Developing Skills**

Stakeholders repeatedly cited inadequate skills as a key hindrance to developing local industry. The largest group among the unemployed is those with secondary general education and no technical skills, although many possess secondary technical and tertiary education (figure 5.1). This suggests that unemployment has two dimensions: those with no job-specific skills and those who have skills but are still jobless, indicating a skills mismatch.

This requires helping the first group to acquire critical employable skills and helping the second group to find jobs that match their qualifications. To combat

**Figure 5.1 Unemployment by Educational Attainment and Location, 2010**

Source: Rutkowski 2012.
high unemployment, particularly among young people, the government has initiated efforts to resolve the disparity between the demand and supply of labor market skills. Quality specialists in technical areas such as engineering are in short supply. The Armenia National Engineering Laboratory at the State Engineering University of Armenia, established in 2012, was created to be a center for excellence in engineering. The center’s focus is on strengthening the educational capabilities and research potential of Armenia’s engineering sector by upgrading education and research facilities to world standards. There is a positive perception in the private sector that building the Armenian National Engineering Lab is a promising initiative that will help bridge the gap between the supply of skills and those demanded by the private sector.

Information and communication technology in Armenia has grown considerably over the past few years, with the number of startups and new companies increasing. For this to be sustainable, a steady supply of skilled personnel must be available to this growing sector. The private sector is helping strengthen the skills base in Armenia—for example, the role Synopsys is playing in the information technology sector (see box 5.2).

Medium- to long-term policies need to reorient the education system to produce more industry-relevant skills. Priority should be given to technical skills at higher education institutions, where course curriculum has industry inputs, so that skills

Box 5.2 Case Study: Synopsys CJSC Armenia—A Foreign Investor Playing a Pivotal Role in Armenia’s Information Technology Sector

General information about the founder and formation

Headquartered in Mountain View, California, with more than 70 offices worldwide, Synopsys arrived in Armenia in 2004 when it acquired Monterey Arset. In Armenia, Synopsys has two thriving businesses: R&D and education. In other words, in addition to R&D the company found a new mission: to develop human capital for both its local site—about 40 percent of employees have graduated from the intensive internal training program—and company sites elsewhere. The company site has about 1,000 people, 600 of them engineers, 300 students, and 100 professors.

The modern Armenia R&D site was commissioned in 2007 and is a state-of-the-art facility located in a former Soviet-era semiconductor lab currently part of the Via Sphere Techno-park, the first technology park in Armenia. This new site can host 500 employees and 120 students and provides world-class working conditions. The building also houses the Synopsys Armenia Data Center, the largest computing cluster in the country, consisting of more than 100 dual-processor servers and featuring supercomputer class computing power.

In addition, the site is the home of the Synopsys Armenia Educational Department, with excellent instruction facilities for 120 students and a comprehensive technical library for both students and employees. The department is a very important asset for the company in Armenia and was a key reason the company entered the country. It allows the company a key role in developing the country’s information technology workforce.

box continues next page
Box 5.2 Case Study: Synopsys CJSC Armenia—A Foreign Investor Playing a Pivotal Role in Armenia’s Information Technology Sector (continued)

Company strategy
Synopsys Armenia has invested heavily in microelectronics education and is engaged in many cooperative programs with major universities such as the State Engineering University of Armenia, Yerevan State University, Moscow Institute for Electronic Technology, and Russian-Armenia (Slavonic) University. About 500 students have graduated from these programs, with a fifth of them aimed for the Russian Federation’s semiconductor workforce market.

Based on industry cooperation with participating universities, the department aims to train highly qualified specialists in the field of very large scale integration design and electronic design automation, who will meet the specific requirements of semiconductor and information technology companies. To support this effort, Synopsys put in place computer laboratory infrastructure and donated hundreds of electronic design automation software tool packages to participating universities. Teaching, supervision of course projects, diploma works, master’s theses, and doctoral dissertations are targeted at real industry projects at Synopsys Armenia and are completed jointly with leading professionals from Synopsys and experienced professors from the university.

Perceived role of the government
There is now a perceived pressure of a rapidly expanding information technology market, which the company very much helped develop. It is facing considerable staff turnover, losing people to other emerging players in the country, and rising salaries. This squeezes the expected benefits from the heavy investment in education and training and puts pressure on the business. Synopsys management feels that the government should continue with investment in information technology infrastructure and invest more heavily in information technology education, including inviting tie-ups with foreign advanced education institutions.

produced are relevant to industry. Collaborating with overseas universities (for example, in Australia and the United Kingdom) could be an additional channel for effective human resources development. Foreign universities can help develop and upgrade curricula and teaching materials as well as provide teaching staff.

Second, Armenia has a vast diaspora (about 6 million people) who are highly skilled. There needs to be a concerted effort to tap into their knowledge and skills both in short-term measures as well as longer term engagements with industry, research organizations, and higher education institutions. The government’s ongoing efforts could be further strengthened to attract skilled Armenian researchers and academics to contribute and encourage collaborative programs between Armenian nationals abroad and research institutes and universities in Armenia. These could include taking Armenian students into their labs or research institutes and providing lectures when they return home to visit their families. Taiwan, China, offers an example of an effective program. The Taiwanese National Youth Council formulated policies in the 1970s that connected Taiwanese businesses with skilled migrants, garnering synergies from these
migrants abroad. The council tracked migrants in a database, advertised jobs overseas, and provided travel subsidies and temporary job placement to potential returnees. The National Science Council and Ministry of Education also recruited thousands of migrants as professors and visiting lecturers for the growing university system.

Third, more emphasis is needed on industry-relevant vocational training and education courses that cater to the technical needs of the various priority sectors identified by the government. In this process, a feedback mechanism between firms and the government is necessary, with feedback being provided to the design and development of those new courses that are responding to the skills needs of industry.

**Business Development Supply Services**

Another important area is providing an adequate supply of managerial and marketing competencies; analysis shows that many of the founders had these skills, which possibly set them apart and provided them with the requisite skills to start their entrepreneurial activity. Evidence also shows that the shortage of managerial capital is an important constraint to firm growth (Bloom and Van Reenen 2010). Support for existing firms to develop managerial and marketing competencies by subsidizing costs or directly procuring business development supply services and advisory services is common in industrial countries. Several countries (such as Chile) use vouchers that allow firms to freely choose service providers.

One way to provide business development supply services is through business incubators that provide entrepreneurs with the expertise, funding, networks, and tools they need to make their ventures successful (Etzkowitz, Carvalho de Mello, and Almeida 2005; Rothaermel 2002). In addition to providing physical space and shared infrastructure, these incubators impart important soft skills, including professional consulting for business planning and strategy, project preparation, financial and legal assistance, and intermediation services, notably funding and linking to capital sources, integration to technology, and business networks, among others.

The Enterprise Incubator Foundation has played a vital role for the information technology sector. In 2002 the World Bank initiated the Learning and Innovation Loan with the government of Armenia, to be implemented by the foundation. The project piloted innovative private-public mechanisms for providing business development services to nascent enterprises, and continual education and training to professionals in information technology. The foundation emerged as a business development and incubation agency supporting technological companies in Armenia. Its objective is to improve the competitiveness of Armenian information technology companies in the global marketplace, build links with business communities in key technology markets, improve local companies’ access to knowledge and information on best practices and experience, and assist Armenian firms in attracting local and foreign investors (USAID, Enterprise Incubator Foundation, and Ministry of Economy of the Republic of Armenia 2010).
In addition to state-supported programs, some private businesses support infrastructure in Armenia. The Microsoft Innovation Center is one of the Enterprise Incubator Foundation projects that functions as a businesses incubator, providing technical and business consultations as well as facilities (space, computers, servers, Internet connections, and so forth.) to startups at the center. It also helps its startups engage partners and cooperate with interested stakeholders and access new markets through the global center’s network. The center is considering establishing an “entrepreneurship lab” to conduct coaching, training, and support of entrepreneurs. Box 5.3 highlights some examples of successful startups supported by the center.

Another project is the Science and Technology Entrepreneurship Program, which was jointly created in 2006 by the Enterprise Incubator Foundation, the U.S. Civilian Research and Development Foundation, and the government of Armenia. The program helps engineers, researchers, and scientists move innovative products to the market and create new ventures. It also facilitates connections between Armenian scientists and local and international companies so that they can collaborate in a mutually beneficial way.

An important source of knowledge and skills transfer is the access to networks of successful entrepreneurs who could mentor other entrepreneurs venturing into new startups. Armenia has the advantage of having a vast diaspora that it could tap into to develop such networks as well as a high level of entrepreneurial activities that could benefit from these networks. The Korea Institute of Startup and Entrepreneurship Development (see box 5.4) is an example of a combination of support measures that aimed at developing the requisite skills by providing a range of support services that address various aspects of entrepreneurial development.

**Increasing Industry-Research Collaboration**

An economy needs both researchers and entrepreneurs to be successful. Universities and industry are linked by the two groups, and they require each other to be successful. But how is the relationship used to the best advantage? In several ways. The university could ask industry what appeared to be the most promising areas for product innovation and invention, or industries could ask what current research had the most commercial applications. Each must see the value of the relationship for any approach to be successful.

Armenian firms spend money on R&D, but there is virtually no interaction between industry and research communities. *Synergies need to be built between these two communities in the priority areas identified by the government.* The Science and Technology Entrepreneurship Program aims to do this in the information technology sector, and it needs to be replicated in other emerging sectors. Examples of successful programs in other countries include India’s SPREAD program, which is an early-stage technology development program directed exclusively at private enterprises with an explicit requirement for collaboration with public research institutes that has been independently evaluated as successful.
Box 5.3 Startups Supported by the Microsoft Innovation Center

**Project:** Clean H\textsubscript{2}O

**Description:** Clean H\textsubscript{2}O enables people to check water quality anytime and anywhere and get up-to-date statistics about water availability, quality standards, and waterborne diseases. The technique involves a small device that checks water quality parameters and transfers the data to a mobile phone or any WiFi-enabled device. The data are analyzed and stored in the cloud, generating worldwide statistics on water quality and accessibility. The tested parameters include acidity, total dissolved solids, and oxidation reduction potential; the system uses the data to provide recommendations on allowable uses of the water. Its primary intention is to facilitate the collection of statistics by organizations working in areas with poor water access.

**Support received:** The center supported Clean H\textsubscript{2}O in creating the business model for the project and helped identify customer segments and potential markets. It also helped with the research, contacting partners and water-testing labs, assessing technical feasibility of the project, and identifying the water parameters to be checked. The Armenia center contacted the worldwide network of Microsoft Innovation Centers and water organizations and received positive feedback on the project. It also provided access to Microsoft's Windows Azure platform through the Microsoft BizSpark program (http://www.bizspark.com) for hosting the software platform.

**Grant:** After extensive research and creation of the first prototype, the team needed funding to be able to develop its second commercial prototype and develop a business model. The team applied for and received a $5,000 grant from the Civilian Research and Development Foundation.

**Future:** After creating the commercial prototype of the device, Clean H\textsubscript{2}O sees itself as a separate startup company that will generate revenue from selling the devices and providing value added services to clients. It intends to form partnerships with international water organizations as the next stage of development and use its devices to test water quality in areas with poor water access.

**Project:** E-Agriculture Marketplace

**Description:** E-Agriculture Marketplace is a web-based marketplace for agricultural commodities, accessible by mobile phones and computers, that allows selling and buying of agroproducts from any location in Armenia. It is also a meeting place for all stakeholders, including service providers (transportation, packaging, marketing, and the like). Apart from being a marketplace and allowing farmers to make informed pricing decisions on their produce, the project generates accurate agricultural statistics, which are nonexistent in Armenia, by collecting data on the quantities and types of agroproducts sold in a given time period, average product prices, and trading patterns (that is, locations, types of products per location, and so on). The innovative part of the system is the systems management server (SMS) component, which allows the use of the system even without Internet access.

After researching the situation in remote areas of Armenia, the team came up with the idea to use technology to support the development of agricultural business. The team created
Box 5.3 Start-Ups Supported by the Microsoft Innovation Center (continued)

a business model based on revenue generated from SMS messages and saw great potential in the system because most farmers have access to mobile devices.

Support from the center: The center provides facilities for the E-Agriculture Marketplace (computers, Internet access, and servers). It helped the entrepreneurs form partnerships with the relevant stakeholders (mobile operators, regional centers, Ministry of Agriculture, and others). The center also provided necessary software licenses through the Microsoft BizSpark program.

Grant: As the project intended large-scale implementation, the team needed funding and applied for and received a Civilian Research and Development Foundation grant that is covering the project expenses.

Future: After the successful implementation of the pilot, the team intends to create a separate startup company and further develop and support the platform.

Box 5.4 Case Study: The Republic of Korea—Korea Institute of Startup and Entrepreneurship Development

Korea has a reputation for having one of the world’s best education systems and a very welcoming business atmosphere (the World Bank ranks the country eighth in ease of doing business). With these advantages, Korea should be teeming with aspiring entrepreneurs. Nonetheless, cultural barriers such as an aversion to risk and failure have kept many would-be entrepreneurs from reaching their full potential. But over the past decade the country has bolstered support for startup enterprises and implemented several programs that foster an entrepreneurial spirit, changing the attitude toward entrepreneurship.

In 2008 Korea began implementing a series of policy packages known as the Start-up Korea Initiatives. These policies foster entrepreneurship with support structured around three themes: developing startup resources, enhancing startup capacity, and leveraging successful incubation. Leading this effort is the Korea Institute of Startup and Entrepreneurship Development, a public institute under the country’s Small and Medium Business Administration. The institute was founded in 2000 as a nonprofit business incubation association but was designated by the government as the organization exclusively in charge of SME startup promotion in 2006, and it officially became a public entity in 2010. The institute is now the primary implementation agency for the Small and Medium Business Administration’s startup initiatives.

The first theme of support involves developing the requisite skills and resources to set a backdrop for successful startup creation. The institute implemented five programs addressing various aspects of development:

- A program to support commercialization of creative ideas through content production, registration, and intellectual property protection.
Box 5.4 Case Study: The Republic of Korea: Korea Institute of Startup and Entrepreneurship Development (continued)

- A program to cultivate entrepreneurs by providing them with financing for business preparation and access to resources at universities and research centers.
- A program to foster the spread of knowledge and know-how by linking successful ventures with fledgling startups to act as mentors and technology consultants.
- A program to encourage technology-oriented startups by providing access to patents held by universities and research organizations.
- A program to organize a variety of events to generate an entrepreneurial spirit among students.

The second type of support measure is enhancing the capacity of potential entrepreneurs through a variety of education programs, clubs, and competitions. The Youth BizCool program grooms entrepreneurs at a young age by sponsoring clubs, activities, and education materials targeted to students from primary school through high school. University startup support programs continue building skills, with support for activities such as clubs and overseas startup training. Potential entrepreneurs who are not students can also participate in an education program for the general public, which offers mentoring and consulting on weekends. Other efforts also help build capacity in this phase, such as the Korea National Startup Competition League, which holds annual competitions. Successful teams in this competition earn prize money and cost compensation for their pilot products.

The third theme of support enhances the potential for businesses to succeed in the country’s network of business incubators. At the end of 2010 Korea had 274 business incubators nationwide, which housed about 4,000 enterprises (KISED 2011). To improve the effectiveness of these incubators, the institute implemented a program to train and certify specialized business incubator managers. It offers the enterprises at these incubators support for marketing at home and abroad and provides commercialization support in the form of design and development assistance to promising businesses. The institute markets businesses that successfully commercialize products in newspapers, subway train ads, and e-books. Along with the startup support mechanisms discussed above, the institute supports Korean entrepreneurs through global outreach and cooperation with international partners to facilitate information exchange. So far, the country’s efforts to support business creation appear to be paying off. Since 2008 the number of new business ventures and incorporations in Korea has steadily grown despite the global economic downturn.

Source: KISED n.d.

Finland, Ireland, and Singapore provide important lessons. Yusuf and Nabeshima (2011) cite these three countries at the very outset, seeing in their strategies a vital role for university-industry links that led to a circulation of knowledge and of researchers. The universities were viewed as a source of entrepreneurship to help transfer innovation to the business sector. In Finland the Nokia Corporation took the lead in conjunction with the National Board of Education, the Ministry of Education, and the Future Committee of the Parliament in persuading the Academy of Finland to accelerate the initiative to
become a knowledge society by mobilizing universities and public research entities. The role that the Finnish Funding Agency for Technology and Innovation had in Finland’s transformation into a knowledge economy has been widely acknowledged. Established by the government in 1983, the agency has a broad mandate that includes identifying areas for technological advance and coordinating the working of the innovation system with the help of catalytic funding of R&D, all the while working closely with government agencies, universities, firms, and private financiers.

Technology transfer institutions are particularly important for firms in the process of catching up. Technology-bridging organizations can facilitate knowledge transfer from research institutions to SMEs through collaborative research and technology programs and through staff exchanges and secondments (in which researchers and engineers are placed in firms).

**Facilitating Firm Restructuring and Exit**

Facilitating business exit is important for entrepreneurship because it helps foster greater entrepreneurial activity. An efficient and effective insolvency regime promotes entrepreneurship in five ways:

- Increasing access to finance.
- Improving ease of business exit and thereby encouraging business entry.
- Encouraging restructuring of viable but distressed businesses, allowing such businesses to continue to operate.
- Facilitating the exit of unviable businesses and returning assets and entrepreneurs to productive activity as soon as possible.
- Removing the stigma of bankruptcy, which may encourage entrepreneurs to take calculated risks and innovate.

Armenia ranked 63 out of 183 economies on the 2013 Doing Business indicator on resolving insolvency. Debt recovery in Armenia, on average, takes 1.9 years, not far behind the Organisation for Economic Co-operation and Development (OECD) average of 1.7 years, and the cost of recovery is, on average, 4 percent of the bankruptcy estate, compared with the OECD average of 9 percent. However, the recovery rate in Armenia is 41.2 percent, lower than the OECD average of 70.6 percent (figure 5.2).

Under the Armenian Law on Bankruptcy, insolvency is defined as a situation where the obligations of the debtor are more than its assets or the debtor is unable to pay overdue obligations.

To be effective, an insolvency regime must perform two critical functions well. It must facilitate the orderly and efficient exit of failed firms from the market, allowing for the assets of these firms to be redeployed to more productive uses as soon as possible and for creditors of failed firms to recover as much as possible of what is owed to them. The insolvency regime must also effectively channel viable businesses into some form of corporate reorganization process and provide
these businesses with the necessary legal tools to restructure, both operationally and financially.

Restructuring. Restructuring is a critical tool to save a viable yet distressed business. To rehabilitate a business that is insolvent but remains viable, additional loans may be required. Such financing may be crucial to the survival of the insolvent business. Experience in jurisdictions with successful restructuring experience, such as the United Kingdom and the United States, shows that post-petition financing is often crucial to allowing a business to continue to operate and reorganize. Without it, the rate of successful restructurings is greatly diminished or nonexistent. Armenia has no mechanism to incentivize post-petition financing, a crucial gap in the framework for reorganizing viable businesses. Additionally, nothing requires that creditors be provided sufficient material information to enable them to make an informed decision on a proposed rescue plan. And no provision requires a reorganization plan to be independently analyzed by creditors.

The law should be improved to allow post-petition ongoing finance and include a requirement that creditors be provided sufficient material information to enable them to make an informed decision on a proposed rescue plan.

Personal Insolvency. A 2003 study quantitatively establishes that the extent of forgiveness and protection of personal assets in the bankruptcy regime
affects the incentive to start a small business (Fan and White 2003). Thus entrepreneurship in a country has been shown to increase when the insolvency regime provides businesses away to mitigate losses to personal fortunes through an effective bankruptcy system that discharges debt and protects a certain level of assets.

The Armenian Law on Bankruptcy prohibits a bankrupt natural person from starting or partnering in a new business for five years, thus hampering the fresh start that should be the goal of a personal insolvency regime. Further, it requires the bankrupt debtor and “affiliated persons” to submit property and income statements for three years, according to a regulation to be issued, which can serve as a disincentive to follow through with an insolvency proceeding.

*The law should allow bankrupt debtors to return to economically productive activity immediately.* The ability to start again immediately is an essential component of the “fresh start” that is provided by successful personal bankruptcy systems such as those in the United Kingdom and the United States, where many prominent businesspeople (such as Milton S. Hershey and Henry Ford) had a bankruptcy or two in their past before they were successful creators of large, profitable companies that employed thousands of people.

**Raising Awareness**

This chapter has elaborated on how government can facilitate high-growth entrepreneurial activity. In addition to instruments, the government must encourage entrepreneurship in the country. It has a key role to play in raising awareness of the private benefits of undertaking entrepreneurial activities. An example of this was the efforts of the Thatcher government, which came into power in the United Kingdom in 1979 with the clear objective to create an “enterprise culture” (Burrows 1991). The idea was to change the social attitudes of the U.K. population away from what the government perceived as a “dependency culture,” in which workers relied on large organizations and the state for employment, to a culture in which individuals strived to start their own businesses and created jobs in the context of an “enterprise culture.” *At the basic education level, school curriculum needs to factor in prerequisites that encourage innovative thinking.* An example of a U.K.-based program designed to influence the attitudes of young people toward self-employment is the Shell Technology Enterprise Program, which raises awareness among college students of the benefits of working in a small business by facilitating short-term placements during summer vacation. Another example of a program aimed at young people is Law 44 in southern Italy, which provides a range of financial and advisory support services to individuals aged 18–30 who wish to start a new business in the region. *Further, showcasing successful entrepreneurs can go a long way in fostering the entrepreneurship culture in society.* The objective of all the policy instruments reviewed here is to create an entrepreneurship culture and increase the supply of new entrepreneurs as well as ensure their survival and, most important, their growth.
How Can Government Policies Stimulate Entrepreneurship?

Fostering Entrepreneurship in Armenia

1. SME DNC n.d.
4. Firms from non–Organisation for Economic Co-operation and Development (OECD) countries score significantly below firms from OECD countries on a measure of management practices (Bloom and Van Reenen 2010).

Summary of policy recommendations and timelines

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<tbody>
<tr>
<td><strong>Facilitating business entry and increasing business environment efficiency</strong></td>
<td></td>
</tr>
<tr>
<td>Simplify tax policy and revamp tax administration.</td>
<td>3–6 months</td>
</tr>
<tr>
<td>Continue and strengthen various e-government initiatives to increase government efficiency.</td>
<td>0–3 months</td>
</tr>
<tr>
<td>Coordinate better among the various institutions involved in SME development to avoid duplicating scarce resources.</td>
<td>0–3 months</td>
</tr>
<tr>
<td><strong>Increased access to finance</strong></td>
<td></td>
</tr>
<tr>
<td>Evaluate existing financial support programs to determine their efficacy and identify ways to strengthen them.</td>
<td>0–3 months</td>
</tr>
<tr>
<td>Allow security interests in all types of movable property to be registered and create an electronically searchable collateral registry for both movable and immovable assets.</td>
<td>6–12 months</td>
</tr>
<tr>
<td>Establish financial programs that support the development of early-stage risk capital.</td>
<td>6–12 months</td>
</tr>
<tr>
<td>Strengthen intellectual property regulations to help further develop the venture capital industry.</td>
<td>6–12 months</td>
</tr>
<tr>
<td>Develop programs to systematically tap into the Armenian diaspora that could help establish links to venture capitalists in the United States and Europe.</td>
<td>3–6 months</td>
</tr>
<tr>
<td><strong>Developing skills</strong></td>
<td></td>
</tr>
<tr>
<td>Reorient higher education programs toward industry needs.</td>
<td>Greater than 1 year</td>
</tr>
<tr>
<td>Introduce industry-relevant vocational training programs.</td>
<td>6–12 months</td>
</tr>
<tr>
<td><strong>Increasing industry-research linkages</strong></td>
<td></td>
</tr>
<tr>
<td>Develop short-term and longer term engagements with the Armenian diaspora in industry, research organizations, and higher education institutions.</td>
<td>3–6 months</td>
</tr>
<tr>
<td>Introduce programs and policies to incentivize researchers to undertake industry-relevant research and to strengthen collaborations between industry and researchers.</td>
<td>3–6 months</td>
</tr>
<tr>
<td><strong>Facilitating firm exit and restructuring</strong></td>
<td></td>
</tr>
<tr>
<td>Improve the insolvency law by allowing post-petition ongoing finance and requiring that creditors be provided sufficient material information to enable them to make an informed decision on a proposed rescue plan.</td>
<td>3–6 months</td>
</tr>
<tr>
<td>Amend the insolvency law to allow a bankrupt debtor to return to economically productive activity immediately.</td>
<td>3–6 months</td>
</tr>
<tr>
<td><strong>Raising awareness</strong></td>
<td></td>
</tr>
<tr>
<td>Showcase successful entrepreneurs to increase awareness of entrepreneurship.</td>
<td>0–3 months</td>
</tr>
<tr>
<td>Introduce changes to the school curricula that encourage innovative thinking.</td>
<td>6–12 months</td>
</tr>
</tbody>
</table>

Notes

1. SME DNC n.d.
4. Firms from non–Organisation for Economic Co-operation and Development (OECD) countries score significantly below firms from OECD countries on a measure of management practices (Bloom and Van Reenen 2010).
References


An empirical study of actual entrepreneurial activities alone may overlook the entrepreneurial potential of an economy. Actual entrepreneurs include only people who have successfully started a business and exclude firms and individuals that are truly facing enormous constraints and are unable to enter the market at all. This bias is known in the literature as the “hippopotamus versus camel” problem, which suggests that studies of enterprises and entrepreneurs that are already present in the market (“camels in the desert”) may completely miss the constraints faced by those who cannot enter the market (“hippopotamus in the desert”).

More than 10 years ago a new literature on “latent entrepreneurship” emerged using data from a household survey that asked members of the labor force whether they would rather be self-employed. Some may argue against this measure of latent entrepreneurship, as it captures the pool of all possible entrepreneurs, including subsistence forms of self-employment. In difficult labor markets, self-employment may serve as an alternative to joblessness and may represent little more than a survival strategy rather than a high-impact, job-creating business venture. Nonetheless, the pool of those who would rather be self-employed may also be thought of as representing the entire pool of possible entrepreneurs. Every successful venture has arguably grown from the initial efforts of self-employed individuals. Those who prefer to be self-employed represent all latent entrepreneurs, in other words, “survival” or subsistence entrepreneurs and “opportunity” entrepreneurs alike, and their success appears to be driven by similar individual-level and policy correlates. In addition, this measure of entrepreneurship is comparable across countries.

The pioneering work in this field covered about 20 countries, including four new European Union member countries and the Russian Federation. The study found large numbers of people who would like to be entrepreneurs but the “entrepreneurial spirit” remained dormant. In the absence of suitable data, the literature has largely remained stagnant since then. However, the inclusion of a number of related questions in the 2010 Life in Transition Survey provides a window of opportunity to revisit this literature. Data from the 2010 survey
suggest that the pool of latent entrepreneurs in Europe and Central Asia—those who prefer to be self-employed—is generally quite large. About a quarter of the labor force in the region, on average, would rather be self-employed, comparable to the size of the latent entrepreneurs in Western European comparator countries in the same survey. In addition, the desire to be self-employed does not appear to be driven by necessity alone, based on survey respondents’ individual characteristics. First, many of the latent entrepreneurs are already gainfully wage-employed. In addition, many are highly educated professionals who are employed as directors or managers of their companies.

Note

## Classification of Exports by Product and Technology

<table>
<thead>
<tr>
<th>Total exports</th>
<th>Primary</th>
<th>Manufactured</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary (oil)</td>
<td>Manufacturing Resource-based 1: Agro-based</td>
<td>Resource-based</td>
</tr>
<tr>
<td></td>
<td>Primary (nonoil)</td>
<td>Resource-based 2: Other resource-based</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low technology 1: Fashion cluster</td>
<td>Low tech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low technology 2: Other low tech</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium technology 1: Automotive</td>
<td>Medium tech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium technology 2: Processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium technology 3: Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High technology 1: Electrical and electronics</td>
<td>High tech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High technology 2: Other high tech</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other transactions</td>
<td></td>
</tr>
</tbody>
</table>

Data Sources and Regression Results of New Entrepreneurship Survey

Gallup World Poll Data
The Gallup World Poll Database includes more than 18,000 observations from 19 countries in Europe and Central Asia. The data for Armenia and Georgia are based on 1,000 observations for each country. The core Gallup World Poll questionnaire includes detailed information on demographics (such as gender, age, marital status, and education); income; well-being and job satisfaction; confidence and trust in institutions, family, and strangers; and most important, entrepreneurs. Data on self-employment distinguish between full- and part-time employment and indicate the number of hours worked.

New World Bank Entrepreneurship Survey
The database of firms from the National Statistical Service of the Republic of Armenia had close to 20,000 firms and was used to obtain the sectoral weights for the sectors of interest. However, the database did not include the years of firm formation. Consequently, the Spyur Company Registry of Armenia was used to obtain the database of firms that were established between 2002 and 2010 in the sectors of interest. Keeping in mind the government’s priority sectors and the potential for high-growth entrepreneurship, a sample of 300 firms established between 2002 and 2010 was surveyed from a sample of 1,000 firms in sectors including food, chemicals, machinery and equipment, electronics, information technology, transport, pharmacy, telecom, and hotels and restaurants.
Box C.1 Specification of Ordinary Least Squares Regression

**Dependent variable**
Growth = average sales growth of the firm during the last five years (percent)

**Independent variables**

*Firm characteristics*
Number of employees = proxy for firm size
Firm age = age of the firm (years)

*Entrepreneur characteristics*
Founders’ education = 1: at least one founder of the firm has above technical degree; = 0 otherwise
Founders’ age = average age of the founders
Industry experience = 1: at least one founder has industry experience before the establishment of the firm; = 0 otherwise

*Innovative activity*
Innovation = 1: the firm introduced a new or substantially improved product or good during the past three years (excluding simple resale of new products purchased from other enterprises and changes of solely aesthetic nature); = 0 otherwise

*Strategy*
Low cost = 1: main strategy of the firm was to offer standardized products/services at low cost; = 0 otherwise
Unique product = 1: main strategy of the firm was to offer unique products and services; = 0 otherwise

*Funding*
Venture capital = 1: received venture capital for setting up the firm; = 0 otherwise
Bank = 1: attracted funds from a bank for setting up the firm

*Market environment*
Competition = 1: there are many business competitors; = 0 otherwise
Technology risk = degree of technology risk/uncertainty in setting up/operating the firm
Market risk = degree of market risk/uncertainty in setting up/operating the firm

*Other firms’ sales growth*
Other firms’ growth = sales growth of other firms in the same sector

This factor is included as a control variable for two reasons. First, firm sales would be expected to grow faster in fast-growing sectors. Second, the variable is a useful control for other omitted local factors that affect sales growth such as taxes and regulation. Information on how taxes, regulation, and other transaction costs vary across sectors was unobservable for this analysis. This variable should control for such factors.
Box C.2 Specification of the Probit Regression

**Dependent variable**
Innovation = 1 if the firm introduced a new or substantially improved product or service during the past three years; = 0 otherwise

**Independent variables**

*Firm characteristics*
- Number of employees = proxy for firm size
- Firm age = age of the firm (years)
- R&D intensity = average R&D expenditure to sales ratio
- High-tech sector = 1 if the firm’s industry belongs to high-technology sector; = 0 otherwise

*Entrepreneur characteristics*
- Founders’ education = 1 if at least one founder of a firm has above a technical degree; = 0 otherwise
  - Founders’ age = average age of the founders
- Technical engineering = 1 if at least one founder’s main area of expertise is technical and engineering knowledge; = 0 otherwise
- General management = 1 if at least one founder’s main area of expertise is general management; = 0 otherwise

*Strategy and market environment*
- International market = 1 if the firm also sells to the international market; = 0 otherwise
- R&D activity = 1 if R&D activity is considered important for creating and sustaining the competitive advantage of the firm; = 0 otherwise
- Alliances = 1 if alliances with other firms are considered important for creating and sustaining the competitive advantage of the firm.

Controls include sector dummy variables and the innovation rates of other firms in the same sector (in the same sector, number of innovative firms excluding the firm as a proportion of total firms excluding itself).
### Table C.1  Regression Results of Ordinary Least Squares Specification

<table>
<thead>
<tr>
<th>Estimation method</th>
<th>&lt;Armenia&gt; Ordinary least squares</th>
<th>&lt;Georgia&gt; Ordinary least squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Growth</td>
<td>Growth</td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Firm characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of employees</td>
<td>0.201* (0.119)</td>
<td>0.123* (0.074)</td>
</tr>
<tr>
<td>Firm age</td>
<td>−7.191*** (2.228)</td>
<td>0.46 (0.701)</td>
</tr>
<tr>
<td><strong>Entrepreneur characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Founders' education</td>
<td>31.06 (26.858)</td>
<td>−0.567 (6.311)</td>
</tr>
<tr>
<td>Founders' age</td>
<td>−13.375** (5.463)</td>
<td>0.329 (1.656)</td>
</tr>
<tr>
<td>Industry experience</td>
<td>24.263* (14.434)</td>
<td>7.275** (3.483)</td>
</tr>
<tr>
<td><strong>Innovative activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td>20.878* (11.673)</td>
<td>5.906 (6.225)</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low cost</td>
<td>48.958*** (17.802)</td>
<td>8.784 (8.123)</td>
</tr>
<tr>
<td>Unique product</td>
<td>26.7* (14.972)</td>
<td>5.062 (8.076)</td>
</tr>
<tr>
<td><strong>Funding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venture capital</td>
<td>31.971 (92.201)</td>
<td>22.554* (13.557)</td>
</tr>
<tr>
<td>Bank</td>
<td>−14.506 (14.217)</td>
<td>−2.982 (3.839)</td>
</tr>
<tr>
<td><strong>Market environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td>−4.292 (10.757)</td>
<td>0.306 (3.313)</td>
</tr>
<tr>
<td>Technology risk</td>
<td>5.095 (4.306)</td>
<td>0.703 (1.747)</td>
</tr>
<tr>
<td>Market risk</td>
<td>−5.856 (4.278)</td>
<td>1.884 (1.65)</td>
</tr>
<tr>
<td><strong>Other firms' sales growth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other firms' growth</td>
<td>0.894*** (0.166)</td>
<td>0.964*** (0.272)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.233 (35.357)</td>
<td>−22.198* (13.504)</td>
</tr>
<tr>
<td>N</td>
<td>291</td>
<td>299</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.2278</td>
<td>0.1032</td>
</tr>
</tbody>
</table>

*Note:* Numbers in parentheses are standard errors. Coefficients on sector dummy variables are not reported. R&D = research and development. Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.
Table C.2 Regression Results of Probit Specification

<table>
<thead>
<tr>
<th>Estimation method</th>
<th>&lt;Armenia&gt; Probit</th>
<th>&lt;Georgia&gt; Probit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Innovation</td>
<td>Innovation</td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Firm characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of employees</td>
<td>0.001 (0.002)</td>
<td>0.004 (0.004)</td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.027 (0.034)</td>
<td>-0.047 (0.073)</td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>0.005 (0.006)</td>
<td>0.075** (0.031)</td>
</tr>
<tr>
<td>High-tech sector</td>
<td>0.012 (0.166)</td>
<td>-0.611 (0.565)</td>
</tr>
<tr>
<td><strong>Entrepreneur characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Founders education</td>
<td>-0.245 (0.474)</td>
<td>0.321 (0.334)</td>
</tr>
<tr>
<td>Founders age</td>
<td>-0.104 (0.081)</td>
<td>-0.198 (0.161)</td>
</tr>
<tr>
<td>Technical engineering</td>
<td>-0.35 (0.328)</td>
<td>0.538 (0.647)</td>
</tr>
<tr>
<td>General management</td>
<td>0.352** (0.172)</td>
<td>0.94* (0.493)</td>
</tr>
<tr>
<td><strong>Strategy and market environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International market</td>
<td>0.363** (0.182)</td>
<td>-0.256 (0.518)</td>
</tr>
<tr>
<td>R&amp;D activity</td>
<td>0.12** (0.057)</td>
<td>-0.174 (0.154)</td>
</tr>
<tr>
<td>Alliances</td>
<td>-0.073 (0.057)</td>
<td>0.069 (0.151)</td>
</tr>
<tr>
<td>Networking</td>
<td>-0.066 (0.064)</td>
<td>0.313** (0.156)</td>
</tr>
<tr>
<td>Product and market</td>
<td>0.353* (0.206)</td>
<td>0.334 (0.306)</td>
</tr>
<tr>
<td><strong>Funding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External fund</td>
<td>0.096 (0.207)</td>
<td>0.254 (0.348)</td>
</tr>
<tr>
<td><strong>Other firms’ innovation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other firms’ innovation</td>
<td>0.023*** (0.009)</td>
<td>0.09*** (0.028)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.684 (0.718)</td>
<td>-3.879*** (1.079)</td>
</tr>
<tr>
<td>N</td>
<td>300</td>
<td>300</td>
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<tr>
<td>Log likelihood</td>
<td>-171.716</td>
<td>-50.783</td>
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</tbody>
</table>

Note: Numbers in parentheses are standard errors. Coefficients on sector dummy variables are not reported. R&D = research and development. Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

**Note**

1. For Europe and Central Asia, the database does not include data on Albania, Bosnia and Herzegovina, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro, and Serbia.
## Appendix D

### Regression Results of Enterprise Survey

**Table D.1  Sample Size and Distribution of ECA 2008/09 Surveys**

<table>
<thead>
<tr>
<th></th>
<th>N (firms)</th>
<th>Manufacturing</th>
<th>Retail, %</th>
<th>Other services, %</th>
<th>Small (5–19), %</th>
<th>Medium (20–99), %</th>
<th>Large (100+), %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Southern Caucasus countries</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Armenia</td>
<td>374</td>
<td>30</td>
<td>33</td>
<td>37</td>
<td>53</td>
<td>32</td>
<td>15</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>380</td>
<td>32</td>
<td>32</td>
<td>37</td>
<td>45</td>
<td>37</td>
<td>18</td>
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<tr>
<td>Georgia</td>
<td>373</td>
<td>33</td>
<td>29</td>
<td>38</td>
<td>49</td>
<td>37</td>
<td>14</td>
</tr>
<tr>
<td><strong>Selected ECA comparator countries</strong></td>
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<tr>
<td>Belarus</td>
<td>273</td>
<td>38</td>
<td>35</td>
<td>27</td>
<td>35</td>
<td>34</td>
<td>31</td>
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<tr>
<td>Bosnia and Herzegovina</td>
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<td>35</td>
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<td>36</td>
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<td>Bulgaria</td>
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<td>Czech Republic</td>
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<td>Kyrgyz Republic</td>
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<td>Lithuania</td>
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<td>Macedonia, FYR</td>
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<td>Moldova</td>
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<td>Mongolia</td>
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<td>23</td>
<td>41</td>
<td>40</td>
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<td>Montenegro</td>
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<td>Poland</td>
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<td>37</td>
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<td>Romania</td>
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<td>Russian Federation</td>
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<td>39</td>
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<td>Serbia</td>
<td>388</td>
<td>35</td>
<td>26</td>
<td>39</td>
<td>37</td>
<td>32</td>
<td>31</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>275</td>
<td>33</td>
<td>30</td>
<td>37</td>
<td>35</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>Slovenia</td>
<td>276</td>
<td>38</td>
<td>20</td>
<td>42</td>
<td>38</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>360</td>
<td>32</td>
<td>30</td>
<td>38</td>
<td>50</td>
<td>36</td>
<td>14</td>
</tr>
<tr>
<td>Turkey</td>
<td>1,152</td>
<td>80</td>
<td>9</td>
<td>12</td>
<td>31</td>
<td>39</td>
<td>30</td>
</tr>
</tbody>
</table>

*table continues next page*
Table D.1  Sample Size and Distribution of ECA 2008/09 Surveys (continued)

<table>
<thead>
<tr>
<th>Country</th>
<th>N (firms)</th>
<th>Manufacturing</th>
<th>Retail, %</th>
<th>Other services, %</th>
<th>Small (5–19), %</th>
<th>Medium (20–99), %</th>
<th>Large (100+), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukraine</td>
<td>851</td>
<td>68</td>
<td>14</td>
<td>18</td>
<td>39</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>366</td>
<td>34</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>26</td>
</tr>
</tbody>
</table>

Note: ECA = Europe and Central Asia.

Table D.2  List of Variables

<table>
<thead>
<tr>
<th>Innovation variables (indicator 0/1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECAo1 Product innovation</td>
</tr>
<tr>
<td>ECAo13 Process innovation</td>
</tr>
<tr>
<td>In both Conducted both product and process innovation</td>
</tr>
<tr>
<td>In neither Conducted either product or process innovation</td>
</tr>
<tr>
<td>ECAo3 Spent on R&amp;D</td>
</tr>
<tr>
<td>e6 Uses foreign-licensed technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance variables (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>perf1 Annual sales growth</td>
</tr>
<tr>
<td>perf2 Annual employment growth</td>
</tr>
<tr>
<td>perf3 Annual labor productivity growth</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explanatory and control variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>wk1 % of firms offering formal training</td>
</tr>
<tr>
<td>wk13 % of unskilled workers* (manufacturing only)</td>
</tr>
<tr>
<td>logexp_wkrs Log of capital-expenditures-to-workers ratio: log((n5a+n5b)/s)</td>
</tr>
<tr>
<td>exporter Indicator if firm has at least 10 percent of annual sales derived from direct exports</td>
</tr>
<tr>
<td>ownership Indicator if firm has at least 10 percent foreign ownership</td>
</tr>
<tr>
<td>car1 Firm age</td>
</tr>
<tr>
<td>Size dummy variables 1 = small (5–19), 2 = medium (20–99), 3 = large (100+)</td>
</tr>
<tr>
<td>Sector dummy variables Garments, food, chemicals, metals and machinery, other manufacturing, retail, other services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regression structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probit: errors clustered by sector7 (7 industries)</td>
</tr>
<tr>
<td>Ordinary least squares: svy set command</td>
</tr>
</tbody>
</table>

Note: R&D = research and development.
Table D.3  Who Innovates? Product Innovation

<table>
<thead>
<tr>
<th></th>
<th>Armenia</th>
<th>Georgia</th>
<th>Czech Republic</th>
<th>Poland</th>
<th>Russian Federation</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter</td>
<td>0.0124</td>
<td>0.355**</td>
<td>−0.0630***</td>
<td>0.0467</td>
<td>0.176***</td>
<td>0.0785</td>
</tr>
<tr>
<td></td>
<td>(0.102)</td>
<td>(0.152)</td>
<td>(0.0228)</td>
<td>(0.0414)</td>
<td>(0.0272)</td>
<td>(0.0600)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>−0.00290</td>
<td>0.00678</td>
<td>0.262***</td>
<td>0.161</td>
<td>0.165***</td>
<td>0.0976</td>
</tr>
<tr>
<td></td>
<td>(0.0425)</td>
<td>(0.0518)</td>
<td>(0.0657)</td>
<td>(0.106)</td>
<td>(0.0308)</td>
<td>(0.155)</td>
</tr>
<tr>
<td>% of unskilled workers (manufacturing firms only)</td>
<td>0.000683</td>
<td>0.00156</td>
<td>−0.00865</td>
<td>0.00251</td>
<td>0.00257**</td>
<td>0.000447</td>
</tr>
<tr>
<td></td>
<td>(0.00161)</td>
<td>(0.00163)</td>
<td>(0.00671)</td>
<td>(0.00427)</td>
<td>(0.00114)</td>
<td>(0.00108)</td>
</tr>
<tr>
<td>Offers formal training</td>
<td>0.260***</td>
<td>0.309***</td>
<td>0.0431</td>
<td>0.166**</td>
<td>0.168***</td>
<td>0.0936</td>
</tr>
<tr>
<td></td>
<td>(0.0601)</td>
<td>(0.0892)</td>
<td>(0.194)</td>
<td>(0.0826)</td>
<td>(0.0448)</td>
<td>(0.0723)</td>
</tr>
<tr>
<td>Capital expenditures to sales ratio</td>
<td>−0.00192</td>
<td>0.00691*</td>
<td>−0.00600*</td>
<td>−0.00155</td>
<td>−0.00869</td>
<td>0.00127***</td>
</tr>
<tr>
<td></td>
<td>(0.00392)</td>
<td>(0.00372)</td>
<td>(0.00335)</td>
<td>(0.00114)</td>
<td>(0.00643)</td>
<td>(0.000474)</td>
</tr>
<tr>
<td>Log (capital expenditures to workers ratio)</td>
<td>0.0472**</td>
<td>0.121***</td>
<td>−0.0918***</td>
<td>−0.0137</td>
<td>−0.0560**</td>
<td>0.0281</td>
</tr>
<tr>
<td></td>
<td>(0.0226)</td>
<td>(0.0161)</td>
<td>(0.0236)</td>
<td>(0.0181)</td>
<td>(0.0230)</td>
<td>−0.0202</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard errors. Table shows estimates for β from equation 4.1. Probit regression where explanatory variables are regressed individually with control variables. Dependent variable: dummy variable if firm conducted product innovation. Marginal effects are shown. Each regression also controls for age, sector, and firm size group. Excluded dummy variables: other manufacturing and small-size firm.
Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

Table D.4  Who Innovates? Process Innovation

<table>
<thead>
<tr>
<th></th>
<th>Armenia</th>
<th>Georgia</th>
<th>Czech Republic</th>
<th>Poland</th>
<th>Russian Federation</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter</td>
<td>−0.00895</td>
<td>0.193***</td>
<td>−0.125</td>
<td>0.156**</td>
<td>0.124***</td>
<td>0.190***</td>
</tr>
<tr>
<td></td>
<td>(0.0985)</td>
<td>(0.0207)</td>
<td>(0.120)</td>
<td>(0.0612)</td>
<td>(0.0204)</td>
<td>(0.0587)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>0.0166</td>
<td>−0.268</td>
<td>0.0124</td>
<td>0.213**</td>
<td>−0.0484</td>
<td>0.126</td>
</tr>
<tr>
<td></td>
<td>(0.0477)</td>
<td>(0.0191)</td>
<td>(0.0367)</td>
<td>(0.0885)</td>
<td>(0.0343)</td>
<td>(0.0974)</td>
</tr>
<tr>
<td>% of unskilled workers (manufacturing firms only)</td>
<td>0.000376</td>
<td>0.00427***</td>
<td>−0.00274**</td>
<td>0.00619**</td>
<td>0.00286***</td>
<td>0.00118</td>
</tr>
<tr>
<td></td>
<td>(0.000687)</td>
<td>(0.000786)</td>
<td>(0.00111)</td>
<td>(0.00295)</td>
<td>(0.000908)</td>
<td>(0.00104)</td>
</tr>
<tr>
<td>Offers formal training</td>
<td>0.0141</td>
<td>−0.0647</td>
<td>0.0790</td>
<td>0.245***</td>
<td>0.106***</td>
<td>0.180***</td>
</tr>
<tr>
<td></td>
<td>(0.0569)</td>
<td>(0.0429)</td>
<td>(0.117)</td>
<td>(0.0891)</td>
<td>(0.0249)</td>
<td>(0.0421)</td>
</tr>
<tr>
<td>Capital expenditures to sales ratio</td>
<td>−0.00374</td>
<td>0.000353</td>
<td>−0.00875***</td>
<td>−0.00206</td>
<td>−0.00585*</td>
<td>0.000645*</td>
</tr>
<tr>
<td></td>
<td>(0.00384)</td>
<td>(0.000261)</td>
<td>(0.00222)</td>
<td>(0.00270)</td>
<td>(0.00348)</td>
<td>(0.000348)</td>
</tr>
<tr>
<td>Log (capital expenditures to workers ratio)</td>
<td>0.0442**</td>
<td>−0.0199**</td>
<td>−0.0806***</td>
<td>0.0628**</td>
<td>−0.0361***</td>
<td>0.0248</td>
</tr>
<tr>
<td></td>
<td>(0.0191)</td>
<td>(0.00988)</td>
<td>(0.0171)</td>
<td>(0.0297)</td>
<td>(0.0123)</td>
<td>(0.0178)</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard errors. Table shows estimates for β from equation 4.1. Probit regression where explanatory variables are regressed individually with control variables. Dependent variable: dummy variable if firm conducted process innovation. Marginal effects are shown. Each regression also controls for age, sector, and firm size group. Excluded dummy variables: other manufacturing and small-size firm.
Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.
**Table D.5 Who Innovates? R&D**

<table>
<thead>
<tr>
<th></th>
<th>Armenia</th>
<th>Georgia</th>
<th>Czech Republic</th>
<th>Poland</th>
<th>Russian Federation</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter</td>
<td>-0.0881*</td>
<td>0.0316</td>
<td>-0.0386</td>
<td>0.250***</td>
<td>0.568***</td>
<td>0.146**</td>
</tr>
<tr>
<td></td>
<td>(0.0524)</td>
<td>(0.0561)</td>
<td>(0.0410)</td>
<td>(0.0572)</td>
<td>(0.0472)</td>
<td>(0.0603)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>0.0322</td>
<td>-0.0429</td>
<td>-0.0945</td>
<td>0.157**</td>
<td>-0.0688***</td>
<td>-0.00679</td>
</tr>
<tr>
<td></td>
<td>(0.0577)</td>
<td>(0.0479)</td>
<td>(0.0632)</td>
<td>(0.0713)</td>
<td>(0.0239)</td>
<td>(0.104)</td>
</tr>
<tr>
<td>% of unskilled workers (manufacturing firms only)</td>
<td>0.00162</td>
<td>0.000609</td>
<td>-0.00231*</td>
<td>0.00180</td>
<td>-0.00101**</td>
<td>0.000167</td>
</tr>
<tr>
<td></td>
<td>(0.00120)</td>
<td>(0.000483)</td>
<td>(0.00118)</td>
<td>(0.00250)</td>
<td>(0.000497)</td>
<td>(0.000852)</td>
</tr>
<tr>
<td>Offers formal training</td>
<td>-0.00268</td>
<td>0.621***</td>
<td>0.0642</td>
<td>0.141*</td>
<td>0.322***</td>
<td>0.157***</td>
</tr>
<tr>
<td></td>
<td>(0.236)</td>
<td>(0.0705)</td>
<td>(0.138)</td>
<td>(0.0733)</td>
<td>(0.0382)</td>
<td>(0.0510)</td>
</tr>
<tr>
<td>Capital expenditures to sales ratio</td>
<td>0.00156</td>
<td>-0.00121**</td>
<td>-0.00114</td>
<td>0.00153*</td>
<td>-0.0100***</td>
<td>-0.000423**</td>
</tr>
<tr>
<td></td>
<td>(0.00161)</td>
<td>(0.000523)</td>
<td>(0.00170)</td>
<td>(0.000823)</td>
<td>(0.00205)</td>
<td>(0.000205)</td>
</tr>
<tr>
<td>Log (capital expenditures to workers ratio)</td>
<td>0.0310</td>
<td>0.0815</td>
<td>0.00414</td>
<td>0.0101</td>
<td>-0.0285***</td>
<td>-0.00749</td>
</tr>
<tr>
<td></td>
<td>(0.0301)</td>
<td>(0.0519)</td>
<td>(0.0201)</td>
<td>(0.0228)</td>
<td>(0.0123)</td>
<td>(0.0181)</td>
</tr>
</tbody>
</table>


Note: Numbers in parentheses are standard errors. Table shows estimates for β from equation 4.1. Probit regression where explanatory variables are regressed individually with control variables. Dependent variable: dummy variable if firm conducted process innovation. Marginal effects are shown. Each regression also controls for age, sector, and firm size group. Excluded dummy variables: other manufacturing and small-size firm. R&D = research and development.

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

---

**Table D.6 Who Innovates? Foreign-Licensed Technology**

<table>
<thead>
<tr>
<th></th>
<th>Armenia</th>
<th>Georgia</th>
<th>Czech Republic</th>
<th>Poland</th>
<th>Russian Federation</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter</td>
<td>-0.109</td>
<td>0.0111</td>
<td>0.0616</td>
<td>0.0109</td>
<td>0.0557</td>
<td>-0.00587</td>
</tr>
<tr>
<td></td>
<td>(0.262)</td>
<td>(0.0926)</td>
<td>(0.0404)</td>
<td>(0.0492)</td>
<td>(0.170)</td>
<td>(0.0499)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>0.0157</td>
<td>0.410**</td>
<td>0.233</td>
<td>-0.000761</td>
<td>0.162</td>
<td>0.0721</td>
</tr>
<tr>
<td></td>
<td>(0.0471)</td>
<td>(0.167)</td>
<td>(0.148)</td>
<td>(0.0553)</td>
<td>(0.213)</td>
<td>(0.116)</td>
</tr>
<tr>
<td>% of unskilled workers (manufacturing firms only)</td>
<td>0.000291</td>
<td>0.00143</td>
<td>-0.000466</td>
<td>-0.000245</td>
<td>-0.000775</td>
<td>0.000183</td>
</tr>
<tr>
<td></td>
<td>(0.00204)</td>
<td>(0.00101)</td>
<td>(0.00112)</td>
<td>(0.000647)</td>
<td>(0.000703)</td>
<td>(0.000224)</td>
</tr>
<tr>
<td>Offers formal training</td>
<td>0.268</td>
<td>0.137***</td>
<td>0.112***</td>
<td>0.0510*</td>
<td>-1.09</td>
<td>0.0799*</td>
</tr>
<tr>
<td></td>
<td>(0.211)</td>
<td>(0.0587)</td>
<td>(0.0252)</td>
<td>(0.0305)</td>
<td>(0.0708)</td>
<td>(0.0434)</td>
</tr>
<tr>
<td>Capital expenditures to sales ratio</td>
<td>0.00688***</td>
<td>-0.00289</td>
<td>-0.00226</td>
<td>0.00638</td>
<td>-0.000387</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00277)</td>
<td>(0.00361)</td>
<td>(0.00365)</td>
<td>(0.00389)</td>
<td>(0.000945)</td>
<td></td>
</tr>
<tr>
<td>Log (capital expenditures to workers ratio)</td>
<td>0.0472</td>
<td>0.00107</td>
<td>-0.0149</td>
<td>0.0768**</td>
<td>0.0332</td>
<td>0.0176</td>
</tr>
<tr>
<td></td>
<td>(0.101)</td>
<td>(0.00181)</td>
<td>(0.0259)</td>
<td>(0.0302)</td>
<td>(0.0314)</td>
<td>(0.0218)</td>
</tr>
</tbody>
</table>


Note: Numbers in parentheses are standard errors. Table shows estimates for β from equation 4.1. Probit regression where explanatory variables are regressed individually with control variables. Dependent variable: dummy variable if firm uses technology that is foreign licensed. Marginal effects are shown. Each regression also controls for age, sector, and firm size group. Excluded dummy variables: other manufacturing and small-size firm.

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent. – = not available.
### Table D.7 Who Innovates? Pooled Regressions

<table>
<thead>
<tr>
<th></th>
<th>Product innovation</th>
<th>Process innovation</th>
<th>Innovated in both</th>
<th>Innovated in either product or process</th>
<th>Spent on R&amp;D</th>
<th>Uses foreign-licensed technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter</td>
<td>0.213***</td>
<td>0.0712</td>
<td>−0.182***</td>
<td>−0.0910</td>
<td>0.00141</td>
<td>0.0170</td>
</tr>
<tr>
<td></td>
<td>(0.0609)</td>
<td>(0.0841)</td>
<td>(0.0562)</td>
<td>(0.0644)</td>
<td>(0.0242)</td>
<td>(0.127)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>0.0438</td>
<td>0.0717</td>
<td>0.0277</td>
<td>0.0346</td>
<td>−0.00477</td>
<td>0.222**</td>
</tr>
<tr>
<td></td>
<td>(0.0319)</td>
<td>(0.0929)</td>
<td>(0.0302)</td>
<td>(0.0806)</td>
<td>(0.0418)</td>
<td>(0.107)</td>
</tr>
<tr>
<td>% of unskilled workers (manufacturing firms only)</td>
<td>0.00125</td>
<td>0.00284***</td>
<td>−0.00113</td>
<td>−0.00270***</td>
<td>0.000578**</td>
<td>0.000465</td>
</tr>
<tr>
<td></td>
<td>(0.00147)</td>
<td>(0.000882)</td>
<td>(0.00135)</td>
<td>(0.000958)</td>
<td>(0.000257)</td>
<td>(0.00133)</td>
</tr>
<tr>
<td>Offers formal training</td>
<td>0.311***</td>
<td>0.0132</td>
<td>−0.306***</td>
<td>−0.00687</td>
<td>0.255</td>
<td>0.178***</td>
</tr>
<tr>
<td></td>
<td>(0.0418)</td>
<td>(0.0570)</td>
<td>(0.0401)</td>
<td>(0.0545)</td>
<td>(0.166)</td>
<td>(0.0686)</td>
</tr>
<tr>
<td>Capital expenditures to sales ratio</td>
<td>−0.000502</td>
<td>−0.000119</td>
<td>−0.000539</td>
<td>9.91e−05</td>
<td>0.000104</td>
<td>0.00574***</td>
</tr>
<tr>
<td></td>
<td>(0.00112)</td>
<td>(0.000426)</td>
<td>(0.00106)</td>
<td>(0.000334)</td>
<td>(0.00118)</td>
<td>(0.00109)</td>
</tr>
<tr>
<td>Log (capital expenditures to workers ratio)</td>
<td>0.0902***</td>
<td>−0.000716</td>
<td>−0.0894***</td>
<td>0.00179</td>
<td>0.0567*</td>
<td>0.130***</td>
</tr>
<tr>
<td></td>
<td>(0.0207)</td>
<td>(0.0116)</td>
<td>(0.0256)</td>
<td>(0.0113)</td>
<td>(0.0299)</td>
<td>(0.0312)</td>
</tr>
</tbody>
</table>

**Source:** World Bank Enterprise Surveys (database) 2013.

**Note:** Numbers in parentheses are standard errors. Table shows estimates for β from equation 4.2. Sample includes Armenia, Azerbaijan, and Georgia. Probit regression where explanatory variables are regressed individually with control variables. Dependent variable: dummy variable if firm uses technology that is foreign-licensed. Marginal effects are shown. Each regression also controls for age, sector, and firm size group. Excluded dummy variables: Armenia, other manufacturing, and small-size firm. R&D = research and development. Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

### Table D.8 Annual Employment Growth and Innovation

<table>
<thead>
<tr>
<th></th>
<th>Armenia</th>
<th>Georgia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1.904)</td>
<td>(1.913)</td>
</tr>
<tr>
<td>Exporter</td>
<td>0.761</td>
<td>0.225</td>
</tr>
<tr>
<td></td>
<td>(5.000)</td>
<td>(3.378)</td>
</tr>
<tr>
<td>Foreign ownership</td>
<td>−3.752</td>
<td>−5.448</td>
</tr>
<tr>
<td></td>
<td>(2.766)</td>
<td>(3.672)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>−0.349***</td>
<td>−0.342***</td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
<td>(0.113)</td>
</tr>
<tr>
<td>Medium-size</td>
<td>1.826</td>
<td>1.878</td>
</tr>
<tr>
<td></td>
<td>(2.284)</td>
<td>(2.326)</td>
</tr>
<tr>
<td>Large-size</td>
<td>0.623</td>
<td>0.746</td>
</tr>
<tr>
<td></td>
<td>(2.839)</td>
<td>(3.085)</td>
</tr>
<tr>
<td>Garments</td>
<td>3.049</td>
<td>3.635</td>
</tr>
<tr>
<td></td>
<td>(4.981)</td>
<td>(4.992)</td>
</tr>
<tr>
<td>Food</td>
<td>9.950</td>
<td>9.812</td>
</tr>
<tr>
<td></td>
<td>(7.366)</td>
<td>(7.283)</td>
</tr>
<tr>
<td>Chemicals</td>
<td>4.928</td>
<td>4.965</td>
</tr>
<tr>
<td></td>
<td>(4.465)</td>
<td>(4.664)</td>
</tr>
<tr>
<td>Metals and machinery</td>
<td>−0.897</td>
<td>−0.975</td>
</tr>
<tr>
<td></td>
<td>(4.561)</td>
<td>(4.737)</td>
</tr>
</tbody>
</table>

**Note:** Numbers in parentheses are standard errors. Table shows estimates for β from equation 4.2. Sample includes Armenia, Azerbaijan, and Georgia. Probit regression where explanatory variables are regressed individually with control variables. Dependent variable: dummy variable if firm uses technology that is foreign-licensed. Marginal effects are shown. Each regression also controls for age, sector, and firm size group. Excluded dummy variables: Armenia, other manufacturing, and small-size firm. R&D = research and development. Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.
### Table D.8 Annual Employment Growth and Innovation (continued)

<table>
<thead>
<tr>
<th></th>
<th>Armenia</th>
<th>Georgia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>0.582</td>
<td>3.865</td>
</tr>
<tr>
<td></td>
<td>(3.406)</td>
<td>(3.201)</td>
</tr>
<tr>
<td>Other services</td>
<td>3.770</td>
<td>9.153**</td>
</tr>
<tr>
<td></td>
<td>(3.483)</td>
<td>(3.683)</td>
</tr>
<tr>
<td>Constant</td>
<td>10.89***</td>
<td>8.765***</td>
</tr>
<tr>
<td></td>
<td>(3.577)</td>
<td>(3.363)</td>
</tr>
<tr>
<td>Observations</td>
<td>224</td>
<td>261</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.135</td>
<td>0.332</td>
</tr>
</tbody>
</table>

**Source:** World Bank Enterprise Surveys (database) 2013.

**Note:** Numbers in parentheses are standard errors. Table shows estimates for $y$ from equation 4.3. Dependent variable is annual employment growth in percentage points. Excluded dummy variables: Armenia, other manufacturing, and small-size firm.

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent. – = not available.
**Environmental Benefits Statement**

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The central challenge facing the government of Armenia today is the need to transform its economic infrastructure into one that, in the medium term, is resilient to external shocks. To do so, it needs to find new sources of long-term economic growth that will enable it to become an upper-middle-income country. Crucial to achieving this objective is a dynamic and vibrant private sector, and in particular entrepreneurial activity, which generates new businesses and fosters competition and economic growth. *Fostering Entrepreneurship in Armenia* uses data and in-depth case studies to identify the determinants of high-growth entrepreneurial activity. It finds that, while there is a higher level of entrepreneurial activity in Armenia compared with other countries in the region, a number of constraints to the growth of entrepreneurial and innovative activity remain. Based on these findings, the book outlines broad policy directions for improving the business environment, providing access to finance, developing skills, increasing access to markets, incentivizing firm-level research and development, and raising awareness, and it identifies priority areas for government action. The issues discussed in this book will be of particular interest to policy makers who are aiming to achieve higher growth and job creation through entrepreneurship, as well as to development practitioners and those in the private sector.