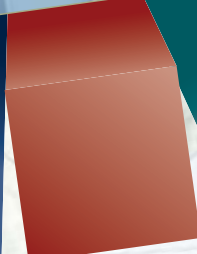


Sweden's Business Climate A Microeconomic Assessment



Sweden's Business Climate

A Microeconomic Assessment





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Executive Summary

A sound and healthy business environment is essential for the development of the private sector and economic growth. Such conditions can be generated through well-designed economic policies that follow best practices and that are successful in achieving desired results. That is why evaluating policies and their effects should be an integral part of any economic policy. Recognizing the need for continuous evaluation of economic policies and their enforcement is the foundation of this second report on the private sector in Sweden. While the first report built on indicators of the business environment of Sweden compiled from existing datasets of the World Bank Global Indicators Group, this second report puts those indicators in the context of the day-to-day operations of private firms in Sweden. By surveying a nationally representative sample of formal private firms that are not in the agricultural or extractive sectors this report goes beyond aggregate measures to shed light on the Swedish business environment as it is experienced by individual firms. The report also traces the link between firms' experience with the business environment and tangible outcomes that have a direct impact on the well-being of the population, such as productivity, employment growth, and gender inclusion. By focusing on firm-level data and self-reported experiences of firms, and through careful regression analysis to pinpoint the relationships among variables, the report uncovers revealing patterns in the data with important policy implications.

Over the years Sweden has made use of many of the economic tools available to policy makers to promote commonly accepted social outcomes. Greater equity in society, higher employment for young people and minorities, gender parity, and nurturing of small and medium enterprises that generate employment and innovation are some of the guiding principles of Sweden's economic policies over the past 20 years. Most of the policies designed to achieve these principles helped Sweden weather the global financial crisis more efficiently than most of its counterparts in the developed world. However, some of the policies implemented may not have fully achieved the results that were expected. This report helps identify some of the areas where potentially more experimentation in policy making and implementation may be necessary to maintain the momentum and progress of the Swedish economy and Swedish society.

MAIN FINDINGS OF THE REPORT: AN OVERVIEW

The report draws on extensive surveys of a representative sample of firms by firm size, region, and sector (the World Bank's Enterprise Survey) implemented in 2014. The main findings are:

- Labor issues—lack of skills in the work force and restrictive labor laws—are the most pressing issues that private firms report in Sweden. From a list of 15 elements of the business environment, 28 percent of Swedish firms chose

the lack of skilled workers as the most important obstacle for their operations, followed by labor laws, which are cited by 18 percent of firms. However, there are significant differences in priorities across firm size, regions, and sectors. For instance, small firms are much more concerned about crime and competition from informal firms than large firms, while large firms are more concerned about constraints emerging from labor laws.

- The use of fixed-term contracts is common in Sweden and is beneficial for the private sector because it is associated with higher labor productivity and higher growth rates of employment and sales in the manufacturing sector. Other features of the labor market—including policy measures aiming at protecting workers from terminations and promoting rehiring—may not be achieving the desired results for workers, while imposing additional costs to firms. Worker turn-over (churning) is substantial, but is masked by a small net change in employment. This pattern suggests that these policy measures could be reconsidered as a way to enhance welfare. There is also enormous heterogeneity across firms in labor-related issues such as job creation, the relationship between labor laws and firm performance, the use of fixed-term contracts, and the tendency to negotiate with labor unions on exemptions from the priority rules for rehiring redundant workers. Taking these heterogeneities into account is likely to improve the understanding of how the labor market in Sweden functions and increase the impact of labor market policies on the economy.
- The largest firms in Sweden report taxes as a major obstacle at a significantly lower rate than do firms with fewer than 250 employees. But overall, one in five firms in Sweden

reports not hiring additional workers because of high taxes or high contribution rates to social safety net programs. In particular, firms seeking mainly skilled workers are nearly twice as likely to report being constrained in hiring for tax-related reasons compared to firms seeking mainly unskilled workers.

- Many jobs in Sweden require some specialized knowledge or skill, but only a relatively small percentage of the workforce has completed tertiary education. Sectors that require more specialized workers are more likely to experience frictions in the labor market, although labor productivity does not seem to be affected. Labor productivity is neither related to training provided by firms nor to the percentage of tertiary educated workers, possibly as a result of a limited fit between skills developed in tertiary education (or through training) and skills needed in the sector of employment.
- Innovative firms in Sweden significantly outperform their non-innovative counterparts on most indicators of technological capacity and technology transfer. Labor market and tax regulations appear to be greater obstacles for innovative firms than non-innovative ones. Although the share of exports, as a percentage of sales, the intensity of research and development (R&D), and the share of tertiary educated employees are positively associated with the probability of innovation or radical innovation, there is no significant relationship between either type of innovation and labor productivity. A possible explanation to this puzzling result is that innovative firms in Sweden might be facing diminishing returns to their innovation efforts given that they compete at the global innovation frontier where competition is heightened.

- Sweden has a healthy financial market. The data collected with the Enterprise Survey show that to a large extent Swedish authorities have been successful in creating an environment conducive to private firms' access to credit. Credit-constrained firms in Sweden tend to spend less on R&D and have lower sales growth than firms that are not credit constrained.
- Women are well integrated into the private sector in Sweden when broader measures of firm ownership and management are considered. However, the picture changes dramatically when the focus shifts to upper levels of responsibility and decision making. Women account for only 23 percent of all managers in a typical firm in Sweden—with an even smaller percentage of top managers (vertical segregation), and firms with women top managers and female-owned firms are concentrated in the services sector (horizontal segregation). Despite the strong vertical and horizontal segregation of women, female-managed and owned firms are very similar to their male counterparts in terms of firm performance. Further unlocking women's potential in the Swedish private sector is key to promoting more dynamism in the Swedish economy with potential gains not only for women but for the whole Swedish society.

OVERVIEW OF PRIVATE FIRMS IN SWEDEN

A representative sample of firms distributed across manufacturing industries and services sectors, firm sizes, and several regions of the country was surveyed in 2014 for this report. The data refer to the circumstances of the firms at the time of the interview but the accounting and financial

information collected refers to the latest complete fiscal year, 2013.

The ownership of Swedish firms is concentrated. Eighty-six percent of firms are privately held. The largest owner holds a majority share of 77 percent, on average. A typical firm in Sweden is about 28 years old. Older firms have higher levels of employment, annual sales, and capacity utilization. However, labor productivity levels do not change much with firm's age. While younger firms outperform older firms in the growth rates of sales and employment, there is no noticeable difference between young and old firms in the growth rate of labor productivity.

The relationship between firm size and firm productivity is highly debated in the literature. While large firms benefit from economies of scale, increased organizational complexity and the higher cost of monitoring tend to weigh against them. The data collected with the Enterprise Survey show that there is no significant relationship between labor productivity and firm size in the overall Swedish economy. This relationship is positive and significant only in the manufacturing sector.

About one-fifth of Swedish formal sector firms report competing with informal firms. Somewhat surprisingly, 40 percent of the firms in Sweden suffer losses due to theft and other crime and 85 percent spend on security. Losses due to crime and expenses on security as a proportion of firm's annual sales in Sweden are comparable to those found in developing countries in such regions as Latin America. Crime and security problems are particularly acute in the retail sector.

The low overall level of capacity utilization (73 percent) in the manufacturing sector is also of concern. Capacity utilization is particularly low among firms in the east and center regions.

There is also indication that the low level of capacity utilization in Sweden is significantly hampering employment growth.

Labor issues—the lack of worker skills and more flexible labor laws—are the most pressing self-reported issues for private firms in Sweden. From a list of 15 elements of the business environment, 28 percent of Swedish firms regard lack of skilled workers as the most important obstacle for their operations. This is followed by labor laws. However, there are significant differences across firm size, regions, and sectors. For instance, small firms are much more concerned about crime and competition from informal firms than large firms; large firms are more concerned about labor laws than small firms.

Part-time workers—defined as all employees who work for less than a full shift—are ubiquitous in Sweden, especially in the retail sector. Nearly 63 percent of Swedish firms use part-time workers. The proportion of part-time workers is significantly higher among relatively smaller firms. Differences across sectors are equally pronounced. In the retail sector, 40 percent of all workers are part-time, compared with 13 percent in other services sectors and 4 percent in manufacturing.

Overall, the picture emerging from the data collected by the Enterprise Survey is one of considerable heterogeneity of firms across firm sizes, sectors of activity, and geographical location within Sweden. The lack of workers with appropriate skills, pressing labor regulations, as well as the strong reliance on part-time workers—possibly as a consequence of the other two factors—are also widespread features of the private sector of the country.

LABOR MARKET POLICIES AND EMPLOYMENT PATTERNS OF FIRMS IN SWEDEN

A number of interesting points emerge from the Enterprise Survey in Sweden regarding the composition of the workforce. Most workers are employed in small and medium enterprises (SMEs). Medium firms (those with 20 to 99 employees) account for 45 percent of full-time jobs, while small firms (5 to 19 employees) account for another 11 percent. Large firms (100+ employees) make up the balance (44 percent). The growth rate of employment is also much higher among small and medium firms than among large firms, but this difference is confined to the manufacturing and retail sectors.

Non-retail services sectors—including wholesale, transport, hotels and restaurants, construction, information technology, and repair of motor vehicles—provide 43 percent of all jobs in the private sector and two to three times as many jobs as the manufacturing sector. The east region, which includes Stockholm and Solna, provides nearly 40 percent of jobs. While older firms (more than 10 years old) provide nearly 85 percent of all jobs, the rate of growth of employment is much higher among younger firms than among older firms.

The use of fixed-term contracts is common in Sweden, and more than half of firms use them. However, the share of workers employed by fixed-term contracts at a typical Swedish firm is about 15 percent (of the headcount). Interestingly, the use of fixed-term contracts is associated with better firm performance in terms of sales and employment growth and productivity in the manufacturing sector, and does not appear to depress open-ended employment.

About one-fifth of firms negotiate with labor unions on exemptions from the priority rule for rehiring redundant workers. About one-third of all firms in Sweden report that labor laws concerning hiring and firing prevent them from expanding their workforce. The percentage of such firms is much higher in manufacturing (43 percent) than in other sectors (31 percent). While caution is required in interpreting firm's subjective opinions, it is revealing that among the firms that complain about labor laws the growth rate of employment is significantly lower for large firms than for smaller firms.

Sweden has implemented a number of programs to increase employment among workers younger than 26 years of age. The data show some success in the implementation of these policies, with youth accounting for about one-third of new hires (33 percent). The proportion is significantly lower in the southern region, including Malmö and Lund, (20 percent) than in any of the other three regions (which average 37 percent).

Two additional features of hiring and firing practices in Sweden are worth highlighting. First, despite regulations aimed at providing some degree of job security, there is substantial churning of workers; hiring and firing occur simultaneously within the same firm—a pattern that is not evident from the relatively low overall employment growth rate. For example, over the last two years, about 77 percent of firms had full-time permanent workers who were terminated or left the firm voluntarily. Among firms that terminated workers or where workers left, 90 percent hired new workers. In contrast, for firms where no workers were terminated or left, only 47 percent hired new workers. Sweden also has regulations in place to foster the rehiring of redundant full-time permanent workers. Nevertheless, rehiring of such workers is limited. Workers rehired after being terminated

for redundancy comprise only 5 percent of all new hires for a typical firm.

Second, there is enormous heterogeneity across firms in labor-related issues such as job creation, the relationship between labor laws and firm performance, the use of fixed-term contracts, and the tendency to negotiate with labor unions on exemptions from the priority rule. Taking into account this variation is likely to improve the cost-benefit analysis of labor market policies and increase welfare gains that can be derived from regulations.

EDUCATION, SKILLS, AND LABOR PRODUCTIVITY

The availability of a skilled workforce seems to be a major concern for the private sector in Sweden. Using the broad definition of skilled labor adopted by the Enterprise Survey—having some specialized knowledge or ability to do one's work—77 percent of the average firm's workforce is skilled. However, the average percentage of workers who have at least a bachelor degree is only 14 percent. In other words, a large proportion of the workforce is employed in occupations that require special skills, but workers do not seem to acquire these abilities through tertiary education. There is also little variation in the average years of education across occupations.

Seventy percent of Swedish firms provide formal training to their employees. The larger the firm, the higher the probability that it will provide training. In contrast to other countries, the proportion of skilled or tertiary-educated workers in Sweden is not correlated with the probability of providing training. On the other hand, firms that had vacancies in the two years before being interviewed for the Enterprise Survey and those with a higher percentage of filled vacancies are more likely to provide training. This suggests that

training is offered more frequently to new recruits.

In the two years before the Enterprise Survey interview, 77 percent of Swedish firms had vacancies. On average, 73 percent of a firm's vacancies were for skilled jobs and 92 percent of the firm's total vacancies were filled. The average duration of a vacancy was 8 weeks, and the longest duration of vacancies (11 weeks) was for skilled non-production manufacturing jobs. Sectors that require more specialized workers (such as manufacturing of machinery and equipment and fabricated metals) seem to be more affected by frictions in the labor market than sectors with less demand for specialized workers, such as retail.

Interestingly—and contrary to what human capital theory would suggest—no relationship was found between the percentage of workers who have tertiary education or the provision of training and labor productivity. Further, firms with a higher proportion of skilled workers do not have an advantage in terms of productivity.

The first World Bank report on Sweden's business environment in 2014 highlighted the relatively small returns to tertiary education for individuals. New evidence from the Enterprise Survey shows the flip side of this relationship for firms: a firm's labor productivity does not appear to change with the percentage of tertiary educated workers it employs. This result may be explained by the lack of incentives for a firm to hire tertiary graduates. Potential reasons explaining the limited relevance of tertiary education for firm productivity may include a mismatch between field of study and sector of employment, or problems in the quality of tertiary education. On a positive note, challenges related to hiring and finding particular skills do not appear to hamper firm productivity.

Given that the results of the Enterprise Survey show that there is no relationship between the provision of formal training programs and labor productivity, the current training programs in Sweden should be reviewed. Better targeting of training toward developing abilities and expertise not acquired through tertiary education could make for a good guiding principle for the revision.

TAX REGULATION AND INCENTIVES

Swedish firms pay 49.4 percent of commercial profit in taxes, more than the average in Nordic, OECD high-income, EU-27, and G-7 countries. While all governments need revenue, the size of the tax burden on business has an impact on investment and growth. Evidence from member countries of the Organisation for Economic Co-operation and Development (OECD) indicates that lowering statutory corporate tax rates can result in large productivity gains by increasing the profitability of already dynamic firms; indeed, high corporate tax rates have been predicted to hinder firm productivity in all firms except the young and small. Analysis for this report using recent data shows that among high-income OECD countries, higher taxes on profits result in lower foreign direct investment, while higher taxes on labor result in lower rates of new-firm formation.

Very large firms in Sweden (those with more than 250 employees) cite tax-related obstacles at lower rates than do other firms. Moreover, for all but the largest firms, there is a significant positive correlation between a firm's size and the likelihood that it will be required to meet with tax officials. Among very large firms, 6 percent of firms are required to meet with tax officials while 10 percent of firms with

fewer workers must devote their time and resources to such meetings.

One notable area where taxes have an evident effect is in Sweden's private sector labor market. One-fifth of Swedish firms report not hiring because of high taxes or contributions to social safety net programs. Notably, the applicants' skill levels are a factor; firms in which a majority of vacancies are for skilled positions are nearly twice as likely to report being constrained in hiring for tax-related reasons compared to firms seeking mainly unskilled workers. Interestingly, productivity and performance indicators, including measures of growth in labor productivity, sales, and employment, are not significantly correlated with firms reporting tax-related impediments to hiring.

To promote youth employment, the Swedish government in 2009 cut the payroll tax rate from 32.42 percent to 15.49 percent for all individuals between 18 and 26 years old. Subsequent research on the outcome of these cuts indicates a modest positive effect on youth employment, but no significant impact on firm profitability. Together, these findings suggest that while tax administration does not appear to substantially burden the private sector in Sweden, high tax rates—particularly as they pertain to labor—may result in market inefficiencies.

R&D, INNOVATION, AND PRODUCTIVITY: A COMPARATIVE ANALYSIS OF INNOVATIVE AND NON-INNOVATIVE FIRMS

Sweden has one of the highest rates of R&D investment globally and its firms are among the most innovative and export-oriented in a wide range of industries. It also has more scientific publications and patents per capita than most OECD countries and ranks

consistently among the top economies in global innovation indexes.

The data collected by the Enterprise Surveys show that innovative firms in Sweden significantly outperform their non-innovative counterparts on most indicators of technological capacity and technology transfer. They are also more likely to be larger, start out with a markedly higher number of employees, and compete in international markets than non-innovative firms. In addition, a higher percentage of innovative firms point to labor market regulations as a major obstacle for their businesses. They also rate the complexity of taxes and the two-year cap on fixed-term contracts as greater obstacles to their operations than non-innovative firms. These findings indicate that innovative firms are more sensitive to the business environment than non-innovative firms.

Differences between sectors are also substantial. Innovative firms in the manufacturing sector have higher shares of R&D and exports than those in the services sector. However, innovative firms in the services sector are more likely to be part of a multi-establishment firm and to have a higher share of foreign ownership than innovative firms in the manufacturing sector.

In line with the findings in the literature, the share of R&D as a percentage of sales is higher for innovative small and medium enterprises (SMEs) than in large innovative firms in Sweden. The share of tertiary educated employees does not differ between innovative and non-innovative firms among large firms and among SMEs. However, large innovative firms have significantly higher shares of tertiary educated employees than innovative SMEs. Large innovative firms also spend less resources per employee than innovative SMEs—suggesting that innovative large firms have an advantage over smaller firms

in the quality of their human capital as well as in the cost per employee.

The share of exports in sales is positively associated with the probability of innovation and radical innovation (innovation that is new to the market) in the manufacturing sector, while R&D intensity is positively associated only with the probability of radical innovation. There is no significant relationship between the share of tertiary educated employees and the probability of either type of innovation in the manufacturing sector. However, in the services sector, the share of tertiary educated employees, along with the rate of technological catch-up, is positively related to the probability of innovation.

Contrary to the findings of existing studies, this study finds that innovative firms in Sweden do not have higher labor productivity than non-innovative firms; indeed, sales and labor productivity growth rates are much higher for non-innovative firms than for innovative ones. Furthermore, this study finds no association between productivity levels and innovation in either the manufacturing or services sector. A possible explanation to this puzzling result is that innovative firms in Sweden might be facing diminishing returns to their innovation efforts given that they compete at the global innovation frontier where competition is heightened.

Taken together, these findings suggest that although innovative firms in Sweden outperform their non-innovative counterparts in the majority of the activities relevant to innovation, they appear unable to translate these achievements into higher sales and productivity. This is consistent with the findings of other studies indicating a mismatch between the high level of innovation activities in Swedish firms and the low number of new high-tech products. However, this mismatch seems to be restricted only to the fast

growing high-tech sector, which may be facing diminishing returns to R&D, and does not necessarily indicate the inefficiency of the Swedish innovation system.

ACCESS TO FINANCE

The data collected by the Enterprise Survey in Sweden can be used to analyze the extent to which policies implemented were successful in reducing or eliminating barriers to access to finance for all firms, including SMEs. An evidence-based indicator of the credit constraint that firms experienced was constructed by using information on firms' use of credit during fiscal year 2013—either for working capital or for investment in fixed assets—and the outcome of firms' applications to financial institutions for loans or lines of credit. The results reveal that only 6.2 percent of private firms in Sweden are credit constrained. This clearly speaks to the merits of Sweden's financial markets. However, SMEs in Sweden are more likely to be credit constrained than large firms and manufacturing firms are more credit constrained compared to other sectors in the economy.

A significantly higher percentage of innovative SMEs were credit constrained in 2013 than non-innovative or large firms. Moreover, sales growth is generally lower in credit-constrained firms than in firms that are not credit constrained. Most firms in Sweden, regardless of size, tend to rely mostly on internal funds to finance investment in fixed assets. However, SMEs finance a considerably larger share of their investment in fixed assets using bank finance than large firms. Swedish female-run firms finance significantly larger shares of fixed asset investment using internal funds than do male-run firms, suggesting that they may have difficulty obtaining bank financing.

Consistent with the evidence-based indicator of credit constraint, only 6.7 percent of firms in Sweden identified access to finance as their top obstacle. In comparison, 28 percent of firms selected an “inadequately educated workforce” as the top obstacle. In general, Sweden consistently ranks high on a number of indexes related to access to financial services. It is only in the “getting credit” indicator of the *Doing Business 2015* report that Sweden ranks relatively low: 61st in the world. This is because this index looks at certain features within the applicable collateral and bankruptcy laws that facilitate lending in which Sweden does not conform to best practices. Nonetheless, this fact has not translated into lower levels of access to credit for the private sector.

The historical evolution of Sweden's financial system explains its size and healthy contribution to the Swedish economy. Swedish SMEs have benefited tremendously from government and EU programs aimed at increasing access to finance, allowing firms to expand their business operations and grow. The data collected by the Enterprise Surveys seem to demonstrate that to a large extent Swedish authorities have been successful in creating an environment conducive to private firms' getting access to credit.

GENDER EQUALITY AND OPPORTUNITY FOR WOMEN IN THE SWEDISH PRIVATE SECTOR

Sweden is currently one of the world's most gender-egalitarian countries, as indicated by composite and non-composite measures. Sweden is also among the countries with the fewest regulatory restrictions on women's participation in economic activity, according to the World Bank Group's *Women Business and the Law* project,

which examines laws and regulations that differentiate between men and women in 143 countries worldwide. Despite these achievements, women in Sweden still face a number of limitations in the labor market. Evidence from the Enterprise Surveys suggests that women are underrepresented in the private sector in Sweden and are concentrated in fewer occupations relative to men (horizontal segregation). Women are also underrepresented in high-paying and influential positions, including top managers and entrepreneurs of private sector firms (vertical segregation).

The Enterprise Survey data show that women are well integrated into the private sector in Sweden when broader measures of firm ownership and management are considered. Half of the firms in Sweden have at least one woman among their owners. In 56 percent of firms, at least one manager is a woman. However, the picture changes dramatically when the focus shifts to upper levels of responsibility and decision making. The Enterprise Survey data confirm the existence of strong vertical segregation in the Swedish private sector: women make up half or more of owners in only 26 percent of firms. Moreover, women account for only 24 percent of all managers in a typical firm in Sweden, and only 13 percent of firms have a female top manager. As in other developed and developing economies, firms in Sweden with women top managers and with majority ownership of women are concentrated in the services sector, and particularly in the retail sub-sector. The share of firms with a female top manager is about twice as high in the retail sector as in manufacturing, and more than three times the level found in non-retail services. The same holds for female-owned firms, which account for 32 percent of total firms in retail and only 14 percent of firms in manufacturing.

Despite the horizontal and vertical segregation of women in the Swedish private sector, firms that are managed and owned by women are very similar to their male counterparts in several aspects, including firm size, labor productivity and value added per worker, and the growth rate of sales, employment, and labor productivity. However, female-managed and owned firms lag behind their male counterparts in exporting activity. While there are some differences in the business environment faced by female-managed and owned firms compared with male-managed and owned firms, the differences are not systematically biased against women.

As employees, women account for 48 percent of the total labor force in Sweden, but only 34 percent of the private sector work force, according to Enterprise Survey data. As is the case with the firms run and owned by women, women constitute a significantly larger proportion of the workforce in retail than in manufacturing or other services, and among firms in the eastern region, which includes Stockholm and Solna, than in the rest of the country.

Interestingly, women are more likely to work in female-managed and owned firms than in male-managed and owned firms. This result holds even after accounting for differences in firms' sector of operation and other firm characteristics, such as size, location, and years of operation. Overall, women account for 61 and 42 percent of the workforce in women-managed and female-owned firms respectively, compared to 31 percent for both measures in men-managed and male-owned firms.

Unlocking women's potential in the Swedish private sector is key to promoting more egalitarian economic participation, allowing women to benefit

fully from economic opportunities and to contribute to overall growth. As the business environment does not seem to be gender-biased, constraints and disincentives outside the business environment must exist and may need to be removed. Identifying these constraints and addressing the remaining barriers to a more inclusive private sector seem to be the next challenge in Sweden.

Overview of private firms in Sweden



This chapter provides a broad overview of the characteristics of private firms in Sweden, their performance, and the business environment they face. It is based in large part on an Enterprise Survey (ES) for Sweden undertaken by the World Bank in 2014. The Enterprise Survey is a representative survey of private firms in the nonagricultural, nonextractive formal sector of the Swedish economy. The data were collected with the purpose of taking a closer look at the experience of the private sector when dealing with issues identified in a previous report by the World Bank, which was based on existing data.¹ A total of 600 firms were surveyed, distributed across different firm sizes, sectors, and regions. While the sample was selected to be representative of the private sector in the southern part of Sweden, where most of the nonagricultural and nonextractive activity is concentrated, the data can be used to characterize the private sector in the entire country. For more details on the methodology of ES data please see www.enterprisesurveys.org.

The private sector in Sweden provides nearly 75 percent of all jobs and contributes twice as much to R&D spending as the public sector.² While the private sector in Sweden is large vis-à-vis the public sector, it is not as large as most other OECD countries.³

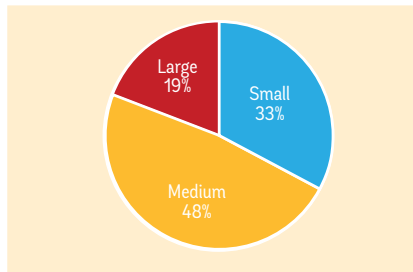
The Enterprise Surveys provide a rich source of information about firms and the environment in which they operate.

This information is a useful complement to the existing macroeconomic data that is most commonly used by researchers to study the dynamism and constraints of the private sector. Survey data such as Enterprise Surveys is not only useful for corroborating findings based on macroeconomic data but also in exploring heterogeneity at the firm level and examining how firms experience laws and regulations. For example, the understanding of international trade has completely changed over the last decade with the use of micro-data showing how firm heterogeneity is critical to understand which and what kinds of firms export and the impact of exports on the economy.⁴ Firm heterogeneity is a common feature of the Swedish economy.

WHAT IS THE DISTRIBUTION OF THE SAMPLE FOR SWEDEN?

The sample was selected using stratified random sampling. The sample was stratified by firm size, sector of activity, and regional location within Sweden. The main objective of the stratification criteria was to ensure enough observations for robust analysis were available for each level of stratification. Consequently, the sample was distributed as follows: 33 percent, small firms (5–19 full-time employees); 48 percent, medium-size firms (20–99 employees), and the remaining 19 percent, large firms (100 or more employees) (figure 1.1). Based on the European Union (EU)

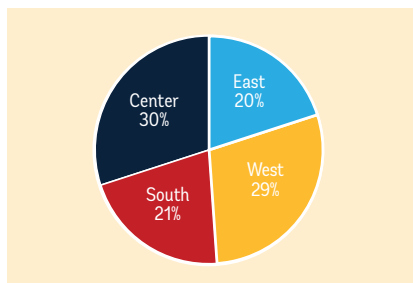
- Firms are more likely to consider a shortage of skilled workers and labor laws than other problems to be the most important obstacle for their business.
- Few Swedish firms are traded on the stock market; ownership is highly concentrated, with the share of the largest owner of the firm as high as 77 percent, on average.
- Competition from the informal sector is common; close to one-third of firms in the formal sector face such competition.
- Crime and security costs are high in Sweden, particularly in the retail sector.
- The capacity utilization level in Sweden is low, averaging 73 percent nationally and less than 69 percent in the east and center regions.
- There is a lot of heterogeneity in Sweden by firm size, sector, and location. Understanding these heterogeneities is likely to help improve policy targeting.

FIGURE 1.1 Sample distribution by firms' size

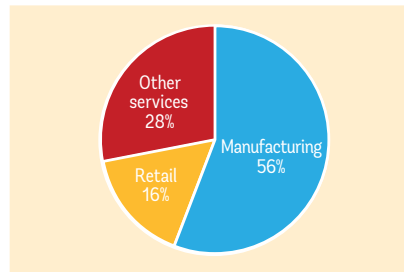
Source: Enterprise Surveys database.

definition of firm size, nearly 64 percent are small firms (10–49 full-time employees), 29 percent are medium firms (50–249 employees), and 7 percent are large firms (250 or more employees). The sample was also distributed across sectors of activity: 56 percent manufacturing firms, 16 percent retail firms, and the remaining 28 percent other services (figure 1.2).⁵ Within manufacturing, two subsectors were singled out: fabricated metal products and machinery and equipment; the rest of the manufacturing sector was subsumed in a residual category.

The survey was originally intended to provide full geographical coverage, but given budgetary restrictions and the fact that most of the manufacturing and services activities in Sweden take place in the southern part of the country, the sample was concentrated in this area. Following the advice of Statistics Sweden (SCB), it was determined that by choosing the top 10 local labor market areas, out of 76 in the

FIGURE 1.3 Distribution of the sample of firms by region of stratification

Source: Enterprise Surveys database.

FIGURE 1.2 Sample distribution by firms' sector of activity

Source: Enterprise Surveys database.

entire country, the sample would cover 66 percent of the population between 20 and 64 years of age (data provided by SCB for 2011). This coverage entails 64 percent of working places, a unit used by SCB that is equivalent to the definition of establishment used by the standard World Bank Enterprise Survey throughout the world. The selected 10 labor market areas correspond to the main big cities in the country; thus the sample is more properly representative of the business environment in the largest cities of Sweden. With the help of SCB, the labor market areas were grouped into the following four regions for stratification: Stockholm-Solna, with 20 percent of the sample, which will be referred to as the east region; Boras, Goteborg, Jonkoping, and Trollhattan-Vanesborg, with 29 percent of the sample (the west region); Malmo-Lund, with 21 percent of the sample (the south region); and Linkoping, Orebro, Kalstad, and Vasteras, with 30 percent of the sample (the center region). Figure 1.3 presents the sample distribution by region of stratification.

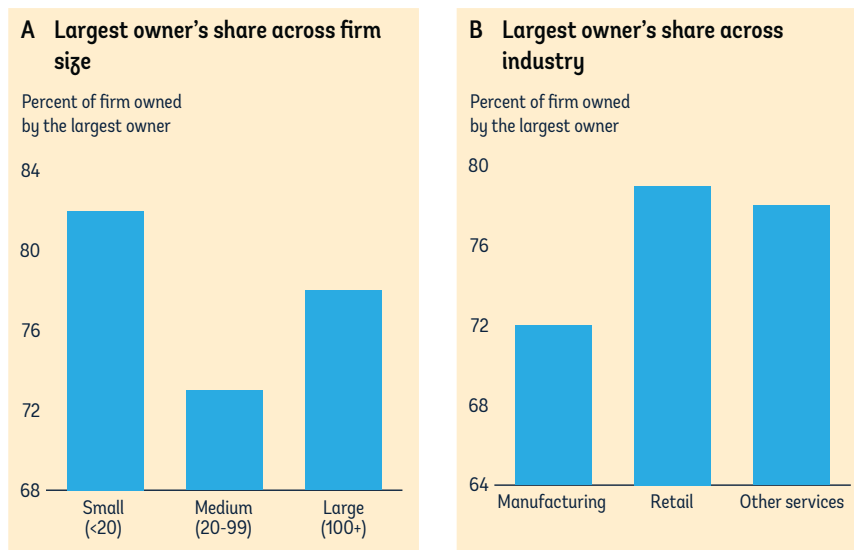
MOST SWEDISH FIRMS ARE SHAREHOLDING FIRMS BUT FEW HAVE SHARES TRADED ON THE STOCK MARKET

The market capitalization rate in Sweden—a measure of the size of the stock market, equal to the value of

outstanding shares as a percentage of gross domestic product (GDP)—equals 103 percent of GDP.⁶ This level is not far from other developed countries such as the United States and the United Kingdom (both at 116 percent in 2012), but much higher than some European countries such as Germany (42 percent). Despite the high capitalization rate, not many Swedish firms are listed on the stock market. The ES data show that 96 percent of the firms in Sweden with 5 employees or more are shareholding firms, but only 14 percent of all firms have shares traded on the stock market (open shareholding firms). The low proportion of open shareholding firms suggests that most Swedish firms are controlled by domestic family groups, a result that has been found in other studies.⁷ Within Sweden, the proportion of open shareholding firms does not change much with firm size. Open shareholding firms are, however, significantly more common among the services sector than in the manufacturing sector (15 percent versus 5 percent). Labor productivity, defined as sales per worker, and value added per worker are significantly higher for open shareholding firms than for other firms.

Given that most firms in Sweden are closed shareholding firms, it is no surprise that the share of the largest owner of the firm is as high as 77 percent, on average. There is no noticeable relationship between firm size and share of largest owner (figure 1.4A), but the share of the largest owner does increase sharply to 86 percent among firms with more than 250 employees, compared with 77 percent for those with fewer employees. This share is also significantly lower among manufacturing firms than other firms (figure 1.4B).

There is no clear consensus in the literature on how concentrated ownership affects firm performance. On the one hand, concentrated ownership tends to mitigate vertical agency problems (between managers and shareholders). On the other hand, it exacerbates

FIGURE 1.4 The largest owner's share in the firm is high in Sweden

Source: Enterprise Surveys database.

horizontal agency problems (between controlling and minority shareholders).⁸ In Sweden, the growth rates of sales, and capacity utilization levels decrease significantly as the share of the largest owner increases. For example, ES data show that annual sales grew at the rate of -0.1 percent per year for firms over the last two years where the largest owner has 50 percent or more of the share, compared with a much higher growth rate of 4 percent for the remaining firms.

The share of foreign individuals and companies in Swedish firm's ownership averages 26 percent. This share is high due to the services sector, where foreigners own 28 percent of the typical firm, compared with a significantly lower 14 percent in the manufacturing sector. Foreign ownership increases significantly with firm size. For instance, share of foreigners in a typical large firm equals 36 percent compared with only 25 percent for firms with fewer than 100 employees. Across regions, foreign ownership is much higher in the east region (41 percent), compared with 13 to 19 percent in the rest of the regions.

YOUNGER FIRMS GROW FASTER THAN THE OLDER FIRMS

A typical firm in Sweden is about 28 years old. Manufacturing firms, with an average age of 38 years, are much older than retail firms (28 years), and other services firms (25 years). There are other differences in firm's age across Sweden: firms in the center region are much younger (23 years) than firms in the east region (29 years) and in the west region (31 years). Natural selection and effects related to learning by doing suggest that older firms—defined as those that are more than 10 years old—are likely to be bigger and more productive and export more. Another strand of the literature suggests that, to the contrary, younger firms—if they survive—may be more dynamic and grow rapidly, having started from a small base. In the case of Sweden, there is some evidence confirming the first view. That is, a firm's age is positively associated with employment and annual sales—and significantly so with annual sales. Estimates using the ES data suggest that a 1 percent increase in firm's age is associated with an increase in annual sales of 0.2

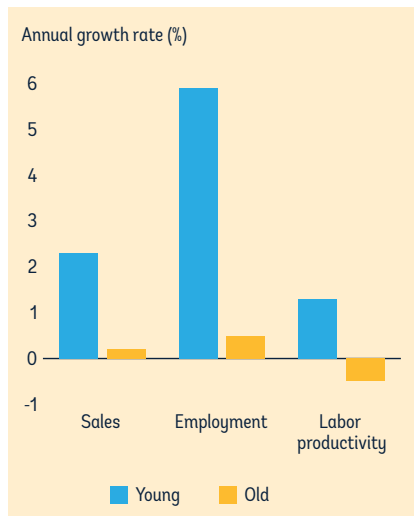
percent and 0.11 percent in employment.⁹ However, the labor productivity level does not change much with firm's age. Also, relatively older firms are significantly more likely to export than younger firms, and the same holds for export volume as percentage of annual sales. For example, about 19 percent of younger firms export, compared with a significantly higher 34 percent of older firms. Exports as a percentage of annual sales equal 6 percent for younger firms and more than 10 percent for older firms.

Regarding the second view of young firms being more dynamic and fast growers, the evidence in Sweden is mixed. On one hand, older firms are more likely to engage in R&D activity than younger firms. For example, 32 percent of older firms engaged in R&D activity over the last three years, compared with 18 percent of younger firms. However, there is no noticeable difference between older and younger firms in the amount spent on R&D as a proportion of the firm's annual sales. On the other hand, relatively younger firms significantly outperform older firms in sales and employment growth rates, but there is no noticeable difference between the two in labor productivity growth rate, level of labor productivity, and value added per worker (see annex 1A, table A1.1). The capacity utilization level—defined as current output as a percentage of maximum possible given firm's resources—is lower among younger firms, equal to 65 percent, compared to 74 percent for older firms.¹⁰ Figure 1.5 provides more details.

FAST GROWING YOUNG FIRMS DIFFER IN SOME WAYS FROM SLOW GROWING YOUNG FIRMS AND THE OLD FIRMS

Recent work on firm dynamics attempts to distinguish between fast and slow growing firms.¹¹ Fast growing

FIGURE 1.5 Sales and employment growth is much higher among younger firms



Source: Enterprise Surveys database.

firms are defined as those that have a rate of employment growth above the median; the rest are defined as slow growing firms. A relevant categorization of firms divides them into young and fast growing (gazelles), young and slow growing (turtles), and the remaining old firms (dinosaurs). About 10 percent of Swedish firms are gazelles, 9 percent are turtles, and the remaining 81 percent are dinosaurs. Some interesting comparisons emerge.

First, average firm size, measured either by sales or employment three years ago, is smaller for gazelles, even though the differences across gazelles, turtles, and dinosaurs are not statistically significant. The number of permanent employees three years ago is roughly the same for turtles (41 employees) and dinosaurs (39 employees), but lower for gazelles (28 employees). Second, the ES data show that there are no statistically significant differences in labor productivity or value added per worker between gazelles and dinosaurs and between gazelles and turtles. However, dinosaurs perform significantly better than turtles in both the measures. This confirms what other studies have found: that there are

no strong differences in firm productivity between gazelles and dinosaurs.¹² Third, gazelles lag behind turtles and dinosaurs in capacity utilization. Average capacity utilization level for gazelles equals 62 percent, compared with 74 percent for dinosaurs. Turtles also enjoy a high capacity utilization rate of 69 percent. This is a surprising result given the dynamism of gazelles, but it could also be explained by a strong investment effort on capacity expansion by gazelles.

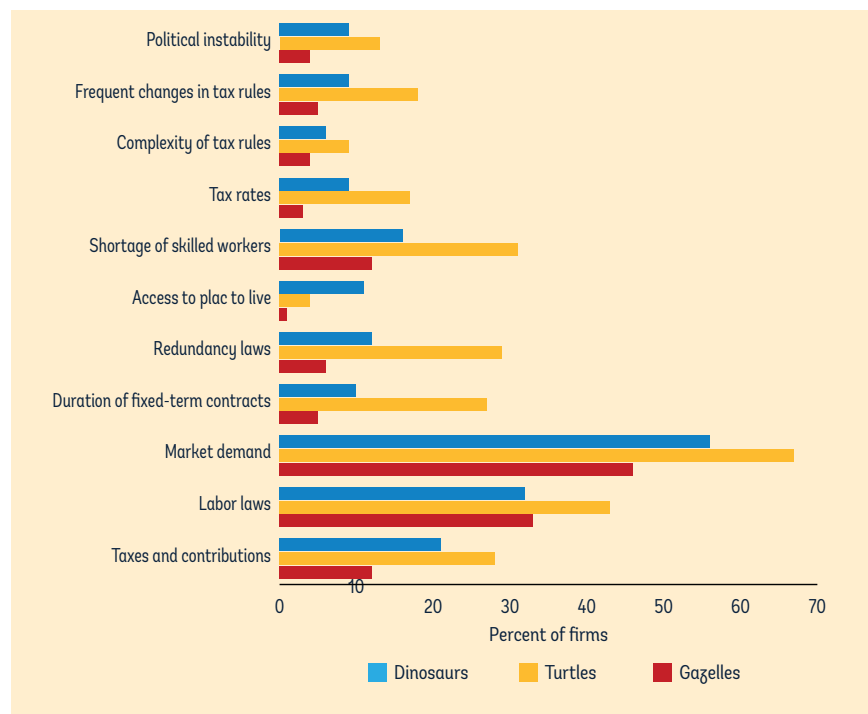
Fourth, there is no evidence that gazelles are much different from the more established dinosaurs in terms of access to finance (this point is further explored in chapter 6). Fifth, the high growth rate among gazelles may imply that they consider their business environment more enabling than the rest of the firms. The data confirm this view. That is, across a number of potential elements that firms select as constraining their businesses, gazelles are less likely—and significantly

so, in some cases—to find them as constraining as the turtles and the dinosaurs (figure 1.6). For example, duration of fixed-term contracts is a major obstacle for only 5 percent of the gazelles, compared with 10 percent of dinosaurs and significantly higher 27 percent of turtles.

EXPORTING ACTIVITY IN SWEDEN IS CONCENTRATED AMONG LARGE FIRMS AND IN THE MANUFACTURING SECTOR

The ES data reveal that while 31 percent of the Swedish firms export (directly or indirectly), exports as a percentage of a typical Swedish firm's annual sales equal only 9 percent. There is some variation in these levels across firm types, particularly by firm size and sectors. The proportion of exporting firms and export volume as a percentage of annual sales are

FIGURE 1.6 Gazelles are less likely to be constrained by the business environment than other firms



Source: Enterprise Surveys database.

both significantly higher among the relatively larger firms. For example, 72 percent of large firms engage in exporting, compared with only 28 percent of firms with fewer than 100 employees; export volume equals 35 percent and 8 percent, respectively.

While exports tend to attract much of the attention of policymakers, imports of intermediate inputs can be equally and even more beneficial to the economy.¹³ Imported inputs are used by 84 percent of the Swedish firms in the manufacturing sector, which points at the high degree of international engagement of the Swedish manufacturing sector. Imported inputs as a proportion of all material inputs used equal 46 percent for a typical Swedish firm.

A number of studies have documented a positive relationship between exports and firm productivity and innovation activity. This positive relationship may stem from the fact that the more productive and dynamic firms generally chose to export or from the procompetitive effects of international markets. In the case of Sweden, exporting firms have significantly higher labor productivity than non-exporting firms, but only in the manufacturing sector; in the services sector, exporting firms have lower labor productivity than the non-exporting firms, although not significantly so. Average labor productivity among manufacturing firms that export is about three times that of firms that do not export. Similarly, in the manufacturing sector, 44 percent of the exporting firms engage in R&D, compared with 35 percent of non-exporting firms. In the services sector, the opposite result holds, with only 22 percent of exporting firms conducting R&D activity, compared to 29 percent of nonexporting firms.

A SUBSTANTIAL PROPORTION OF MANUFACTURING FIRMS IN SWEDEN COMPETE IN THE LOCAL MARKET

The data recently collected in Sweden also provide information on the main market (local, national, or international) for manufacturing firms. It is possible that competition at the local level may be a natural outcome for some products and industries. However, for others, localized competition may represent fragmented markets and lack of proper competition, with potential negative effects on firm performance.¹⁴ In the case of Sweden, ES data show that about one-quarter of manufacturing firms compete mainly in the local market.

Comparing performance between firms that compete mainly nationally or internationally, the results are mixed. Firms competing mainly in the local market show significantly lower levels of efficiency than other firms in terms of labor productivity. This is consistent with the general belief in the literature that competition is good for efficiency.¹⁵ However, there is no significant difference between the two in value added per worker. The same holds for capacity utilization level and the growth rates of employment, sales and labor productivity (figure 1.7). Capacity utilization rates and sales growth rate are also higher for firms that compete mainly locally, but these differences are not significant.

COMPETITION FROM INFORMAL SECTOR APPEARS TO BE WIDESPREAD IN SWEDEN

While the informal sector is pervasive in the developing countries, the developed countries also have a fair share of informal firms. Some estimates

FIGURE 1.7 Firms that compete in the local market have higher growth rates than other firms



Source: Enterprise Surveys database.

suggest that about 15–20 percent of the economic activity may occur in the informal sector for countries in the top income quartile.¹⁶ Recent studies put the share of informal activity in GDP in Sweden at about 14 percent, higher than some of the other developed countries such as Switzerland (7 percent), Austria (8 percent), and France (10 percent).¹⁷ Unlike formal sector firms, informal or unregistered firms do not have to comply with government regulations. This places the formal sector firms competing against informal firms at a disadvantage, potentially affecting their performance and growth.

According to the data collected by the ES, about 30 percent of the firms in Sweden compete against informal businesses. This proportion is significantly lower among firms with more than 250 employees. There is also substantial variation across regions within Sweden, ranging from a low of 24 percent in the center region to a high of 38 percent in the southern region. Entry barriers and sunk costs to start a business are typically lower in services sectors than in manufacturing, suggesting that informality may be more pervasive in the services

sectors. ES data seem to confirm this view for Sweden. The percentage of firms competing against informal firms is significantly higher among retail (26 percent) and other services sector firms (39 percent) than manufacturing firms (12 percent).

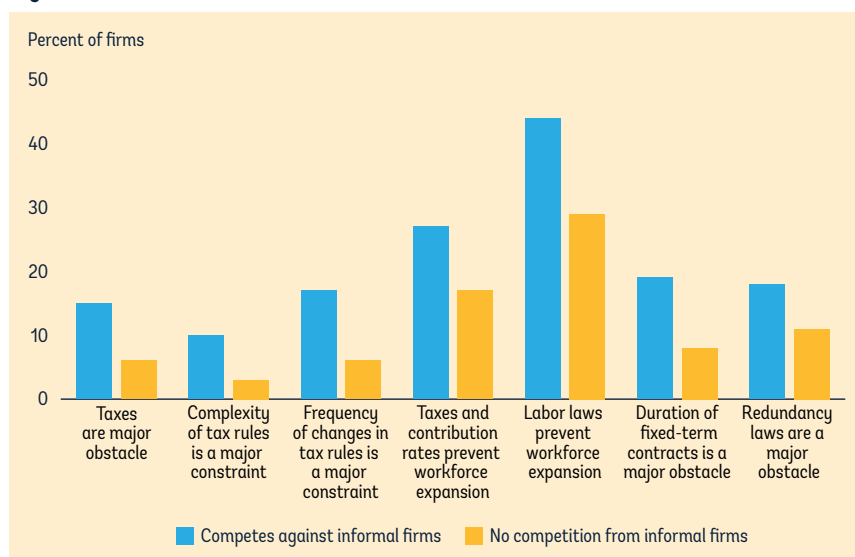
Labor productivity is significantly lower for firms that compete against informal firms than other firms. However, there is no significant difference between firms that do and do not compete against informal firms on other firm performance measures such as value added per worker and growth rate of sales, employment, and labor productivity (table A1.2).

Firms that compete with informal firms may find government regulations such as labor laws and taxes particularly burdensome. The data collected by the ES in Sweden do not reject such a view. That is, firms that compete against informal sector firms are much more likely—and significantly so in many cases—to report government regulations as major obstacles than firms that do not compete against informal sector firms (figure 1.8). It is also revealing that from a list of 15 obstacles (discussed below), small firms identified practices of competitors in the informal sector as the third most commonly chosen top obstacle.

A SHORTAGE OF SKILLED WORKERS AND LABOR LAWS ARE THE MAIN OBSTACLES IN SWEDEN

Firms were asked to identify the most important obstacle (top obstacle) for their business from a list of 15 obstacles (figure 1.9). Inadequately educated workers was the obstacle most commonly chosen (by 28 percent of the firms), followed by labor laws (18 percent), and access to land (10 percent). With some exceptions, across all locations within Sweden, firm sizes,

FIGURE 1.8 Firms that compete with informal sector firms feel more constrained by regulations

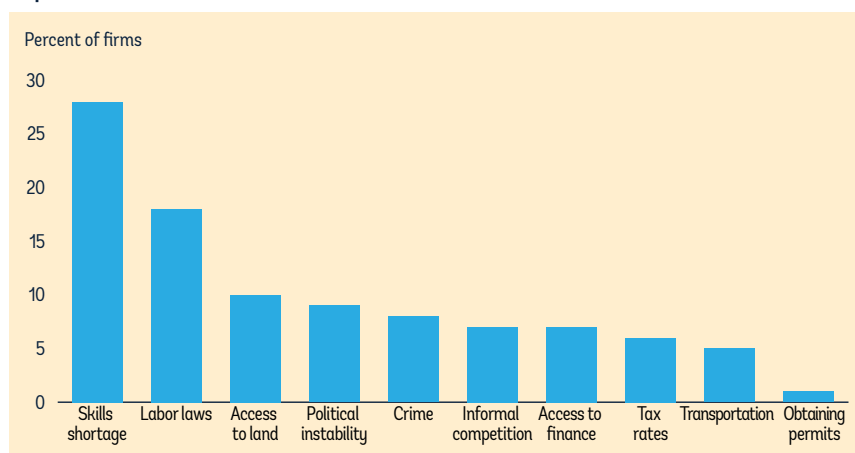


Source: Enterprise Surveys database.

and sector of activity, lack of educated workers, and labor laws consistently figure among the three most commonly chosen top obstacles. In the eastern region, which includes the capital Stockholm, the most commonly chosen top obstacles are labor laws, followed by access to land and political instability. Only 6 percent of firms in the eastern region chose lack of skilled workers as the top obstacle. For small firms, the most commonly chosen top obstacles include lack of skilled workers, followed by crime and practices

of competitors in the informal sector. Some important differences emerge across sectors, regions, and firm size (table A1.3). For example, lack of skilled workers is the top obstacle for only 11 percent of retail firms, compared with a significantly larger 43 percent of manufacturing firms and 35 percent of other services sector firms. In contrast, labor laws is the most important obstacle for 25 percent of retail firms, compared with 12 percent of manufacturing and 14 percent of other services sector firms. By firm size, the proportion of

FIGURE 1.9 Lack of skilled workers and labor laws are ranked as the most important obstacles



Source: Enterprise Surveys database.

firms reporting labor laws as the most important obstacle is significantly higher among the larger firms.

HIGHER TIME TAX IS ASSOCIATED WITH LOWER LABOR PRODUCTIVITY IN MANUFACTURING SECTOR

The data that the Enterprise Surveys collect provide a more direct indicator of the burden of regulation: the time tax. The time tax is defined as the percentage of time that a firm's senior management spend on dealing with government regulations. It is computed from direct estimates provided by the top managers of the interviewed firms. The time tax can have a direct effect on firm performance by distracting senior managers from business activity to comply with the rules. For a typical Swedish firm, the time tax equals 5 percent. This is lower than 36 out of the 50 countries covered by ES between 2011 and 2013. The overall relationship between time tax and firm size in Sweden is weak. However, in the manufacturing sector, the time tax is significantly lower for large firms (3.3 percent) than for medium firms (4.8 percent) and small firms (6.6 percent). A higher time tax is also significantly associated with lower labor productivity in the manufacturing sector. However, there is no such relationship in the service sector (figure 1.10 and table A1.4).

NEARLY 40 PERCENT OF THE SWEDISH FIRMS EXPERIENCE LOSSES DUE TO CRIME IN A YEAR AND 85 PERCENT SPEND ON SECURITY

While the literature on crime and businesses is in a nascent stage, available studies show that crime-related losses can have a significant impact on firm performance and growth.¹⁸ While

FIGURE 1.10 In the manufacturing sector, the higher time tax is associated with lower labor productivity



Source: Enterprise Surveys database.

Note: The figures are a partial scatter plot of (log of) sales per worker after controlling for region fixed effects, industry fixed effects, (log of) age of the firm, and (log of) number of permanent full-time employees three fiscal years ago.

USD = U.S. dollars.

Sweden is not known for high levels of crime, the ES data show that close to 40 percent of firms experience losses due to crime (theft, robbery, vandalism, arson, fraud, embezzlement, or cyber attacks) in a year; and 85 percent spend on security. As a percentage of firm's annual sales, losses due to crime average 0.31 percent and security expenses average 0.36. Thus a typical Swedish firm loses about 0.7 of its

annual revenue to crime and security-related costs. The cost of crime and security in Sweden is comparable to some of the other high-income countries for which comparable data are available, such as Estonia (0.7 percent of annual sales), Latvia (0.8 percent), and Lithuania (1 percent).

The bulk of losses due to crime and expenses for security in Sweden are driven by the retail sector. The proportion of firms experiencing crime and spending on security is significantly higher in the retail sector than both the manufacturing and the other services sector. Some 69 percent of retail firms suffered losses due to crime, compared with a significantly lower 24 percent of other services firms and 16 percent of manufacturing firms. The percentage of firms spending on security equals 95 percent in the retail sector, and around 80 percent for the other services sector and the manufacturing sector. Losses due to crime are also significantly higher in the retail sector than in the manufacturing sector and other services sector. However, expenditure on security as a percentage of firm's annual sales does not vary much across sectors.

Higher losses among firms due to crime are associated with lower capacity utilization rates and employment and sales growth rates in Sweden, but these relationships are not significant.

THE WAITING TIME FOR CONSTRUCTION PERMITS IS HIGH IN SWEDEN, ESPECIALLY FOR RETAIL FIRMS

Nearly 21 percent of the firms in Sweden applied for a construction permit during the previous two years. These firms spent an average of about 5 days dealing with various application-related procedures. However, the average waiting time for getting the construction permit is much higher, at 129 days, suggesting that the hurdle is not the procedures required from the firm but time spent to process the application. The waiting time of 129 days in Sweden is higher than 39 out of 49 countries covered by ES between 2011 and 2013.¹⁹ The high waiting time in Sweden is also confirmed by other data sources such as World Bank's *Doing Business*

project, which estimates about 116 days of waiting time in 2014. Focusing on ES data, figures 1.11A through 1.11D show how the waiting time varies in Sweden (waiting time includes the time spent on procedures). The retail sector stands out, with a waiting time of 215 days compared with a significantly lower 65 days for manufacturing firms and 64 days for other services sector firms (figure 1.11A). Regional variation is also large, with firms in the eastern region spending 273 days on average, compared with only 54 days in the southern region (figure 1.11B). It is tempting to assume that the younger firms are likely to face more difficulty in obtaining construction permits than the more established and experienced older firms, but this is not the case in Sweden. In fact, the opposite is true, with younger Swedish firms reporting significantly fewer days than older firms (figure 1.11C). While not significantly so, waiting time is higher for the faster growing firms and firms with higher labor productivity (figure 1.11D).

Firms that wait longer to get a construction permit are more likely to report access to land as a major, rather than a less severe, obstacle. Among the firms with waiting time above the median, 11 percent report access to land as a major obstacle, compared with only 5 percent of the firms with waiting time below the median.

IN THE MANUFACTURING SECTOR, QUALITY CERTIFICATES ARE MORE COMMON AMONG MORE PRODUCTIVE AND EXPORTING FIRMS

There are many cases where the buyer cannot easily assess the quality of the seller. In such cases, a signal such as internationally recognized quality certification can help alleviate the problem. Use of quality certificates has been found to be especially useful for

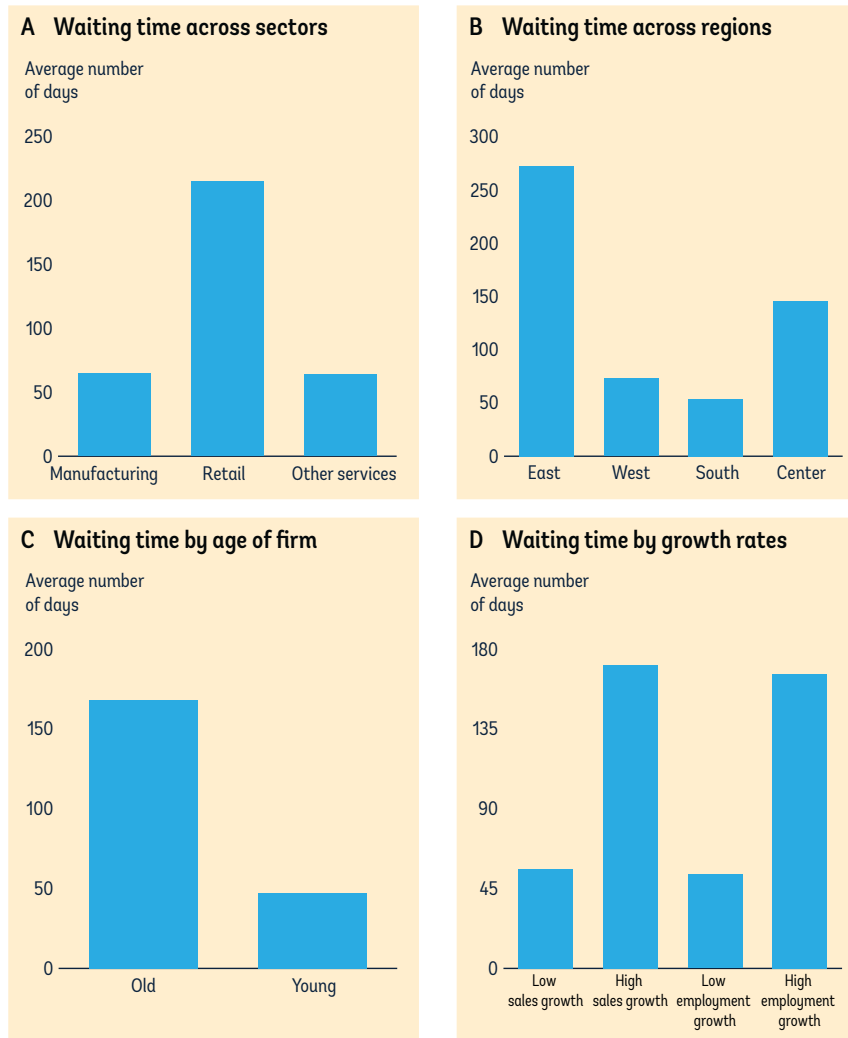
firms that sell their product in distant international markets. In Sweden, use of quality certificates is common. About 39 percent of all firms have a quality certificate.

Since obtaining quality certificates may involve substantial fixed costs, large firms are more likely to have these certificates than the small firms. This is true in Sweden, where the likelihood of a firm having a quality certificate increases significantly with firm size. For example, 29 percent of small firms compared with a significantly higher 48 percent of medium and large firms have a quality certificate. Similarly, the retail sector stands out, with a significantly lower proportion of firms (29 percent) having a quality certificate than manufacturing firms (54 percent) and other services firms (42 percent). In the manufacturing sector, higher productivity firms and exporting firms are significantly more likely to have a quality certificate than lower productivity and non-exporting firms. However, in the services sector, there is no noticeable relationship between labor productivity or exporting activity and the likelihood of having a quality certificate.

PART-TIME WORKERS IN SWEDEN ARE PREVALENT IN THE RETAIL SECTOR AND AMONG SMALL FIRMS

Labor laws are important ways to protect the employment and income of workers. However, the reduced flexibility (from the point of view of businesses) that comes with labor laws tends to add to the cost of businesses, reducing their efficiency and growth prospects. Swedish labor laws attempt to strike a balance between the costs and benefits of labor laws. Notably, the laws allow firms to hire workers on a fixed-term basis for a maximum duration of two years, and reduce wages when necessary in consultation with

FIGURE 1.11 Waiting time for obtaining construction permits is particularly high in the retail sector and in Stockholm



Source: Enterprise Surveys database.

labor unions. Part-time workers—defined as all employees that work for less than full shift—are also allowed in Sweden and they abound, especially in the retail sector. Nearly 62 percent of the Swedish firms use part-time workers. For a typical Swedish firm, nearly 22 percent of all workers are part-time workers.²⁰ The proportion of part-time workers is significantly higher among relatively smaller firms. For example, only 4 percent of the workers in large firms are part-time workers, compared with a significantly higher 23 percent in firms with fewer than 100 employees.

Differences across sectors are equally pronounced. In the retail sector, 40

percent of all workers are part-time, compared with 13 percent in other services and 4 percent in manufacturing. All these proportions are significantly different from one another. The flexibility of using part-time workers is likely to be particularly useful to startups and relatively younger firms, as they discover their own potential and market opportunities. The ES data do not reject this view. Younger firms have a significantly larger proportion of part-time workers than older firms. In Sweden, the labor productivity growth rate is significantly higher but employment growth (of permanent full-time employees) is much lower for firms with proportionately more part-time

workers. Greater use of part-time workers in Sweden is also associated with a significantly smaller proportion of (permanent full-time) workers who are fired.

LABOR PRODUCTIVITY RISES WITH FIRM SIZE IN SWEDEN'S MANUFACTURING SECTOR

The relationship between firm productivity and firm size is highly debated in the literature. While large firms benefit from economies of scale, increased organizational complexity and the higher cost of monitoring tend to weigh against them. In the full Swedish economy, there is no significant relationship between labor productivity and firm size. However, the relationship is positive and significant in the manufacturing sector. Figure 1.12 illustrates the point.

CAPACITY UTILIZATION LEVEL IN SWEDEN'S MANUFACTURING SECTOR IS LOW

The ES data also provide information on capacity utilization levels for Sweden's manufacturing sector. On average, capacity utilization level is 73 percent. Across regions, the west has the highest capacity utilization rate (77 percent), followed by the south (73 percent), the east, and the center (68 percent each). Young firms have lower capacity utilization than older firms (65 percent versus 74 percent), and this may affect their contribution to job growth given than lower capacity utilization in Sweden is significantly associated with lower growth rate of employment.

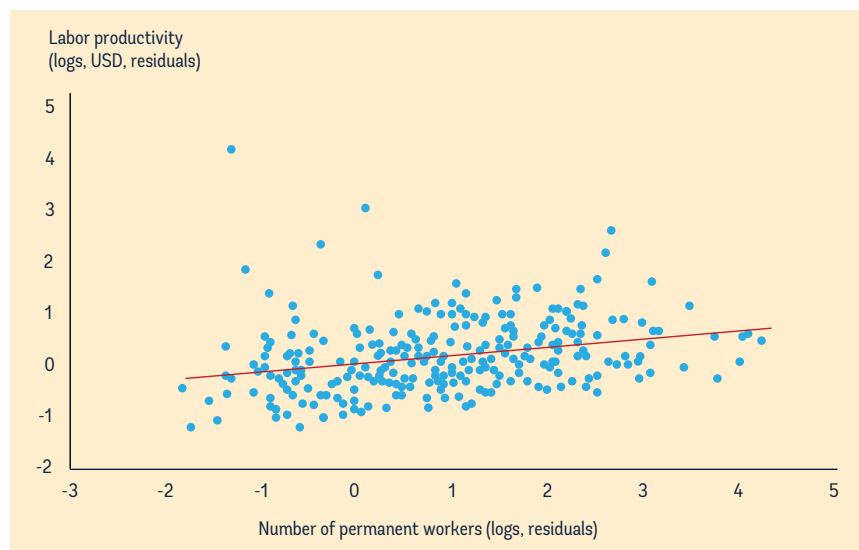
CONCLUSION

This chapter highlights a number of issues related to the nonagricultural private formal sector in Sweden. Few Swedish firms are traded on the stock market. Ownership of private firms in Sweden is concentrated, with the largest owner having a majority share on average. Informality affects about one-fifth of Swedish formal sector firms. The data do not reject the possibility that firms that compete with informal firms consider government regulations such as labor laws and taxes particularly

burdensome. Somewhat surprisingly, crime and security costs affect a large proportion of firms in Sweden. Losses due to crime and expenses on security as a proportion of firm's annual sales in Sweden are comparable to those found in developing countries in such regions as Latin America. Another worrying feature about the Swedish economy is the low overall level of capacity utilization. The problem of low capacity utilization is exacerbated for firms in the east and center regions. To what extent improvements in the business environment such as lower taxes, more flexible labor laws, or other policy measures

can help improve capacity utilization in Sweden is a moot point. Labor issues—the lack of skills and labor laws—are the most pressing issues for private firms in Sweden, to judge from their survey responses. Last, there is a lot of heterogeneity in Sweden by firm size, sector, and location. The heterogeneity concerns not only the level of growth rate or the crime rate but extends to the structure of the relationship between various economic variables. Understanding these heterogeneities is likely to help improve policy targeting.

FIGURE 1.12 Labor productivity rises with firm size in the manufacturing sector



Source: Enterprise Surveys database.

Note: The figure is a partial scatter plot of labor productivity (logs) and the number of full-time permanent workers at the firm three fiscal years ago (logs) after controlling for regional fixed effects, industry fixed effects, and (log of) age of the firm.

USD = U.S. dollars

ANNEX A1

TABLE A1.1 Younger firms grow faster in terms of employment and sales						
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Annual sales growth rate		Annual employment growth rate		Annual labor productivity growth rate	
Age of the firm (log values)	-3.128*** (0.894)	-3.145*** (1.029)	-3.844** (1.624)	-2.977** (1.294)	-0.399 (1.040)	-0.257 (1.070)
Automotive services		-1.587 (2.301)		2.340 (2.316)		-4.224* (2.525)
Fabricated metals		0.471 (3.115)		-0.013 (1.992)		0.774 (2.653)
Machinery & equipment		4.898 (4.575)		7.870* (4.274)		-2.249 (3.740)
Other manufacturing		1.662 (3.133)		0.832 (2.282)		1.230 (3.318)
Other services		-1.121 (2.139)		0.255 (2.513)		-1.411 (1.957)
East		-1.089 (2.510)		1.893 (2.773)		-2.287 (2.012)
West		0.294 (2.404)		-1.168 (2.504)		2.117 (2.418)
South		-1.555 (2.620)		-0.585 (2.732)		-0.157 (2.489)
Employment (log values) (3 fiscal years ago)		-0.652 (0.709)		-0.310 (0.805)		-0.327 (0.741)
Constant	10.222*** (2.910)	13.014*** (3.850)	13.262** (5.763)	9.866** (4.329)	0.997 (3.250)	2.625 (3.721)
R-squared	0.040	0.060	0.036	0.050	0.001	0.035
Number of observations	526	508	543	540	509	508

Source: Enterprise Surveys.

Note: OLS regression with robust standard errors (in brackets). Omitted industry is retail and omitted region is the center region.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A1.2 Firms competing against informal sector firms have lower labor productivity

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Labor productivity (log values)		Annual sales growth rate (%)		Annual employment growth rate (%)	
Compete against informal firms (dummy)	-0.269* (0.161)	-0.280 (0.176)	-1.052 (2.351)	-0.584 (2.449)	-1.907 (2.818)	-0.390 (2.691)
Employment (logs) (3 fiscal years ago)		-0.014 (0.047)		-0.692 (0.743)		-0.200 (0.840)
Age of the firm (log values)		-0.005 (0.085)		-3.243*** (1.037)		-2.776** (1.317)
East		0.219 (0.156)		-1.259 (2.588)		1.856 (2.854)
West		0.214 (0.140)		0.354 (2.534)		-1.624 (2.498)
South		0.208 (0.164)		-1.563 (2.666)		-0.756 (2.771)
Automotive services		-0.762*** (0.180)		-1.306 (2.523)		2.115 (2.464)
Fabricated metals		-1.565*** (0.133)		0.882 (3.233)		-0.194 (2.055)
Machinery & equipment		-1.102*** (0.135)		4.890 (4.615)		7.531* (4.395)
Other manufacturing		-0.968*** (0.208)		1.681 (3.246)		0.410 (2.462)
Other services		-0.814*** (0.154)		-0.865 (2.171)		-0.147 (2.479)
Constant	1.296*** (0.075)	1.736*** (0.295)	0.827 (1.036)	13.500*** (3.929)	1.971 (1.608)	9.508** (4.418)
R-squared	0.018	0.277	0.002	0.063	0.003	0.049
Number of observations	563	511	526	497	542	528

Source: Enterprise Surveys.

Note: OLS regression with robust standard errors (in brackets). In columns 2, 4, and 6, omitted industry is retail and omitted region is the center region.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A1.3 Shortage of skills and labor laws as the most important obstacle across industries and firm size (marginal effects)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Shortage of skilled workers is the most important obstacle		Labor laws is the most important obstacle			
Manufacturing (dummy)	0.399*** (0.099)	0.298** (0.126)	-0.099** (0.047)	-0.055 (0.048)		
Other services (dummy)	0.274*** (0.080)	0.261*** (0.078)	-0.104 (0.068)	-0.062 (0.067)		
Employment (current, log values)		0.012 (0.031)		0.083*** (0.025)	0.084 (0.155)	0.083*** (0.025)
Age of the firm (log values)		0.033 (0.042)		-0.027 (0.034)		-0.027 (0.034)
East		-0.345*** (0.057)		0.014 (0.075)		0.014 (0.076)
West		-0.019 (0.073)		-0.071 (0.055)		-0.070 (0.055)
South		-0.144** (0.056)		-0.045 (0.060)		-0.045 (0.060)
Automotive services						-0.022 (0.067)
Fabricated metals						-0.063 (0.063)
Machinery & equipment						-0.086* (0.045)
Other manufacturing						-0.035 (0.058)
Other services						-0.065 (0.069)
Number of observations	470	458	470	458	470	458

Source: Enterprise Surveys.

Note: Marginal effects from logit regression with robust standard errors (in brackets). In columns 2, 4, and 6, omitted industry is retail and omitted region is the center region.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A1.4 Time tax and labor productivity relationship						
	(1)	(2)	(3)	(4)	(5)	(6)
	Manufacturing		Services		All firms	
Time tax	-0.036*** (0.010)	-0.023** (0.010)	0.001 (0.012)	-0.000 (0.012)	-0.007 (0.010)	-0.007 (0.009)
Employment (logs) (3 fiscal years ago)		0.156* (0.090)		-0.026 (0.071)		0.003 (0.052)
Age of the firm (log values)		-0.058 (0.089)		0.088 (0.135)		0.048 (0.094)
Machinery & equipment		0.325*** (0.101)				-0.226 (0.151)
Other manufacturing		0.462*** (0.164)				-0.119 (0.233)
East		0.402** (0.164)		0.179 (0.239)		0.214 (0.173)
West		0.506** (0.215)		0.090 (0.232)		0.175 (0.158)
South		0.294** (0.131)		0.164 (0.256)		0.180 (0.176)
Automotive services				-0.090 (0.229)		-0.074 (0.188)
Retail				0.810*** (0.183)		0.812*** (0.154)
Fabricated metals						-0.722*** (0.160)
Constant	0.887*** (0.135)	-0.099 (0.287)	1.303*** (0.121)	0.654 (0.424)	1.246*** (0.090)	0.679** (0.303)
R-squared	0.095	0.235	0.000	0.229	0.003	0.263
Number of observations	316	291	242	217	558	508

Source: Enterprise Surveys.

Note: OLS regression with robust standard errors (in brackets). Dependent variable is labor productivity (log values). Omitted region is the center region in columns 2, 4, and 6; omitted industry is fabricated metal in column 2 and other services in columns 4 and 6. Columns 1 and 2 contain results for manufacturing sector. Columns 3 and 4 contain results for services sector.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

ENDNOTES

This chapter was written by Mohammad Amin and Jorge Luis Rodríguez Meza.

1. World Bank 2014b.
2. OECD 2013a and EU 2011.
3. OECD 2013a.
4. Mitchell, Smith and Weale 2000, Bernard and others 2012 and Melitz 2003.
5. Other services sector includes wholesale, transport, hotel and restaurant, services of motor vehicles, construction, and information technology.
6. World Development Indicators, World Bank, 2012.
7. OECD 2014a.
8. Vermeulen 2013.
9. These estimates are obtained from regression analysis. Annual sales (log values) was regressed on (log of) firm's age controlling for regional fixed effects and industry fixed effects. A similar regression was run with employment (log values) as the dependent variable instead of annual sales.
10. The difference in capacity utilization and firm's age holds across young and old firm category but not for the continuous measure of firm's age.
11. Haltiwanger 2012 and Acs and Mueller 2008.
12. Haltiwanger 2012.
13. Amiti and Konings 2007.
14. Aghion and Griffith 2005.
15. Djankov and Murrell 2002.
16. La Porta and Shleifer 2008.
17. Schneider 2013.
18. Hopkins 2002 and Islam 2014.
19. Data are missing for one country, Albania, which was also surveyed during between 2011 and 2013.
20. Unless specified otherwise, all discussion about part-time workers is based on the number of workers (part-time, temporary, permanent) without accounting for the amount of time in the day or year that they work.

Labor market policies and employment patterns of firms in Sweden



The main challenge in designing labor market policies is to find the right balance between protecting employees and establishing the kind of flexible labor market that is critical to the efficient reallocation of labor. Since the 1990s, Sweden has implemented major reforms to promote the flexibility and efficiency of its labor market. However, some areas of Sweden's labor market regulations, particularly those related to the redundancy rules for permanent employees and the length of fixed term contracts remain stricter than in many of the OECD high-income economies.¹

Using the World Bank Group's Enterprise Surveys (ES), this chapter aims to provide an analysis of how labor market policies and regulations in Sweden are associated with firm employment choices and related to firm productivity. The ES data provide information on a wide range of labor-related issues including the level, growth rate, and composition of firm employment; firm hiring and redundancy patterns, and use of fixed-term contracts; and how social security contributions, regulations concerning fixed-term contracts and redundancy regulations affect firm employment choices. The ES data also contain information about various firm characteristics, making it possible to analyze how the employment growth rate and labor productivity vary with the age, size, sector and location of firms.

LABOR LAWS, EMPLOYMENT, AND FIRM PRODUCTIVITY: A BRIEF REVIEW OF THE LITERATURE

Theory does not provide a clear-cut conclusion about the effect of stricter labor laws on employment, as stricter laws have two opposing effects: they increase employment by decreasing layoffs, and decrease employment by making it more costly for firms to hire new workers. Their impact on total employment is therefore ambiguous.² Similarly, the impact of stricter labor laws on productivity is also ambiguous in theory: while they prevent firms from firing unproductive workers, thereby decreasing firm productivity, they also incentivize firms to find a better match between workers and firm requirements, increasing firm productivity. Labor laws induce substitution effects between labor and capital, which if properly designed, may optimize labor-to-capital ratios and enhance productivity. Highly rigid laws, however, can generate excessive labor substitution and may reduce productivity. Which of these effects dominates determines how labor laws affect firm productivity.³

Empirical studies from around the globe show that, in general, greater labor market flexibility or less stringent labor laws have a positive impact on employment.⁴ For example, a recent

- Nearly 43 percent of all jobs in Sweden are provided by the nonretail service sector, such as wholesale, information technology, construction, and transport. Job creation as measured by the annual employment growth rate is higher among relatively younger firms.
- Use of fixed-term contracts is common, with over half of firms using them. The use of such contracts is associated with higher overall employment and better firm performance in some parts of the economy.
- Youth (less than 26 years old) account for one third of new hires, while the proportion of redundant workers that are rehired is low at 5 percent.
- Negotiating with labor unions for exemptions from the priority rule, which stipulates that employees hired last should be fired first, is common, with one in every five Swedish firms doing so. Negotiating large firms exhibit lower employment growth.
- The net change in employment is low, masking substantial hiring and firing that occurs simultaneously at a typical Swedish firm. The high level of churning in the Swedish workforce carries an important policy implication, as additional policy measures may be required to ensure that terminations and new hiring occur at minimal possible cost to workers and firms.

study covering 73 developing and developed countries between 2000 and 2003 reports that stricter labor laws concerning hiring and firing workers as well as collective bargaining by unions increase unemployment, while minimum wage laws and unemployment benefits do not matter much.⁵ Another study covering 97 OECD and non-OECD economies finds that between 1985 and 2008 less stringent labor laws concerning hiring and firing workers had a significant positive effect on employment.⁶ A follow-up study also shows that the impact of the financial crisis on unemployment was much more benign in the medium term in countries with less stringent labor laws.⁷

There is also some evidence that labor legislation, when combined with an active labor market policy—involving, for example, reducing search costs, providing skills to the unemployed, and improving coordination between labor unions and employers—can substantially reduce the otherwise negative effects of stricter labor laws on employment. A study using data from 20 OECD economies for 1983–1988 and 1989–94, found that unemployment increases with several factors: higher overall taxes; generous unemployment benefits that continue indefinitely; no support for the unemployed to find jobs; high unionization with no coordination between unions and employers; and poor educational standards at the low end of the labor market. However, the negative effect on employment disappears when stricter labor laws, unionization, and unemployment benefits are accompanied by an active labor market policy (ALMP) that helps unemployed workers find jobs and increases the coordination between labor unions and employers.⁸

Although there is no consensus in the empirical literature on the impact of stricter labor regulations on firm productivity, several studies do indicate a

negative impact. For example, country-level studies including in the United States and Italy and several cross-country studies in OECD and non-OECD economies show that stricter labor regulations reduce productivity.⁹ However, some studies also indicate the opposite. For example a study focusing on 19 OECD economies between 1960 and 2004 finds that increasing flexibility in labor laws had a negative effect on labor productivity growth.¹⁰

LABOR MARKET POLICIES AND LAWS IN SWEDEN

Sweden has a long history of labor unions and laws to protect workers, along with active labor market policies aimed at reducing labor market search costs, providing new skills to redundant workers, and incentives for firms to expand employment. Labor unions in Sweden are widely credited with having achieved a healthy balance between protecting employees and being flexible enough to ensure a dynamic workforce best suited to business needs.¹¹

The Rehn-Meider (R-M) model focusing on low unemployment, fair wages, high growth, and price stability shaped Swedish economic policy throughout the second half of the twentieth century until it was abandoned in 1997 with the adoption of the Industrial Agreement between leading trade unions and employers' associations, which shifted collective bargaining from the intersectoral to the sectoral level.¹² The aim of the Industrial Agreement was to keep wage levels in line with those in other European countries and to maintain the competitiveness of the Swedish economy.¹³ Other major changes in Sweden's labor market regulations have included reducing the level of unemployment benefits in 1996; introducing a work placement program in 1995; establishing adult education training in 1997; launching trainee replacement schemes during 1991–97;

introducing a two-tier benefit system in 2001; raising membership fees for unemployment insurance in 2007 and enacting an in-work tax credit reform in 2007. Research shows that these policies increased the job search and placement rate for the unemployed.¹⁴

The current state of labor regulations in Sweden is described in detail in the annual *Doing Business* report of the World Bank Group.¹⁵ The indicator of *Doing Business* that deals with labor regulations focuses mainly on three areas: regulations on hiring, hours, and redundancy. *Doing Business* measures hiring regulations based on three indicators: statutory minimum wage, availability of fixed-term contracts, and the maximum duration of such contracts. Sweden does not have legislative restrictions on the first two, but the maximum length of fixed-term contracts cannot exceed 24 months, which is shorter than in the majority of OECD high-income economies.

Regulations on hours are measured by five subindicators: whether the possibility of extending the workweek to 50 hours for two months of the year is allowed; restrictions on night work; restrictions on weekly holiday work; maximum number of working days per week; and mandatory annual leave days.¹⁶ Sweden does not have restrictions on extending the workweek to 50 hours and the length of the workweek in Sweden can extend to 5.5 days along with 6 other OECD high-income economies. In 20 OECD high-income economies the length of the workweek can extend to 6 days and in 2 it can extend to 7 days.¹⁷ Sweden's average mandatory annual leave is 25 working days for employees with 1, 5, and 10 years of tenure, which is considered a semi-rigid regulation of annual leave. The average mandatory annual leave among OECD high-income economies is 21 working days.

Doing Business measures the regulations on redundancy by two indicators: redundancy rules and redundancy cost. Redundancy rules consist of the following components: whether there are requirements for notifying and obtaining approval of a third party before dismissing a single or a group of nine redundant workers; priority rules in redundancy dismissal and re-employment; existence of retraining requirements before dismissing a redundant worker. Among the OECD high-income economies, 22 countries, including Sweden, do not require employers to notify or obtain the approval of a third party, such as a government agency, before dismissing a redundant worker. When dismissing a group of workers, however, employers in Sweden, as in 12 other OECD high-income economies, must notify a third party. In Sweden, the approval of the third party is not required.¹⁸

Sweden, along with 11 other OECD high-income economies, requires employers to give priority to workers based on specific criteria before their employment can be terminated. Sweden's priority rule is based on the seniority principle, requiring that an employee hired last will be dismissed first, referred to as the last-in-first-out principle. This principle was modified in 2001 to allow employers with 10 or fewer employees to exempt two employees from the seniority rule. Sweden's law also requires employers to provide retraining to employees or to reassign them to another position before they can be made redundant. This regulation is also present in 14 other OECD high-income economies. In addition, Sweden requires the offering of available positions to workers previously dismissed, a regulation shared by 8 other OECD high-income economies.

The cost of redundancy is computed as the average of severance payment and notification calculated in weeks of salary, for workers with 1, 5, and 10 years

of tenure. As in 13 other OECD high-income economies, Sweden's law does not require employers to pay severance to a redundant worker. However, Sweden's mandatory notice period for dismissal is 14.4 weeks of salary, well above the average notice period of 6.8 weeks of salary in OECD high-income economies. Only Luxembourg and Belgium have higher notice periods than Sweden, with 17.3 and 19.7 weeks of salary, respectively.¹⁹

Regarding regulations on unemployment protection, health insurance, and labor disputes, Sweden, along with the majority of OECD high-income economies, offers unemployment protection schemes to workers, and Swedish law requires employers to provide health insurance for permanent employees. The majority of OECD high-income economies, including Sweden, also have specialized labor courts to resolve labor disputes more effectively.

Overall, the findings of *Doing Business* data indicate that Sweden's regulations on hiring and minimum wage are more flexible than in the majority of OECD economies, while its regulations on work during the weekly holidays, mandatory annual leave, and redundancy regulations are stricter. OECD's employment protection legislation data, published in 2014, which measures the strictness of redundancy regulations for permanent and temporary employees, also indicate that out of 31 OECD high-income countries, Sweden's labor laws provide 11th highest level of protection for permanent employees—and 6th lowest level of protection for temporary employees. This large difference in employment protection between temporary and permanent employees can create a dual labor market, where permanent employees enjoy high levels of job security and better career prospects, while temporary employees are largely marginalized.²⁰

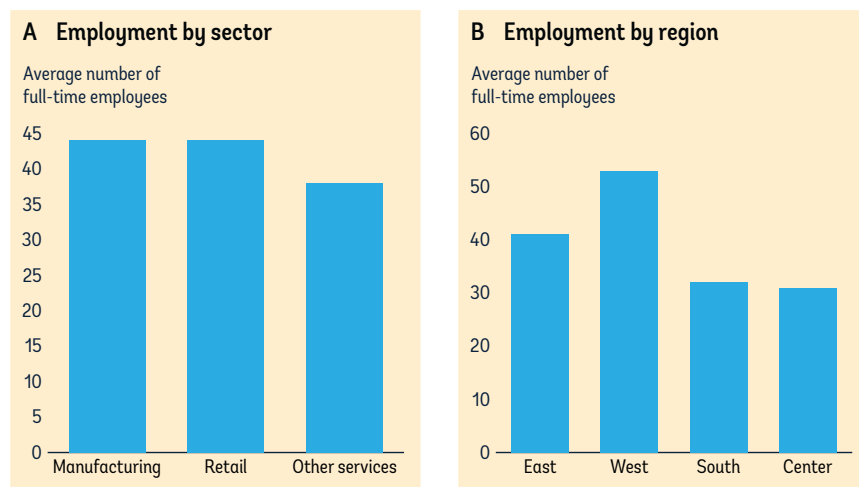
FULL-TIME EMPLOYMENT AMONG SWEDISH FIRMS

The Enterprise Survey collected a series of variables on firms in Sweden, including workforce profile by type of contract and the frequency of use of certain labor regulations. These data can be used to determine the extent to which labor regulations are constraining on the private sector. They can also be used to analyze the relationship between various firm outcomes and labor laws as experienced by the firms.

From the Enterprise Survey data it is possible to infer that the average size of a Swedish firm is 41 full-time employees. These include permanent and temporary or fixed-term workers adjusted for the number of days worked per year. Figure 2.1A shows how average firm size varies across sectors. The mean level of employment is roughly the same across sectors, ranging narrowly between 38 employees (other services sector)²¹ and 44 employees (manufacturing, other services). Some differences in average employment are specific to manufacturing. For example, in the manufacturing sector, firms that compete with informal sector firms have significantly lower employment than the remaining firms (36 versus 44 employees). Regional differences in firm size are more pronounced (figure 2.1B). Average employment in the west is significantly higher than in the other regions individually or collectively; it is also significantly higher in the east compared with the south and center regions.

The broader literature on trade has consistently found that export activity and firm size are positively correlated. One reason for this could be that larger firms are more efficient due to economies of scale and hence are in a better position to survive in international markets. R&D activity and firm size

FIGURE 2.1 Average employment of firms varies sharply across regions



Source: Enterprise Surveys database.

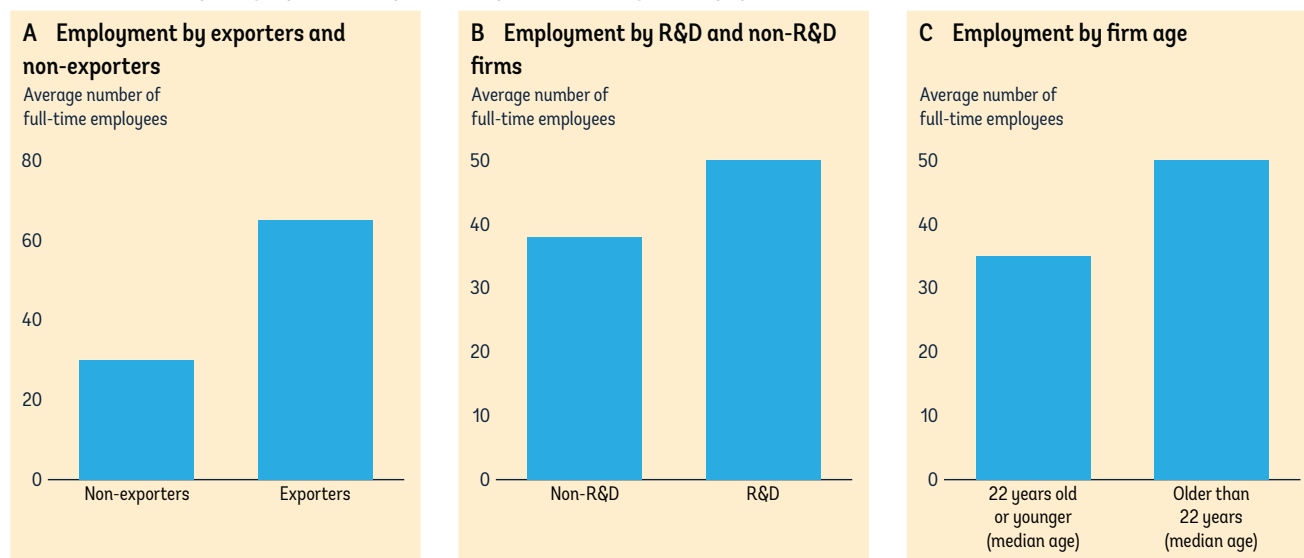
are also known to be positively correlated, in part due to the fixed costs involved in R&D. It is also possible that the more productive firms may grow more and become larger, and being large helps capture international markets due to fixed costs in exporting. Both these findings hold in the case of Sweden (figures 2.2A and 2.2B). Average employment is significantly higher among exporting firms than non-exporting firms and among firms that engage in R&D activity compared to other firms.²² Natural selection

and learning-by-doing suggest that older firms are likely to be bigger than younger ones. This prediction holds for Sweden as well: firms older than the median age of 22 years are significantly larger, with 50 workers, while firms younger than the median have an average of 35 workers (figure 2.2C). Alternatively, estimates suggest that a 1 percent increase in a firm's age is associated with a significant increase of 0.12 percent in employment.

DISTRIBUTION OF FULL-TIME EMPLOYEES IN SWEDEN

Based on ES data, the total number of full-time (permanent plus temporary) jobs in Sweden's private sector (the parts covered by the ES) can be estimated at 1.6 million: this includes the nonagricultural, nonextractive, formal private sector with five employees or more. This projection also excludes the financial intermediation sector. The distribution of these jobs by firm size, sector of activity and region is provided in figures 2.3A, B, and C. As the figures show, medium-size firms account for most jobs (45 percent), followed by large firms (44 percent) and small firms (11 percent). Across sectors, other services account for most jobs (43 percent) while manufacturing is at the bottom of the ladder (16 percent). The eastern region, which includes Stockholm and Solna, provides 40 percent of all jobs, while the center region provides the fewest (12 percent). In keeping with the literature,²³ dinosaurs are defined as relatively older firms (more than 10 years old) while the remaining younger firms are divided into faster-growing gazelles (above median growth rate in

FIGURE 2.2 Average employment is higher among firms that export, engage in R&D, and are older



Source: Enterprise Surveys database.

FIGURE 2.3 Forty percent of jobs in Sweden are concentrated in the east region, which includes Stockholm and Solna

Source: Enterprise Surveys database.

employment) and the remaining slow-growing turtles. As studies suggests, dinosaurs in Sweden do not experience rapid employment growth rates like gazelles, but nonetheless provide 85 percent of total employment.²⁴ In contrast, gazelles provide only 8 percent and turtles the remaining 7 percent of jobs (figure 2.3D).

WHAT TYPES OF FIRMS GROW FASTER IN TERMS OF EMPLOYMENT?

As mentioned, maintaining a high level of employment has been a central

element of Swedish economic policy. Hence it is important to understand what types of firms contribute most to job creation or job growth. For example, do manufacturing firms contribute more to employment growth than retail firms? According to the ES data, the annual employment growth rate at the firm level over the last two years averages 1.3 percent. Regional differences in the growth rate are noticeable, although not statistically significant. The east region is the most dynamic, with an average employment growth rate of 3.4 percent (per year), compared with 1.4 percent for the center

region, -0.4 percent in the south region, and -0.8 percent in the west region.

The relationship between firm size and growth rate is debated in the literature, with most studies showing that small firms grow faster than large firms.²⁵ Indeed, in Sweden, employment growth rates are higher for SMEs than for large firms, though the difference is not significant.²⁶ The overall employment growth rate for SMEs is 1.4 percent per year, compared with -0.6 percent for large firms. However, there are sharp differences in employment growth rates by firm size among the various sectors. In the manufacturing and retail

FIGURE 2.4 Employment growth rate decreases with a firm's age



Source: Enterprise Surveys database.
 Note: coef = 2.9142335, (robust) se = 1.32325, t = -2.2

sectors combined, employment growth rate decreases as firm size increases, and significantly so. In contrast, in the other services sector, the growth rate increases as firm size increases, although not significantly so. In terms of the magnitude in manufacturing and retail combined, SMEs grow at a rate of 2.3 percent, while large firms grow at -5.4 percent per year; in the other services sector, SMEs grow at a

rate of 0.5 percent, compared with 3.8 percent among large firms.

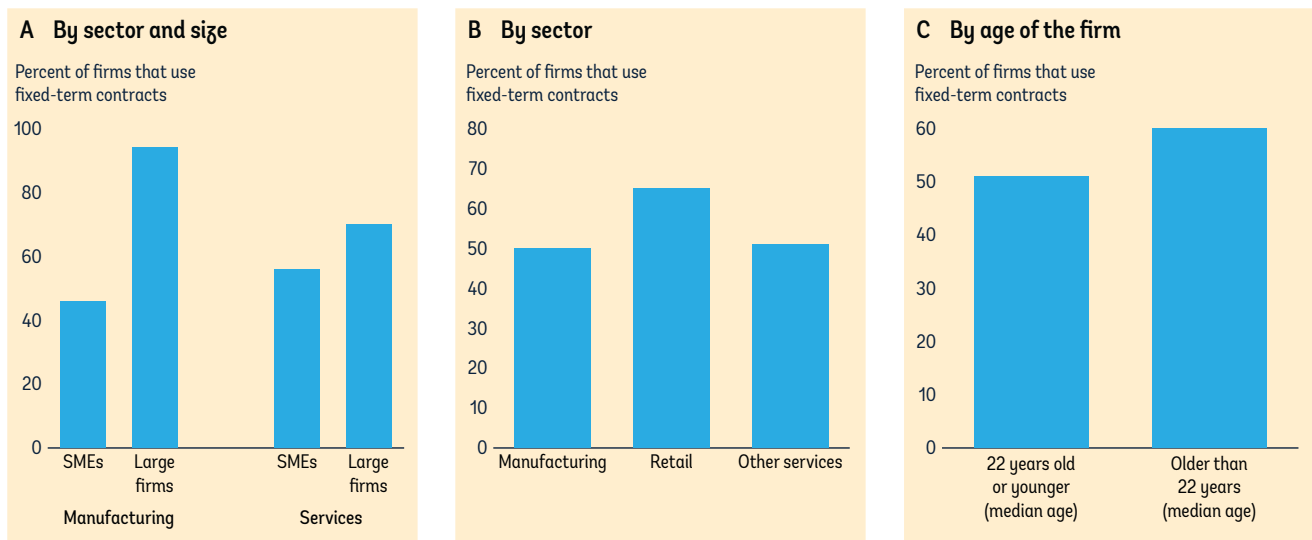
There is substantial evidence in the literature that younger firms tend to be more dynamic, and that younger firms grow faster than older firms—despite the fact that older firms are more established and have more accumulated experience.²⁷ One possible reason for this could be that younger firms may

start out on a small scale to test the waters. Firms that are successful and survive expand quickly to achieve their optimal size. Significantly higher growth (in sales and employment) among younger firms is confirmed in Sweden (figure 2.4). For example, employment growth among firms 10 years or younger is 5.9 percent per year, compared with only 0.5 percent for firms older than 10 years. Alternatively, moving from the 25th to the 75th percentile in terms of firm age in Sweden is associated with a decrease in the annual employment growth rate of 3.6 percentage points. This result was obtained from a multivariate regression analysis in which other potential explanations for the behavior of the employment growth rate were accounted for, such as regional location, sector of activity, and the initial employment level (see annex A2, table A2.1).

USE OF FIXED-TERM CONTRACTS

As mentioned, Swedish labor laws provide some flexibility to employers by allowing them to hire temporary or fixed-term workers for a maximum

FIGURE 2.5 The percentage of firms that use fixed-term contracts is higher in the retail sector and among relatively older firms



Source: Enterprise Surveys database.
 Note: Large firms are those with 100 or more employees; small and medium enterprises (SMEs) have 5–99 employees.

duration of two years. Nearly 56 percent of Swedish firms use fixed-term contracts. These include all contracts of two years' duration or less. For a typical Swedish firm, nearly 15 percent of full-time workers are under a fixed-term contract. This figure is significantly lower in the manufacturing sector (8 percent), compared with retail (18 percent) and other services (15 percent). The percentage of firms using fixed-term contracts increases significantly with firm size. This positive relationship is much larger and significant in the manufacturing sector and much smaller and insignificant in the services sector (table A2.2). For example, as seen in figure 2.5A, in the manufacturing sector, 94 percent of large firms use fixed-term contracts, compared with only 46 percent of SMEs. In the services sector, the corresponding figures are 70 percent for large firms and 56 percent for SMEs. As table A2.2 shows, these differences in the use of fixed-term contracts across firms of various size hold even after accounting for differences between firms in age, location, and sector of activity.

The percentage of firms that have fixed-term workers is higher in the retail sector than in the manufacturing and other services sectors, although not significantly so (figure 2.5B). The eastern region stands out with a lower (not significantly so) proportion of firms using fixed-term contracts (48 percent), compared with the other three regions. Finally, it may be tempting to assume that firms that compete against informal firms, exporting firms that operate in more challenging environments, and younger firms still trying to establish a niche for themselves may want to benefit from the flexibility offered by fixed-term contracts more than other firms. This does not seem to be the case in Sweden. Firms that compete against informal firms and firms that export do have a higher proportion of firms using fixed-term contracts, but the difference is not significant. The

use of fixed-term contracts is higher among relatively older firms; while this difference between young and old firms is not significant, it is quantitatively large (figure 2.5C).

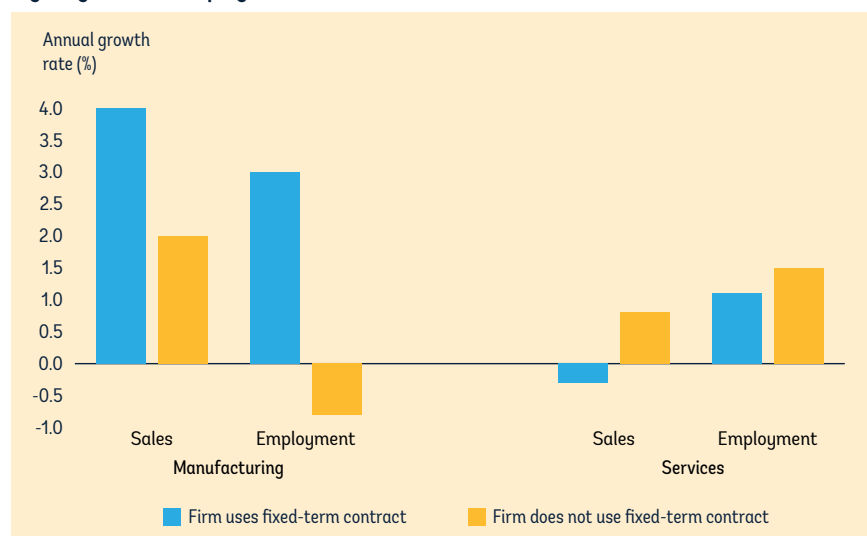
USE OF FIXED-TERM CONTRACTS AND FIRM PERFORMANCE

As noted, the literature has yet to reach a consensus on the effects of rigid labor laws on firm performance and overall employment. When it comes to employment, rigid laws might prompt firms to opt to use fixed-term workers in lieu of permanent workers. In that case, the flexibility offered by fixed-term contracts would offer no beneficial effect on employment. However, in the case of Sweden, there is a significant positive association between firm employment and the use of fixed-term contracts. This positive relationship is pronounced in the manufacturing sector, although it holds in the services sector too. Employment growth rate for permanent workers is also higher in the manufacturing sector among firms that use fixed-term contracts compared to those that do

not.²⁸ While this difference is not statistically significant, it is quantitatively quite large (3 percent per year versus -0.8percent).

In Sweden, there is also some evidence of better performance in the manufacturing sector associated with the use of fixed-term contracts. That is, value added per worker, the likelihood of conducting R&D, and the likelihood of investing in fixed capital assets are all significantly higher for manufacturing firms that use fixed-term contracts; similar result holds for the sales and employment growth rate in the manufacturing sector, although not significantly so (figure 2.6). These results continue to hold, and significantly so for the growth variables, even after accounting for differences between firms in age, sector of activity, location and firm size (table A2.3).²⁹ According to ES data, value added per worker in 2013 averages Swedish kronor (SKr) 0.7 million for manufacturing firms that use fixed-term contracts and a much lower SKr 0.3 million for manufacturing firms that do not. For firms in the services sector, however, none of these performance variables show any meaningful

FIGURE 2.6 In the manufacturing sector, firms that use fixed-term contracts have higher growth of employment and sales



Source: Enterprise Surveys database.

correlation to the use of fixed-term contracts.³⁰

LABOR LAWS AND FIRM PERFORMANCE

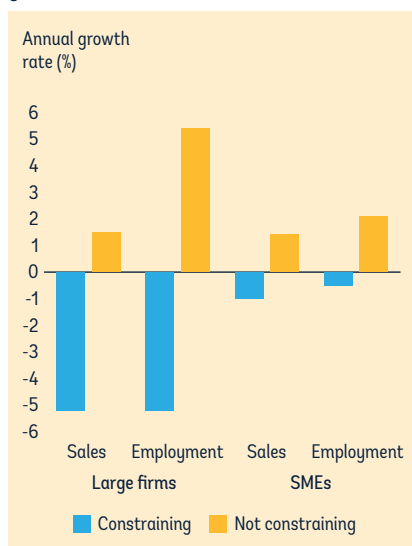
About 33 percent of all firms in Sweden report that labor laws concerning hiring and firing constrain workforce expansion. The percentage of such firms is significantly higher in manufacturing (43 percent) than in other sectors (31 percent). Across regions, the proportion varies from a low of 26 percent in the east to 40 percent in the west. More stringent labor laws can put firms that compete against informal sector firms at a disadvantage, since informal sector firms do not bear the cost of stricter labor laws. The ES data seem to support this view; 44 percent of firms that compete against the informal sector report that labor laws constrain their workforce expansion, compared with only 29 percent among the remaining firms.³¹

Assessing the relationship between firm complaints regarding labor laws and actual employment growth and other performance measures can be complicated. One complication emerges from the possibility that firms like to complain, making it difficult to properly understand which labor laws are really constraining. In this analysis, that possibility is ruled out by ensuring that all results hold even after accounting for firm complaints about the following business climate issues: corruption, inadequately educated workers, transportation, tax rates, and obtaining business licenses and permits.³² Another complication emerges from competing effects on the relationship between firm performance and complaints about labor laws. The stated relationship may be negative because labor laws have a negative effect on firm performance; however, it may be positive if faster-growing and more productive firms need to expand their workforce but feel constrained by labor laws. While it is difficult to disentangle these effects, exploring the relationship between a firm's subjective opinions and firm performance is useful, including to better understand which firms find labor laws constraining and hence the likely effects of changes in the laws.

that complain about labor laws, but the difference is not significant. Hence, based on firms' subjective opinions, the case can be made that labor laws have a negative effect on employment growth among large firms in Sweden.

Taxes and contributions are another type of law or regulation that can add to the cost of hiring labor. About 20 percent of firms in Sweden consider taxes and contribution rates (henceforth, taxes) as constraining workforce expansion. As with labor laws, the percentage of firms that report taxes as constraining is higher for firms that export compared to the remaining firms. It is also higher for firms that compete against informal sector firms. While these differences are large, they are not statistically significant except for exporting and after accounting for differences in the location of firms. The results discussed here for exports and firms competing against informal firms continue to hold even after accounting for the average level of complaints of firms as discussed above. For the overall Swedish economy, firms that complain about taxes are not significantly different from the rest of the firms in terms of labor productivity, and the growth rates of employment, sales and productivity. However, in this case as well, the result changes for large firms. In the case of large firms, labor productivity levels are significantly lower for firms that complain about taxes after controlling for basic firm characteristics such as age, industry of activity and region of location. The same holds for the growth rate of sales. Growth rate of employment is also noticeably lower for large firms that complain, although not significantly so. Among large firms, the average annual employment growth rate equals -1.6 percent per year for firms that consider taxes to be constraining, compared with 3.7 percent for those that do not.

FIGURE 2.7 Large firms reporting that labor laws constrain workforce expansion have lower employment growth rates



Source: Enterprise Surveys database.
 Note: Large firms are all firms with 100 or more full-time permanent employees at the beginning of the growth period; the remaining are SMEs.

Overall, there is no significant relationship between firms' subjective opinions as to how labor laws constrain workforce expansion and firm performance, as measured by labor productivity levels and the growth rates of employment, sales, and labor productivity. However, among large firms, employment growth rate is significantly lower for firms that complain about labor laws than for the rest. Similarly, sales growth rate among large firms is also lower for firms that complain compared to those that do not. While this differences is not statistically significant, it is noticeably large (figure 2.7). For smaller firms with fewer than 100 employees, employment and sales growth rates are also lower for firms

HIRING PATTERNS OF FIRMS

According to the ES data, over the last two years, about 81 percent of Swedish firms hired new full-time permanent workers. Averaging over this period, a typical Swedish firm added four new workers, or about 10 percent of the number of full-time permanent workers three fiscal years ago. As might be expected, younger firms have a significantly higher proportion of new hires than older firms. The east region, which includes Stockholm and Solna, stands out, with new hires reaching 13 percent, which is significantly higher than 9 percent in the rest of the country.

Sweden has implemented a number of programs to increase employment among youth less than 26 years of age. The data show some success in the implementation of these policies, with youth accounting for about one-third of new hires (33 percent). The proportion is significantly lower in the south region (20 percent) than in the other three regions (which average 37 percent). Sweden also has regulations in place to foster the rehiring of redundant full-time permanent workers. Nevertheless, rehiring of such workers is limited. Workers rehired after being terminated for redundancy are only 5 percent of all new hires for a typical firm. The proportion is significantly higher among relatively small firms—10 percent for small firms, compared with only 2 percent for medium and large firms. Young firms also have a higher proportion of new hires that are rehired after becoming redundant (9 percent), compared to 4 percent for old firms, but this difference between young and old firms is not significant. Overall, redundant workers rehired in a given year constitute a very small proportion (0.6 percent) of the workforce of full-time permanent workers at the beginning of the period.

LABOR TURNOVER

While labor laws in Sweden tend to protect workers' interests, they offer employers some flexibility to adjust or fire workers as needed. Over the last two years, about 77 percent of firms had full-time permanent workers that were terminated or left the firm. For firms that terminated a worker, 38 percent terminated workers due to poor performance, 28 percent due to lack of demand, and 25 percent due to lack of proper skills. A significantly higher proportion of large firms terminated workers due to poor performance and lack of demand compared to small and medium firms. For example, 62 percent of large firms that terminated workers did so due to poor performance. The corresponding figure for medium-sized firms is much lower, at 48 percent, and only 19 percent for small firms. Although not significantly so, firms are more likely to terminate employees due to lack of skills in the services sector (26 percent) than in manufacturing (19 percent). The termination rate is defined as the number of full-time permanent workers who left or were terminated over the last two years as a percentage of all full-time permanent workers three fiscal years ago. The termination rate for a typical firm in Sweden averages 9 percent per year. The termination rate does not vary much by firm size, age, location, or industry.

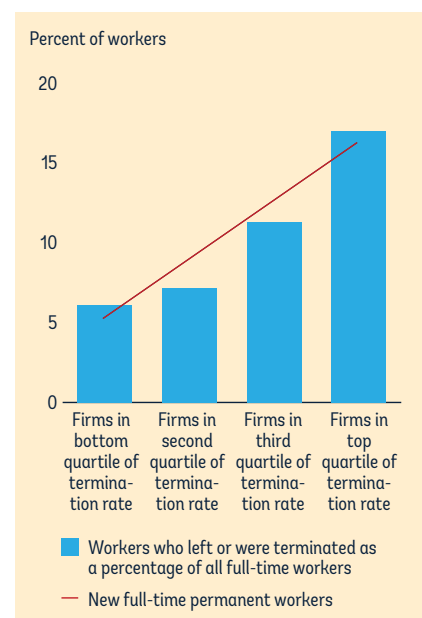
A low overall net change in employment at the firm does not necessarily mean that there is no churning of the workforce. Net change in employment can be zero due to high rates of termination and commensurate new hires. This seems to be the case in Sweden: the typical firm has a high rate of new hires and terminations. For example, among firms that terminated workers or where workers left, 90 percent hired new workers. In contrast, for firms that had no terminations or workers leaving,

only 47 percent hired new workers. Thus the rate of new hires and the rate of workers leaving or terminated—as a proportion of all full-time permanent workers three fiscal years ago—are significantly and positively correlated (figure 2.8). The high level of churning in the Swedish workforce carries an important policy implication, as additional policy measures may be required to ensure that terminations and new hiring occur at minimal possible cost to workers and firms.

LAST-IN-FIRST-OUT RULE: EXEMPTIONS AND NEGOTIATIONS

As mentioned, Swedish labor law stipulates that the firing of workers should start with the most recent workers hired (the priority rule). However, firms with fewer than ten employees are allowed to exempt two workers from this

FIGURE 2.8 There is substantial churning of the workforce in terms of terminations and new hires, even though the net change in workforce is relatively small



Source: Enterprise Surveys database.

Note: All figures shown are on per year basis (annualized), obtained by dividing the change in the number of terminations and new hires over the last two years by two.

priority rule. In addition, any Swedish firm can negotiate exemptions from the priority rule with labor unions.

For the sample of firms that terminated workers over the last two years and had fewer than ten employees—making them eligible for exemption from the priority rule—nearly 13 percent utilized the exemption. The percentage is higher, although not significantly so, among retail firms (31 percent), compared with manufacturing (18 percent) and other services firms (8 percent). The percentage also varies sharply across regions and is highest in the west (26 percent), followed by the south (19 percent), the center (9 percent), and the east (5 percent). However, these regional differences are not statistically significant.

The stated use of the exemption is significantly more common for firms that compete with informal sector firms, firms with a female top manager, and firms with slower employment growth. For example, 23 percent of firms that compete against informal firms utilized

the exemption, compared with only 8 percent of firms that do not. Use of the exemption is much more common among young firms compared with old firms and firms engaged in R&D. However, there is no evidence of a significant relationship between the use of the priority rule exemption and firm performance in terms of labor productivity, capacity utilization rates, or growth rates of labor productivity and sales. The only exception is the employment growth rate, which is significantly negatively correlated with use of the priority rule exemption.

Negotiations (successful or unsuccessful) with labor unions for priority rule exemptions are carried out by 22 percent of all Swedish firms. Larger firms are significantly more likely to negotiate these exemptions: only 15 percent of small firms negotiated, compared with 24 percent of medium and 56 percent of large firms. Across sectors, a higher proportion of manufacturing firms (29 percent) negotiated the exemption than in the services sectors (21 percent), although this difference is not significant. A firm's age is also a relevant factor, with a significantly higher proportion of older firms negotiating the exemptions compared to younger firms.

Table A2.4 provides details on these results. Firms competing with the informal sector are also more likely, although not significantly so, to negotiate with labor unions for exemptions from the priority rule than other firms. Theoretically, the relationship between firm performance and the need for an exemption from the priority rule is unclear. Faster growing and dynamic firms may need to restructure their workforce, and hence may need the exemption. However, workforce restructuring can be equally important for firms that are struggling to survive. The data show that the level of labor productivity, the capacity utilization level, and sales growth rates do not

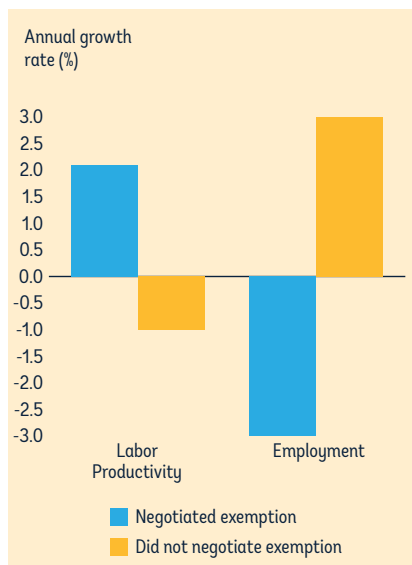
vary much between firms that do and do not negotiate the exemption. However, the labor productivity growth rate is noticeably higher (although not significantly) and the employment growth rate is significantly lower for firms that negotiate the exemptions (figure 2.9). This is an interesting result, implying that firms that negotiate an exemption generate less employment than those who do not.

CONCLUSION

A low level of unemployment, coupled with fair wages and protection of workers, has been a central pillar of Swedish economic policy from the start. To this end, Sweden has followed an active labor market policy that aims to strike a balance between worker protection and providing the flexibility employers need in setting wages and hiring and firing workers. Sweden is widely credited with achieving a low unemployment rate by OECD standards. However, labor laws tend to be more stringent when it comes to permanent employment—favoring workers over businesses by OECD standards—but less stringent for temporary employment.

Based on data collected by the World Bank Enterprise Surveys, this chapter takes stock of various aspects of the Swedish labor market. A number of interesting points emerge. Large firms account for 44 percent of all jobs and medium firms for 45 percent; small firms lag behind at only 11 percent. The other service sectors provide 43 percent of all jobs and more than two and a half times as many jobs as the manufacturing sector; the east region, which includes Stockholm and Solna, provides nearly 40 percent of jobs. While old firms account for an overwhelming share of available jobs, young firms have much higher employment growth rates.

FIGURE 2.9 The labor productivity growth rate is inversely correlated with the likelihood of negotiating an exemption from the priority rule with labor unions



Source: Enterprise Surveys database.

Use of fixed-term contracts is common, with over half of firms using them. However, the share of workers covered by fixed-term contracts at a typical Swedish firm is about 15 percent. Interestingly, the use of fixed-term contracts is associated with better firm performance in terms of growth and productivity in the manufacturing sector, and does not appear to depress permanent employment. Negotiating with labor unions on exemptions from the priority rule for redundant workers is fairly common, with one in every five firms doing so. While the results show some interesting differences in the employment growth rate and labor productivity, firm performance measures do not show any strong and consistent relationship with the proclivity to negotiate exemptions.

Two features worth highlighting are the substantial churning of workers in terms of hiring and firing, which is not evident from the relatively low overall employment growth rate, and the enormous heterogeneity across firms in labor-related issues such as job creation, relationship between labor laws and firm-performance, use of fixed-term contracts and the tendency to negotiate with labor unions on exemptions from priority rule. Taking into account these heterogeneities is likely to improve the understanding of how the labor market in Sweden functions and the impact of labor market policies on the economy.

ANNEX A2

TABLE A2.1 Younger firms grow faster in terms of employment and sales						
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Annual employment growth rate (%)			Annual sales growth rate (%)		
Age of the firm (log values)	-3.844** (1.624)	-2.676** (1.186)	-2.977** (1.294)	-3.128*** (0.894)	-3.052*** (0.938)	-3.145*** (1.029)
Permanent employees (log values, 3 fiscal years ago)		-0.486 (0.753)	-0.310 (0.805)		-0.596 (0.677)	-0.652 (0.709)
East			1.893 (2.773)			-1.089 (2.510)
West			-1.168 (2.504)			0.294 (2.404)
South			-0.585 (2.732)			-1.555 (2.620)
Automotive services			2.340 (2.316)			-1.587 (2.301)
Fabricated metals			-0.013 (1.992)			0.471 (3.115)
Machinery & equipment			7.870* (4.274)			4.898 (4.575)
Other manufacturing			0.832 (2.282)			1.662 (3.133)
Other services			0.255 (2.513)			-1.121 (2.139)
Constant	13.262** (5.763)	10.370** (4.449)	9.866** (4.329)	10.222*** (2.910)	11.746*** (3.434)	13.014*** (3.850)
R-squared	0.036	0.028	0.050	0.040	0.043	0.060
Number of observations	543	540	540	526	508	508

Source: Enterprise Surveys database.

Note: OLS regression results with robust standard errors (in parenthesis). Dependent variable is as indicated above. Omitted industry is retail and omitted region is the center region in columns 3 and 6.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A2.2 Use of fixed-term contracts (marginal effects)						
Dependent variable: Firm uses fixed-term contract (dummy)	(1)	(2)	(3)	(4)	(5)	(6)
	All firms		Manufacturing		Services	
Employment (log values, current)	0.109** (0.047)	0.112** (0.048)	0.296*** (0.065)	0.357*** (0.060)	0.086 (0.060)	0.086 (0.061)
Age of the firm (log values)		0.080* (0.042)		0.060 (0.056)		0.085 (0.056)
East		-0.255** (0.107)		-0.168 (0.149)		-0.211 (0.141)
West		-0.056 (0.115)		-0.462*** (0.131)		0.055 (0.160)
South		-0.008 (0.102)		-0.203 (0.176)		0.055 (0.135)
Automotive services		-0.174 (0.111)				-0.191 (0.131)
Fabricated metals		-0.374*** (0.082)		-0.073 (0.127)		
Machinery & equipment		0.044 (0.140)		0.363*** (0.079)		
Other manufacturing		-0.284*** (0.092)				
Other services		-0.180* (0.102)				-0.181 (0.116)
Number of observations	581	560	323	317	258	249

Source: Enterprise Surveys database.

Note: Marginal effects obtained from logit estimation with robust standard errors (in parentheses). Omitted industry in columns 2 and 6 is retail and other manufacturing in column 4; omitted region in columns 2, 4, and 6 is the center region.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A2.3 Value added per worker and use of fixed-term contracts				
Dependent variable: Value added per worker in manufacturing (log values)	(1)	(2)	(3)	(4)
Firm uses fixed term contracts (dummy)	0.869*** (0.199)	0.913*** (0.190)	0.953*** (0.185)	0.843*** (0.173)
Permanent employees (log values, 3 fiscal years ago)		-0.043 (0.081)	-0.037 (0.103)	-0.061 (0.100)
Age of the firm (log values)			0.228 (0.164)	0.255* (0.152)
East			0.662** (0.269)	0.454 (0.328)
West			0.583*** (0.199)	0.481** (0.240)
South			0.404 (0.286)	0.391 (0.286)
Fabricated metals				-0.587** (0.237)
Machinery & equipment				0.096 (0.232)
Constant	-1.521*** (0.182)	-1.408*** (0.320)	-2.639*** (0.498)	-2.425*** (0.513)
R-squared	(0.183)	(0.201)	(0.302)	(0.365)
Number of observations	160	147	146	146

Source: Enterprise Surveys database.

Note: Ordinary Least Squares (OLS) regression results with robust standard errors (in parentheses). Dependent variable is as indicated above. In columns 3 and 4, omitted region is the center region; omitted industry in column 4 is other manufacturing.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A2.4 Negotiating with labor unions for exemptions from the priority rule is more common among large and older firms (marginal effects)

Dependent variable: Firm negotiated exemptions from priority rule with labor unions (dummy)	(1)	(2)	(3)	(4)	(5)
Employment (current, log values)	0.096*** (0.024)		0.101*** (0.027)		0.100*** (0.026)
Age of the firm (log values)		0.107*** (0.038)	0.096** (0.038)		0.096** (0.038)
Manufacturing (dummy)				0.088 (0.064)	0.039 (0.066)
East			-0.132** (0.058)		-0.134** (0.057)
West			-0.098 (0.065)		-0.100 (0.064)
South			0.035 (0.089)		0.041 (0.092)
Automotive services			0.002 (0.089)		
Fabricated metals			0.150 (0.165)		
Machinery & equipment			-0.056 (0.091)		
Other manufacturing			0.052 (0.090)		
Other services			0.011 (0.076)		
Number of observations	570	559	555	574	555

Source: Enterprise Surveys database.

Note: Marginal effects based on logit model with robust standard errors (in parentheses). Dependent variable is as indicated above. Omitted region is the center region in columns 3 and 5. Omitted industry is retail in column 3 and all services (retail and other services) in columns 4 and 5.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

ENDNOTES

This chapter was written by
 Mohammad Amin and Hulya Ulku.

1. Ulku and Muži 2014; World Bank 2014a.
2. See, for example, Lagear (1990) and von Below and Thoursie (2010).
3. See, for example, Autor, Kerr and Kugler (2007).
4. See, for example, Bentolila and Saint-Paul (1994) and Scarpetta (1996).
5. See Feldman (2008).
6. See Bernal-Verdigo, Furceri and Guillaume (2012a).
7. See Bernal-Verdigo, Furceri and Guillaume (2012b).
8. See Nickell (1997).
9. See Autor, Kerr, and Kugler (2007); Bassanini and Marianna (2009); Braunerhjelm and Henrekson (2015); Cingano and others (2010); Martin and Scarpetta (2012); Micco and Pagés (2006); and OECD (2007).
10. See Vergeer and Kleinknecht (2010).
11. Ahlberg and Bruun (2005); Blanchard, Jaumotte and Loungani (2013). Sweden's first national trade union, Svenska Typografforbundet, was established as early as 1886. This was quickly followed by a number of other trade unions many of which were combined to form the Swedish Trade Union Confederation (LO) in 1898. The first labor court was established in 1928, with the objective of peaceful resolution of labor disputes.
12. See for example, Calmfors, Forslund and Hemström (2004); Fischer (2006). The Swedish economic policy after the Second World War was developed by two trade union economists, Gosta Rehn and Rudolf Meidner (R-M model) with low unemployment, fair wages, high growth, and price stability as its key objectives. The dual objective of low unemployment and fair wages were to be achieved through an active labor market policy consisting of employment subsidies; solidarity wages defined as equal pay for equal work irrespective of firm's profitability; centralized bargaining; supply side boost via vocational education, retraining, and relocation grants; better matching via improved public information services; and demand-oriented policies that targeted certain industries and regions to increase labor demand. While the R-M model has played a central role in shaping labor policies in Sweden since 1950, the model was never fully implemented. Departures were made as necessary, for example, following the oil shocks of the 1970s and the banking crisis of early 1990s. Following the banking crisis of the early 1990s, the focus of the labor policy shifted to become more active and less passive.
13. Anxo and Niklasson 2007; Karlson and Lindberg 2011.
14. See for example, Forslund and Krueger (1997); Calmfors, Forslund and Hemström (2004); and Kjellberg (2013).
15. *Doing Business Report 2015* (World Bank Group, 2014b).
16. *Ibid.*
17. *Ibid.* Sweden requires that workers' weekly rest take place on weekends to the extent possible. Only temporary exceptions can be made, and only under special circumstances that the employer could not have foreseen (World Bank Group, 2014a).
18. *Doing Business Report 2015* (World Bank Group, 2014b).
19. *Ibid.*
20. See Dolado, Oritigueira and Stucchi (2012).
21. Other services sector includes wholesale, transport, hotel and restaurant, services of motor vehicles, construction, and information technology.
22. Firms engaged in R&D activity are referred to as R&D firms.
23. See, for example, Acs and Mueller (2008) and Haltiwanger (2012).
24. Throughout this report total employment or size refers to total full-time employment that includes permanent and temporary or fixed-term workers adjusted for the number of days worked per year. It excludes part-time employment.
25. See, for example, Haltiwanger (2012).
26. In this section, SMEs and large firms are defined as those with 5-99 employees and 100 and more employees, respectively, using full-time employment figures three fiscal years ago.
27. See, for example, Haltiwanger, Janmin and Miranda (2010).
28. Permanent workers are all workers that work full-time and have a contract of one year or more.
29. The positive and statistically significant relationship in table 2A.3 between value added per worker and the use of fixed term contracts (dummy) continue to hold even if the dummy is replaced with the percentage of firm's workers that are under fixed-term contract.
30. One exception is the percentage of firms that bought fixed assets. After accounting for some basic differences in firm-size, age, location, and industry, the percentage is estimated to be lower by about 7 percentage points in the economy as a whole and 10 percentage points for the services sector for firms that use fixed-term contracts versus the rest. While these differences are quantitatively large, they are not significant.
31. The difference is statistically significant, but not when firm's tendency to complain about the business environment (corruption, tax rates, transportation, obtaining permits and licenses, and shortage of skilled workers) is taken into account. See the next note for more details.
32. This is done for all the results discussed in this section using regression analysis and controlling for the firm's average score (on a 0-4 scale) on the level of severity of the following main obstacles: corruption, inadequately educated workers, transportation, tax rates, and obtaining licenses and permits.

Education, skills, and labor productivity



A growing body of empirical literature shows that firms that employ a larger proportion of highly skilled workers are more productive, just as human capital theory would suggest.¹ The availability of highly skilled labor is therefore important to consider when examining how the business environment affects firm performance.

Despite high tertiary education completion rates in the working-age population,² more than 20 percent of workers in Sweden report that their qualifications are lower than would be required to get their jobs today, compared to an average of 13 percent of workers for OECD countries.³ About one-quarter of Swedish employers reported difficulties filling vacancies in 2013, and the 10 most difficult to fill jobs included occupations at all skill levels: accountants, technicians, engineers, and managers, but also sales representatives, skilled trades, supervisors, machine operators, cooks, and drivers.⁴ Small firms had most difficulties hiring, and recruitment times were longest for information technology (IT) specialists, professionals, and Stockholm-based positions.⁵

This chapter analyzes the skills and education profile of the workforce employed by Swedish businesses; the challenges that firms encounter when trying to hire; and how these issues may relate to firm performance, as measured by labor productivity. The analysis is based on establishment-level

Enterprise Survey (ES) data collected in 2014, and on administrative data from Statistics Sweden's Longitudinal Integration Database for Health Insurance and Labour Market Studies (known by its Swedish acronym, LISA) for the period 2003–12.⁶

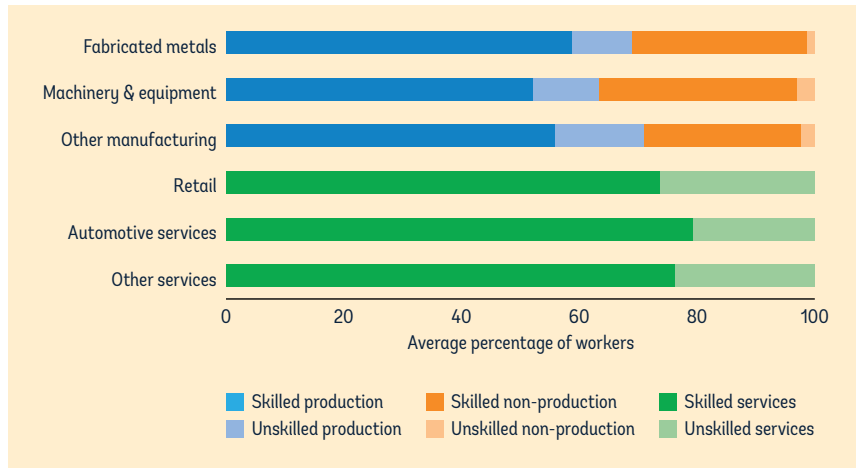
MANY HIGH-SKILLED JOBS, BUT FEW HIGHLY EDUCATED WORKERS

Skill level is usually defined either by the level of education or by the type of occupation.⁷ Both approaches require specific information that the Enterprise Survey respondent (typically, the top manager) may not be able to provide. Therefore, the ES adopts a different approach based on a more subjective evaluation by the respondent. The survey identifies as “skilled workers” those who “have some special knowledge or (usually acquired) ability in their work. A skilled worker may have attended a college, university, or technical school” or “may have learned his skills on the job.”⁸

Based on this broad measure, across all industrial sectors the large majority (77 percent) of the workforce in Sweden is skilled (figure 3.1) and fabricated metals is the sector with the highest percentage of skilled workers (88 percent).⁹ Adopting a different definition of “skilled workers,” based on occupation—which can only be applied to the LISA data—the overall percentage of skilled workers was considerably lower (38.6 percent

- The average level of worker education does not differ much across occupations; the maximum difference is 4.7 years between occupations that require tertiary education and occupations that require only primary education.
- Between 2012 and 2014, 77 percent of firms had vacancies and 92 percent of the vacancies were filled during that period, on average.
- Vacancies for skilled non-production manufacturing workers took longest to fill (11 weeks on average).
- Employers consider technical skills the hardest to find, while language, computer, and writing skills are not an issue for most firms.
- Firms that offer formal training do not have higher labor productivity than firms that do not.
- A higher proportion of skilled or tertiary educated workers is not associated with higher productivity.

FIGURE 3.1 The majority of the workforce in Sweden is skilled, with the highest proportion of skilled relative to unskilled workers in non-production manufacturing



Source: Enterprise Surveys database.

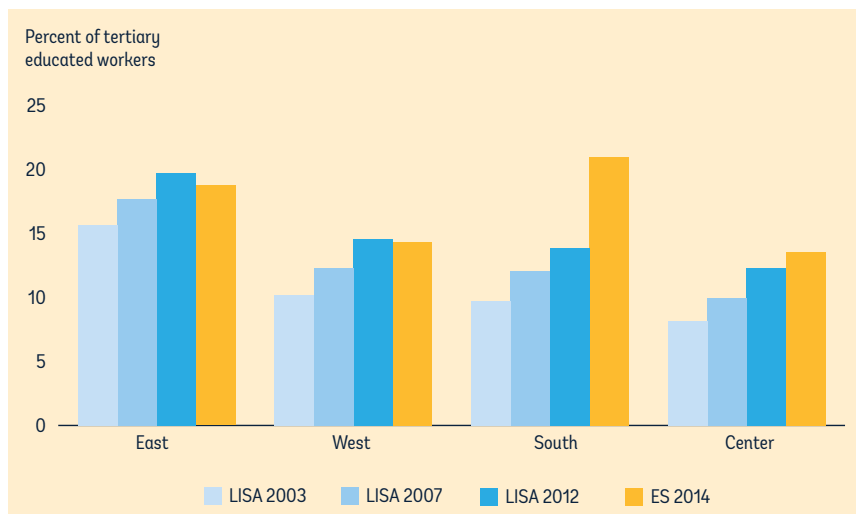
in 2012).¹⁰ If instead one defines “skilled workers” as those who have completed tertiary education, the percentage of skilled workers was even lower, at 16.2 percent in 2012 based on LISA data.¹¹

The 2014 ES data on the percentage of tertiary educated workers is broadly consistent with the positive trend in the LISA data on education between 2003 and 2012 (figure 3.2).¹² Only in the south is the percentage of workers with tertiary education in the ES data considerably higher than that recorded

in the LISA 2012 data.¹³ According to ES data, the south has the highest percentage of workers with tertiary education, followed by the east (21 and 19 percent, respectively). The same comparison using LISA 2012 data shows that the east has the highest percentage of workers with tertiary education, followed by the west and south (20, 15, and 14 percent, respectively).

When breaking down the data by sector, there seem to be more discrepancies between the ES and the LISA data.¹⁴

FIGURE 3.2 The percentage of workers with tertiary education increased in all regions from 2003 to 2012



Source: Enterprise Surveys and Statistics Sweden LISA databases.

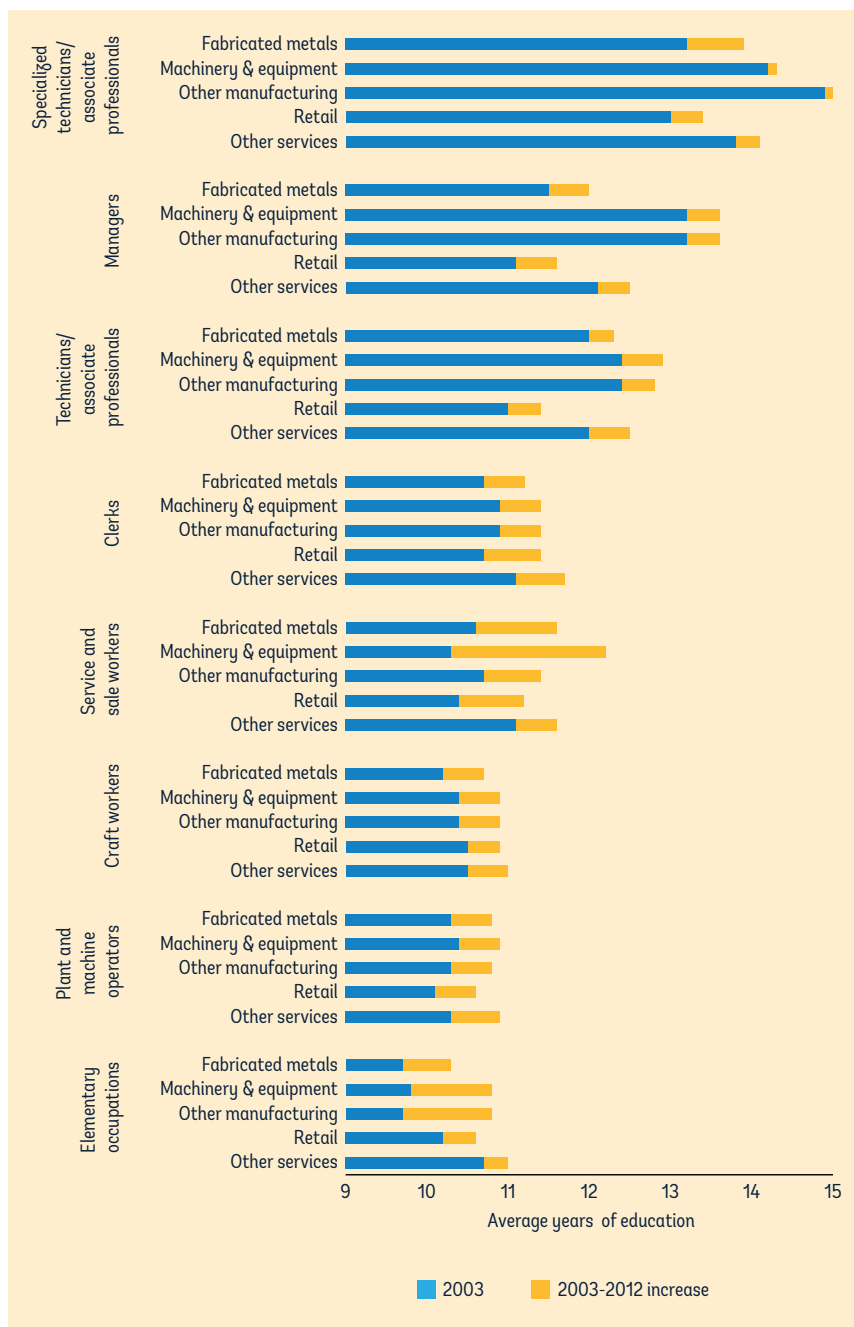
Regardless of the source, however, fabricated metals and retail are the two sectors with the smallest percentage of workers with tertiary education.¹⁵

Previous studies have found that many workers in Sweden believe their qualifications are lower than would be needed to get their jobs today. This may be because the level of education by occupation has increased over time. The LISA data show an increasing trend in years of education between 2003 and 2012 for all occupations in all sectors. The increase is smaller among higher-skilled occupations, such as technicians and managers, than among elementary and clerical or sales occupations (figure 3.3). Surprisingly, the data also show little variation in the average years of education across occupations. For example, in the fabricated metals sector in 2012, the average years of education was 10.3 for the least qualified (elementary) occupations and 13.9 for the most qualified ones (specialized technicians and associate professionals).¹⁶ In the latter category, the average years of education ranged from 13.4 in retail to 15.0 in the “other manufacturing” sector. Interestingly, fabricated metals is the only sector in which managers have a lower level of education, not only relative to specialized technicians but also compared to less-qualified technicians and associate professionals.¹⁷

For most occupations, the maximum difference in education across sectors is one year or less. For technicians, associate professionals, and managers, however, the maximum difference ranges between 1.4 and 2.0 years. In general, workers in the fabricated metals sector and in retail appear to have lower levels of education compared to other sectors for most occupation categories, particularly for managers and highly specialized technicians.

Age is another worker characteristic that may correlate to individual labor productivity. Some studies have

FIGURE 3.3 The average level of education increased for all occupations between 2003 and 2012, but more for the lower-skilled



Source: Statistics Sweden LISA database.

found that younger and prime-age workers are more productive than older workers.¹⁸ In Swedish firms, the average age (according to LISA data) is comparable between manufacturing sectors (slightly lower than 43 years), but is lower in retail and other services (39.5 and 38.2 years, respectively) (figure 3.4).¹⁹ Between 2003 and 2012,

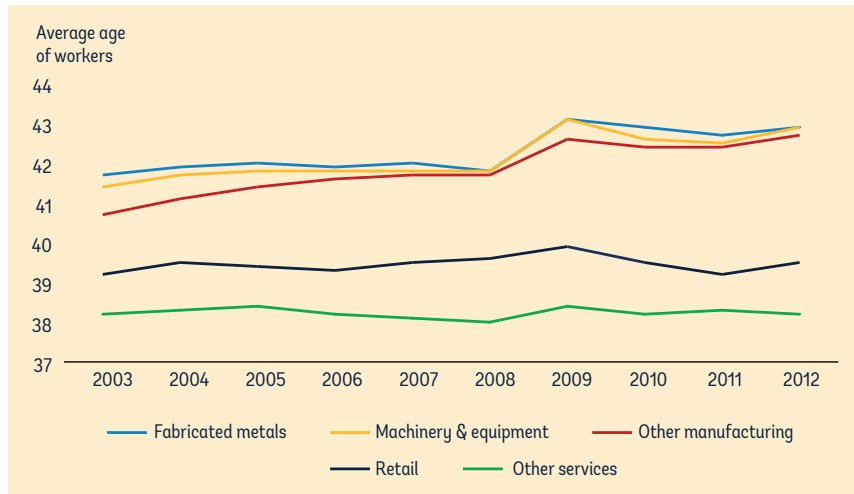
average age did not change in other services, and increased by only 0.2 years in retail, whereas it increased by 1.2 years in machinery and equipment, by 1.5 years in fabricated metals, and by 2.0 years in the other manufacturing sector. Most of this increase occurred between 2008 and 2009.

Overall, a large proportion of the workforce is employed in occupations that require special skills, but these abilities do not seem to be acquired through tertiary education. The aging of the workforce may indicate that such skills are acquired instead through experience, although aging may also be a consequence of the economic slowdown in 2008–09, when firms may have been unable to hire new workers or may have been forced to terminate the most recent hires.

FORMAL TRAINING

Several empirical papers have found a positive correlation between the provision of training and the level of labor productivity.²⁰ Training can be used as a tool to enhance the skills of the workforce, which in turn could translate into productivity gains.

On average, 70 percent of Swedish firms provide formal training to their employees.²¹ To understand which firms are more likely to provide training, table A3.1 in annex A3 presents the estimates of four regression models that look at the probability of providing training as a function of firm characteristics. Each column in the table takes into account additional firm features, starting with a basic model that includes size, age, sector, location, and an indicator denoting whether the firm is an innovator.²² Results in column 1 of table A3.1 show that the larger the firm, the higher the probability it will provide training.²³ Compared to non-innovating firms, innovators are no more likely to provide training. Retail and automotive services are the sectors in which firms are more likely to provide training. These results do not change much after taking into account the proportion of skilled and tertiary-educated workers, neither of which is associated with the probability of providing training (table A3.1, column 2). This result contrasts with previous empirical evidence

FIGURE 3.4 The workforce is aging in manufacturing, but not in services

Source: Statistics Sweden LISA database.

showing that highly educated workers tend to receive more training.²⁴

In column 3 of table A3.1, results also take into account whether the firm had vacancies in the two years before the interview for the ES, which is positively associated with the probability of providing training.²⁵ In the last column of table A3.1, the analysis is restricted to firms that had vacancies, and it considers the percentage of filled vacancies as an indicator of hiring difficulties. The higher the percentage of filled vacancies, the higher the probability that the firm provides training. Interestingly, the data show that, for firms that had vacancies, there is a negative and significant relationship between the percentage of skilled workers and the probability of providing training. This result contrasts with the previous evidence that higher-skilled workers tend to receive more training. Overall, firms that have recently hired workers are more likely to provide training, but less likely to do so if they have a higher percentage of skilled workers. This may suggest that training is offered more frequently to new recruits that are employed in unskilled occupations.

RECRUITMENT CHALLENGES FOR SWEDISH FIRMS

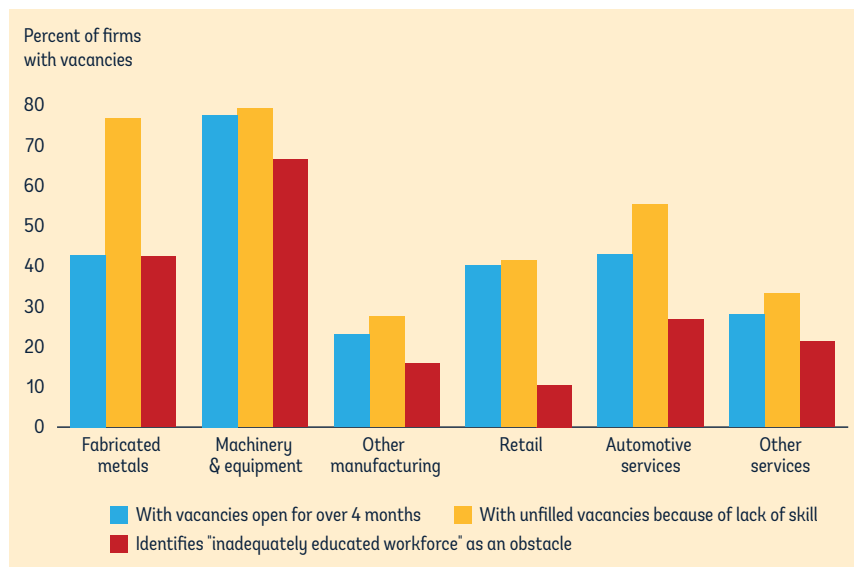
In the two years before the interview for the 2014 ES, 77 percent of Swedish firms had vacancies. This number is only 43 percent among fabricated metals firms, 86 percent for machinery and equipment and retail, 74 percent for other services sectors, and 64 percent for automotive services. There is not much variation across regions, except in the center, where only about 65 percent of firms had vacancies, as opposed to 77, 78, and 80 percent respectively in the south, west, and east. Consistent with empirical evidence from other countries, the percentage of firms with vacancies increases with firm size: 62 percent of small firms, 90 percent of medium-sized firms, and 99 percent of large firms had vacancies.²⁶ The vacancy rate (number of vacancies divided by the sum of employees and vacancies) is higher among services firms than among manufacturing firms.²⁷ On average, 73 percent of the vacancies were for skilled jobs. This percentage was higher in manufacturing than in services, and higher in the west than in other regions. This result suggests that the manufacturing sector may be more constrained by the relative

scarcity of skilled workers, since it has a higher incidence of skilled vacancies.

For firms that have been seeking to hire, the ES explored how difficult it was for them to find workers with the right skills and how long it took. As potential indicators of hiring difficulties, three different measures are used: two are based on factual data (the percentage of vacancies that were filled and the average number of weeks it took to fill them), and one is a subjective assessment by the ES respondent, indicating whether an “inadequately educated workforce” is a major or very severe obstacle to the establishment’s current operations. On average, 92 percent of the vacancies were filled over the two years before the interview. It took an average of eight weeks to fill a generic vacancy, although the average was higher for skilled non-production jobs (11 weeks) than for skilled production jobs (7 weeks) or unskilled non-production and unskilled services jobs (4 weeks).²⁸ These results are consistent with previous studies showing that employers search more intensively (and therefore vacancy durations are longer) for positions that require higher education levels or more training.²⁹

For skilled non-production jobs, the average duration of vacancies was particularly high in the center (16 weeks) compared to other regions, and higher for machinery and equipment (15 weeks) compared to other manufacturing sectors. Machinery and equipment is also the sector in which firms that had vacancies were the most likely to have them open for more than four months at the time of the interview (78 percent) (figure 3.5), were more likely to indicate the lack of skills as the main reason for their vacancies remaining open (79 percent), and were more likely to indicate lack of skills as a major or very severe obstacle to current operations (67 percent).

FIGURE 3.5 Firms in the machinery and equipment sector report the most skills-related hiring problems



Source: Enterprise Surveys database.

In order to disentangle all the potential factors that may explain the difficulty of hiring workers—which may include not only the sector of activity of the firm, but also its age or size and regional location, whether the firm is an innovator, and the percentage of vacancies that are for skilled jobs—a multivariate regression analysis was conducted. The results are shown in table A3.2 in annex A3. In the first two columns of table A3.2, the two factual indicators (percentage of filled vacancies and average weeks required to fill them) were analyzed in relation to basic firm characteristics, for all firms that had vacancies. The last three columns of table A3.2 focus instead on the subjective indicator—the probability of reporting the lack of skills as a “major” or a “very severe” obstacle, first by considering basic firm characteristics and then by including the two factual hiring difficulties indicators.

Column 1 of table A3.2 shows that the sectors of machinery and equipment, fabricated metals, and automotive services have on average a significantly lower percentage of filled vacancies compared to other manufacturing sectors, while region, firm size, and

innovation do not seem to matter. On the other hand, neither sector nor other firm characteristics helps to explain the number of weeks needed to fill a vacancy, except for innovation and for the percentage of vacancies that are for skilled jobs (column 2). Filling a vacancy in an innovating firm requires on average 6.1 weeks more than in a noninnovating firm.³⁰ However, innovators do not differ from non-innovators in the percentage of filled vacancies. Similarly, if a hiring firm has a higher percentage of vacancies that are for skilled jobs, the average vacancy duration is longer, but there are no statistically significant differences in the percentage of filled vacancies. The lack of other statistically significant results for vacancy duration may also be due to countervailing effects of firm characteristics. For example, large firms or firms in a particular region may have fewer challenges finding the right candidates thanks to a large number of applicants (which would reduce the vacancy duration), yet may have the resources to go through a more extensive (and time-consuming) selection process.³¹ The fact that sector variables are statistically significant in all the models of hiring difficulties except for

the average vacancy duration seems to suggest that there are challenges inherent in some of the sectors, which are not captured by vacancy duration. Therefore, while vacancy duration may provide useful information about the firm’s search process, the percentage of filled vacancies may be a better indicator of hiring difficulties.³²

Column 3 analyzes the relationship between basic firm characteristics and the probability of reporting the lack of skills as a “major” or a “very severe” obstacle. This probability is higher for firms in fabricated metals and machinery and equipment. Columns 4 and 5 present the results of a similar analysis conducted only for firms that had vacancies, by also taking into account objective measures of hiring difficulties, such as percentage of vacancies filled and weeks required to fill them. The previous results remain valid, and the probability of reporting a “skills obstacle” is significantly higher for firms with a smaller percentage of vacancies filled and for firms that took more weeks to fill the vacancies. Therefore, perceptions of labor market frictions align with factual experiences faced by firms.

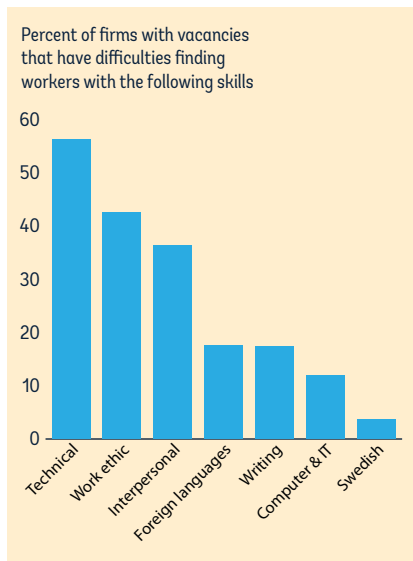
The analysis of hiring difficulties overall indicates that there are important differences across industrial sectors. Sectors that require more specialized workers (machinery and equipment and fabricated metals) seem to be more affected by frictions in the labor market than sectors with less demand for specialized workers, such as retail. Of course more disaggregated analysis at the sector level would allow this result to be better tested, as the categories other manufacturing (not shown in table A3.2) and other services are residual categories that subsume many sectors with different demands of specialized workers.

SEARCHING FOR SPECIFIC SKILLS

Technical, vocational, or job-specific skills were considered difficult or very difficult to find by 56 percent of the firms who had vacancies (figure 3.6). Other skills considered difficult to find include work ethic (43 percent of hiring firms) and interpersonal skills (36 percent). Far fewer firms report difficulties finding workers with computer and IT skills, or with writing or other language skills (in both Swedish and in foreign languages).³³ Interestingly, some of the skills that are most difficult to find are “soft” skills, which are not necessarily acquired in formal education, and are also more difficult to assess during the hiring process.

Regression analysis was conducted to test whether specific types of firms had more difficulties than others in finding a particular skill. Table A3.3 presents the results for all firms that had vacancies, by taking into account age, size, location, sector, and innovation. Once again, there are important

FIGURE 3.6 Technical or job-related skills are difficult to find for the majority of firms that had vacancies in the last two years



Source: Enterprise Surveys database.

differences across sectors and regions: foreign language skills are more likely to be a problem for firms providing automotive services or in retail (which can be explained by the fact that these industries require personal interaction with clients), and less likely to be a problem in the east and west regions. Firms in the east are also less likely to have difficulty finding workers with IT or technical skills, probably because these skills are in greater supply in the urban center around Stockholm (included in this region). Technical skills are more difficult to find for firms in machinery and equipment and automotive services. Interestingly, innovating firms are more likely to report difficulties finding workers with foreign language skills.

Lack of the necessary skills may be a reason why firms may want to terminate the employment of some workers. On average, 19 percent of firms had terminated at least one worker over the last two years due to a lack of the required skills. However, more than double the number of firms (45 percent) indicate they would have terminated workers due to lack of skills, if regulations had permitted it.

SKILLS MISMATCH AND FIRM PERFORMANCE

Limited availability of workers with the necessary skills may affect firm performance by preventing the firm from allocating resources in the most efficient manner.³⁴ To assess whether this problem is relevant for Swedish firms, regression analysis was used to study the relationship between labor productivity and indicators of hiring difficulties, in addition to other factors that can be expected to partly explain labor productivity: the age of the firm, its size, location, and sector of activity; whether the firm is an innovator; and a few indicators of the quality of the human capital stock available to the

firm (percentage of workers with tertiary education, percentage of skilled workers, and whether the firm provides formal training). As a measure of firm performance, labor productivity is computed as the average annual sales (in Krona) per worker. Since the data are a cross-section of firms interviewed only once, there is no possibility to take into account the effect of unobserved firm characteristics. Thus results should be interpreted as evidence of correlation rather than causal relationships.

Table A3.4 presents the regression results. Column 1 refers to all firms, and includes the basic set of firm characteristics: size, age, sector, location, innovation, percentage of tertiary educated workers, percentage of skilled workers, and whether the firm offers training. Column 2 adds only one indicator to test whether firms that had vacancies differ from the firms who did not. Column 3 focuses only on firms that had vacancies; it includes the percentage of filled vacancies as an indicator of hiring difficulties. The last three columns follow the same analytical procedure, for manufacturing firms only. For this type of firm, the distribution of workers can be more finely described by distinguishing between skilled production, skilled non-production, unskilled non-production, and unskilled production (baseline category not reported in the table).

Column 1 shows that firms in the fabricated metals sector are on average less productive, while firms in retail are more productive. Interestingly, and contrary to what human capital theory would suggest, no relationship is found between labor productivity and the percentage of workers who are skilled or have tertiary education, or with the provision of training.³⁵ Consistent with results discussed in chapter 5 on innovation, innovating firms do not have higher labor productivity than non-innovating firms. As seen in column 2, whether the firm had vacancies

in the last two years does not affect the results. Column 3 restricts the analysis to firms that had vacancies in the last two years: again results do not change much, and a variable that could indicate hiring difficulties (the percentage of vacancies that were filled) does not seem to be associated with labor productivity. Turning to manufacturing firms only, column 4 shows that a higher percentage of non-production unskilled workers (as opposed to production unskilled workers) is positively associated with labor productivity.

Finally, columns 5 and 6 add indicators of hiring difficulties to the analysis for manufacturing firms: results show that firms that had vacancies over the last two years have significantly higher productivity levels, but the percentage of filled vacancies is not correlated with labor productivity. The relationship between vacancies over the last two years and current productivity is not easy to interpret. Two main explanations are possible: one is that highly productive firms tend to grow more, and therefore may be more likely to have hired recently; the other is that being able to adjust the firm's skills composition through recent hiring increases productivity.

Restricting the analysis only to innovating firms (those that introduced a new product or process in the previous three years) does not change the results.

CONCLUSION

The average earnings of Swedish workers with a tertiary education are only 25 percent higher than those of workers with an upper secondary education, compared to an OECD average of 57 percent.³⁶ Perhaps due to the relatively small returns to tertiary education, the firm-level average percentage of tertiary-educated workers in Swedish sectors covered by the ES is only 14 percent, and the average years of education for workers in highly skilled occupations (such as specialized technicians and managers) does not differ much from the average schooling of workers in elementary and clerical occupations. Unexpectedly, a higher percentage of tertiary-educated workers does not seem to be associated with higher labor productivity. This may help explain the relatively low percentage of tertiary graduates working in firms: there may be little incentive to hire them. However, vacancies for skilled occupations have been the hardest to fill.

Workforce training does not appear to be used as an alternative to the search for new hires: on the contrary, firms are more likely to provide training if they had vacancies in the last two years, and the higher the percentage of vacancies filled, the higher the probability of providing training. The level of labor productivity has no relationship with

the provision of training, but is higher for firms that had vacancies in the last two years.

Finally, while some sectors report hiring difficulties, such as long vacancy durations, a low percentage of filled vacancies, or open vacancies due to lack of candidates with the required skills, these challenges do not seem to affect the level of labor productivity.

The results discussed in this chapter have different implications for firms, prospective workers, and policymakers. In terms of measures that could be adopted by firms to enhance competitiveness, formal training could be reviewed to ensure that it is better targeted to improve labor productivity, providing the type of ability and expertise that does not appear to be acquired through tertiary education.

The limited relevance of tertiary education for firm productivity may be due to a number of factors that this study cannot help identify: a mismatch between field of study and sector of employment, or problems in the quality of tertiary education. Further, the percentage of tertiary workers employed by firms seems low compared to the proportion of the active-age population with a tertiary degree: this may cause concerns for the employment prospects of tertiary graduates.³⁷

ANNEX A3

TABLE A3.1 Probability of a firm providing official training to its workforce (probit models)

Firms included	(1)	(2)	(3)	(4)
	All	All	All	With vacancies
Size (log)	0.417 (0.104)***	0.390 (0.110)***	0.301 (0.123)**	0.285 (0.141)**
Age (log)	0.091 (0.117)	0.131 (0.123)	0.176 (0.121)	0.255 (0.143)*
Innovator	0.186 (0.276)	0.268 (0.286)	0.243 (0.286)	0.058 (0.380)
Fabricated metals	-0.146 (0.324)	-0.191 (0.329)	-0.063 (0.334)	0.188 (0.499)
Machinery & equipment	0.547 (0.359)	0.624 (0.358)*	0.541 (0.361)	0.817 (0.546)
Retail	0.810 (0.318)**	0.926 (0.329)***	0.864 (0.339)**	0.928 (0.466)**
Automotive services	0.608 (0.328)*	0.507 (0.335)	0.539 (0.346)	1.112 (0.584)*
Other services	0.347 (0.305)	0.410 (0.303)	0.411 (0.317)	0.255 (0.478)
Percentage of skilled workers		-0.001 (0.004)	-0.003 (0.004)	-0.010 (0.005)**
Percentage of workers with tertiary education		-0.005 (0.006)	-0.006 (0.006)	-0.009 (0.007)
Had vacancies in last 2 years			0.606 (0.290)**	
Percentage vacancies filled				0.012 (0.006)*
Constant	-1.587 (0.631)**	-1.565 (0.660)**	-1.752 (0.676)***	-1.755 (0.990)*
Region dummies	Yes	Yes	Yes	Yes
Observations	577	531	531	391

Source: Enterprise Surveys database.

Note: Omitted industry is other manufacturing.

Standard errors are in parentheses.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A3.2 Regression models for difficulties in hiring					
Dependent variable	(1)	(2)	(3)	(4)	(5)
	Percentage of vacancies filled	Average weeks required to fill vacancies	Probability of a firm considering skills as an obstacle	Probability of a firm considering skills as an obstacle	Probability of a firm considering skills as an obstacle
<i>Firms included</i>	With vacancies	With vacancies	All	With vacancies	With vacancies
<i>Model</i>	Linear	Linear	Probit	Probit	Probit
Size (log)	1.853 (1.509)	1.137 (2.826)	0.079 (0.076)	0.026 (0.101)	0.066 (0.102)
Age (log)	-0.642 (1.506)	-0.571 (1.220)	0.015 (0.140)	0.043 (0.178)	0.079 (0.200)
Innovator	7.832 (6.221)	6.101 (2.195)***	-0.192 (0.246)	-0.317 (0.319)	-0.379 (0.375)
Fabricated metals	-16.853 (9.067)*	2.693 (3.517)	0.883 (0.356)**	0.694 (0.330)**	0.698 (0.390)*
Machinery & equipment	-27.555 (16.546)*	0.025 (3.074)	1.156 (0.385)***	1.262 (0.357)***	1.066 (0.427)**
Retail	-6.634 (4.162)	2.840 (4.529)	-0.375 (0.297)	-0.217 (0.294)	-0.254 (0.307)
Automotive services	-25.916 (11.101)**	0.297 (2.520)	0.377 (0.328)	0.461 (0.371)	0.790 (0.322)**
Other services	-0.458 (2.694)	1.794 (2.279)	0.018 (0.311)	0.233 (0.294)	0.193 (0.303)
Percentage of skilled vacancies	-0.072 (0.055)	0.084 (0.033)**		0.001 (0.004)	0.000 (0.005)
Percentage of vacancies filled				-0.009 (0.004)**	
Average weeks to fill vacancies					0.012 (0.006)**
Constant	92.085 (6.992)***	-9.048 (7.225)	-0.771 (0.640)	-0.152 (0.815)	-1.354 (0.874)
Region dummies	Yes	Yes	Yes	Yes	Yes
Observations	425	376	577	423	374

Source: Enterprise Surveys database.

Note: Omitted industry is other manufacturing.

Standard errors are in parentheses.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A3.3 Probability of a firm reporting difficulties to find certain skills (probit models)							
Type of skills	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Interpersonal	Writing	Work ethic	Swedish	Languages	IT	Technical
Firms included	With vacancies	With vacancies	With vacancies	With vacancies	With vacancies	With vacancies	With vacancies
Size (log)	-0.157 (0.104)	0.030 (0.116)	-0.127 (0.103)	0.074 (0.120)	-0.091 (0.129)	-0.150 (0.109)	-0.169 (0.127)
Age (log)	-0.116 (0.128)	-0.061 (0.145)	-0.099 (0.130)	-0.301 (0.205)	0.096 (0.185)	-0.027 (0.113)	0.153 (0.148)
Innovator	0.179 (0.360)	-0.095 (0.377)	0.476 (0.310)	0.177 (0.362)	1.110 (0.320)***	0.528 (0.401)	0.317 (0.361)
Fabricated metals	-0.263 (0.352)	0.221 (0.400)	-0.375 (0.362)	0.363 (0.448)	0.080 (0.434)	0.249 (0.335)	0.604 (0.391)
Machinery & equipment	0.173 (0.420)	1.227 (0.532)**	0.479 (0.489)	-0.410 (0.421)	0.076 (0.413)	-0.140 (0.466)	0.831 (0.446)*
Retail	0.183 (0.287)	-0.008 (0.356)	-0.043 (0.311)	-0.565 (0.412)	0.798 (0.365)**	-0.068 (0.329)	0.134 (0.330)
Automotive services	0.885 (0.356)**	0.168 (0.484)	0.314 (0.407)	0.743 (0.491)	1.195 (0.481)**	-0.693 (0.437)	0.700 (0.410)*
Other services	0.292 (0.310)	-0.082 (0.389)	-0.265 (0.330)	-1.196 (0.456)***	-0.087 (0.378)	-0.327 (0.384)	-0.213 (0.337)
East	-0.075 (0.283)	-0.107 (0.395)	-0.031 (0.300)	0.335 (0.474)	-0.897 (0.359)**	-0.846 (0.435)*	-0.945 (0.363)***
West	-0.464 (0.310)	-0.780 (0.363)**	-0.002 (0.290)	-0.090 (0.379)	-1.039 (0.419)**	-0.526 (0.392)	-0.262 (0.352)
Center	-0.210 (0.280)	-0.135 (0.384)	0.045 (0.280)	0.682 (0.425)	0.051 (0.414)	0.366 (0.321)	-0.295 (0.330)
Constant	0.281 (0.555)	-0.576 (0.702)	0.255 (0.580)	-1.183 (0.654)*	-1.707 (0.711)**	-0.536 (0.566)	0.461 (0.650)
Observations	438	420	439	440	337	417	419

Source: Enterprise Surveys database.

Note: Omitted industry is other manufacturing; omitted region is south.

Standard errors are in parentheses.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A3.4 Regression models for (log) labor productivity						
	(1)	(2)	(3)	(4)	(5)	(6)
Firms included	All	All	With vacancies	Manufacturing	Manufacturing	Manufacturing with vacancies
Size (log)	-0.040 (0.056)	-0.067 (0.060)	-0.090 (0.075)	0.146 (0.110)	0.050 (0.139)	-0.060 (0.202)
Age (log)	0.004 (0.079)	0.019 (0.079)	0.049 (0.101)	-0.034 (0.089)	0.017 (0.093)	0.209 (0.161)
Innovator	0.165 (0.180)	0.154 (0.182)	0.334 (0.238)	0.115 (0.212)	0.097 (0.208)	0.247 (0.293)
Fabricated metals	-0.618 (0.204)***	-0.578 (0.192)***	-0.754 (0.283)***	-0.512 (0.156)***	-0.466 (0.144)***	-0.755 (0.260)***
Machinery & equipment	-0.163 (0.196)	-0.201 (0.196)	-0.408 (0.277)	-0.159 (0.159)	-0.250 (0.190)	-0.424 (0.236)*
Retail	0.855 (0.205)***	0.829 (0.200)***	0.597 (0.233)**			
Automotive services	0.026 (0.246)	0.026 (0.242)	-0.151 (0.350)			
Other services	0.023 (0.230)	0.016 (0.222)	-0.226 (0.278)			
Percentage of workers with tertiary education	-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.003)	-0.002 (0.006)	0.001 (0.006)	-0.003 (0.008)
Percentage of skilled workers	0.002 (0.002)	0.002 (0.002)	0.004 (0.002)			
Firm offers training	0.251 (0.160)	0.213 (0.164)	0.173 (0.212)	0.211 (0.261)	0.085 (0.207)	0.041 (0.228)
Had vacancies in last 2 years		0.223 (0.170)			0.517 (0.278)*	
Percentage of vacancies filled			0.002 (0.004)			0.002 (0.004)
Percentage of skilled production workers				0.005 (0.004)	0.006 (0.004)	0.010 (0.005)*
Percentage of skilled non-production workers				0.004 (0.005)	0.003 (0.005)	0.008 (0.007)
Percentage of unskilled non-production workers				0.013 (0.006)**	0.016 (0.006)**	0.030 (0.009)***
Constant	14.263 (0.445)***	14.202 (0.441)***	14.142 (0.692)***	13.664 (0.427)***	13.545 (0.446)***	13.109 (0.563)***
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	513	513	376	295	295	213
R ²	0.300	0.310	0.300	0.220	0.270	0.260

Source: Enterprise Surveys database.

Note: Omitted industry is other manufacturing.

Standard errors are in parentheses.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

ENDNOTES

This chapter was written by Valeria Perotti.

1. Haltiwanger, Lane and Spletzer 1999; Mason, O'Leary, and Vecchi 2012.
2. Among the population aged 25–64, 35 percent have attained tertiary education compared to an OECD average of 32 percent (World Bank 2014b).
3. Results from the OECD Survey of Adult Skills (OECD 2013c); World Bank 2014b.
4. Manpower Group 2013.
5. Cerna 2012; Statistics Sweden 2011.
6. The LISA database, maintained by Statistics Sweden, is an administrative database containing sociodemographic information about individuals that can be matched to information about the firms where they work. Statistics Sweden provided the data to the World Bank at an aggregate level, reporting averages computed across all individuals working in establishments that belong to sectors, regions, and firm-size groups that are part of the ES universe (and not just for individuals who work in establishments participating in the ES). The industrial sectors of the ES universe include fabricated metals, machinery and equipment, and other manufacturing (rest of group D in the ISIC 3.1 classification); retail, automotive services and other services (group F, rest of group G, groups H and I, and K72 of the ISIC 3.1 classification). In the LISA data used in this chapter, automotive services are included in the other services category. For further information on LISA data, visit: <http://www.scb.se/en/Services/Guidance-for-researchers-and-universities/SCB-Data/Longitudinal-integration-database-for-health-insurance-and-labour-market-studies-LISA-by-Swedish-acronym/>
7. For example, these approaches are followed by the International Labour Organization (ILO) (2012b).
8. Enterprise Surveys Questionnaire Manual, <http://www.enterprisesurveys.org/-/media/GIAWB/EnterpriseSurveys/Documents/Methodology/Questionnaire-Manual.pdf>
9. In the manufacturing sectors, an average of 69 percent of the workforce is employed in production activities, and the percentage of skilled workers is higher in nonproduction (94 percent) than in production activities (80 percent).
10. The ILO identifies four levels of skills, based on occupation. The two high-skilled groups include managers and technicians and associate professionals. The two low-skilled groups include clerks, service and sales workers, craft workers, plant and machine operators, and elementary occupations (International Labour Organization 2012b).
11. In the LISA data used for this chapter, tertiary education refers to long post-secondary education ("lång eftergymnasial utbildning" in Swedish). The LISA data used in this chapter refer only to the sectors covered by the ES. Therefore, they do not include sectors that may have a higher percentage of tertiary educated workers, such as the health, education, or financial services sectors.
12. In the ES data, tertiary educated workers are those who have "at least a bachelor degree."
13. To improve comparability, when ES data are compared with LISA data, the ES percentages are calculated over the total of workers for the relevant category in the relevant region (or sector), instead of averaging firm-level percentages, as is done throughout the rest of the chapter.
14. The ES percentage of workers who have tertiary education is higher than in the LISA data for the fabricated metals, retail, and other services sectors; it is comparable for the machinery and equipment sector; and it is smaller for the other manufacturing sector.
15. Another comparison can be made between the average years of education for production workers in the ES data and the corresponding LISA data for workers in the "plant and machine operators" occupation category. Very similar results are found both across manufacturing sectors and across geographic regions. The average remains stable at about 10.5 years throughout the entire period 2003–12.
16. The Swedish term for specialized technicians and associate professionals is "Arbete som kräver teoretisk specialistkompetens."
17. The Swedish term for less-qualified technicians and associate professionals is "Arbete som kräver kortare högskoleutbildning."
18. Haltiwanger, Lane, and Spletzer 1999; Lallemand and Rycx 2009.
19. By comparison, the median age of workers in the United States in 2013 was 44.9 in manufacturing and 38.0 in retail (U.S. Bureau of Labor Statistics, Current Population Survey).
20. See, for example, the papers cited in the review by Blundell and others 1999.
21. For high-income OECD countries where an Enterprise Survey was conducted, the average percentage of firms that provide formal training is 41 percent (see www.enterprisesurveys.org for coverage).
22. A firm is considered to be an innovator if it has introduced a new product or process in the previous three years.
23. This result is also found by Barron, Black, and Loewenstein (1987).
24. Mason, O'Leary, and Vecchi 2012.
25. The term "vacancy" is used in the ES to indicate a job opening, whether or not it was publicly advertised.
26. Holzer 1994.
27. This result is also consistent with that found in Holzer (1994).
28. Skilled services and unskilled production vacancies required respectively 10 and 9 weeks to fill on average; however, confidence intervals are too wide to identify statistically significant differences with other vacancies.
29. Barron, Berger, and Black 1997; Almeida and Jesus 2012.
30. Almeida and Jesus (2012) also find that innovative firms have longer vacancy durations than non-innovative firms.
31. In an analysis of search strategies by Dutch employers, van Ours and Ridder (1992, 154) find that "most vacancies do not exist because there are no applicants, but because it takes time to select a suitable employee from the available applicants."
32. This measure has some drawbacks as well: for example, it is not possible to establish whether the vacancies that were not filled are also the most recent, and whether they are still open or were closed without being filled.
33. The ES interviewer manual defines "Computer skills/General IT skills" as "the ability to use a computer for general tasks like writing a document, searching the internet, sending e-mails, et cetera." A potential scarcity of IT specialists may not be adequately captured in the ES, as their skills would not be included in the "Computer skills/General IT skills" nor in the "Technical skills, other than computers/vocational, job-specific skills" category.
34. Haskel and Martin (1993) found that shortages of skilled labor in the United Kingdom were associated with a lower level of labor productivity, particularly for industries with intensive use of skilled labor.
35. The lack of a statistically significant relationship between firm-provided training and labor productivity could also be due to the fact that the investment in training may have a delayed effect on productivity, as found by Bartel (1994). Unfortunately, the ES data do not allow one to capture the effect of training conducted before the last fiscal year on the current level of firm productivity. On the relationship between share of skilled workforce and labor productivity, there is little evidence from firm-level data in Sweden. However, in at least one paper, which found a positive relationship between human capital and productivity, "no relationship between productivity and higher general skills could be traced" when restricting the analysis to manufacturing firms (Hagsten 2009).
36. World Bank 2014b.
37. As noted by the World Bank (2014b, 84), "the unemployment rate among people with an upper secondary education is remarkably close to the rate among those with a tertiary education."

Tax regulation and incentives



Taxes are as important as they are inevitable; they are essential for a well-functioning government and can have a substantial impact on the business environment. Yet taxes represent a burden, and the optimal level of taxes, and their administration, will always be a central point of debate, as has been the case recently in Sweden.

Since Sweden instituted a major reform of the tax system in 1991, corporate tax rates have successively fallen, with further reductions in 1994, 2005, 2008, and most recently, in 2013.¹ Sweden's private sector, nonetheless, still faces comparably high tax rates. As of 2012, the Swedish statutory corporate tax rate (26.3 percent) remained higher than the EU-27 average (23.5 percent).² Even after the 2013 reduction in statutory rates to 22.0 percent, the estimated profit tax in Sweden only fell to 13.37 percent of commercial profit, just slightly below the EU-27 average of 13.43 percent.³

Nonetheless, Sweden's social security contributions, at 35.5 percent of commercial profit in 2013, continue to be well above averages in Nordic countries (20.1 percent), OECD high-income economies (23.0 percent), the G-7 (24.0 percent), and the EU-27 (27.6 percent).⁴ This is evident when looking at the most recent *Doing Business 2015* report, which estimates the effective tax rates paid by corporations in 2013. According to the report, firms in Sweden face a total tax rate (TTR) of 49.4 percent of commercial

profit, which includes taxes on corporate profits, social security contributions paid by employers, and other taxes. This rate, expressed as a percentage of commercial profit, is above the Nordic (36.3 percent), OECD high-income (41.3 percent), the EU-27 (42.7 percent), and G-7 averages (47.2 percent).

Despite comparatively higher tax rates, however, firms' administrative costs to comply with taxes remain low in Sweden.⁵ As reported by *Doing Business 2015*, Sweden's tax system requires comparatively less compliance time (122 hours a year) compared to high-income OECD (175 hours), EU-27 (188 hours), and G-7 countries (196 hours), though marginally more time than the Nordic average (121 hours). Firms in Sweden, moreover, are required to make only six tax payments per year, fewer than G-7 (10 payments), EU-27 (11 payments), OECD (12 payments), and Nordic averages (13 payments).⁶

While Sweden's tax system has undergone a notable series of reforms in recent years, several additional policy proposals are currently being considered, with possible implications for the country's private sector. One particular proposal targets the tax system with respect to debt and equity finance. Like that of comparable countries, Sweden's tax system favors debt over equity finance: costs associated with debt finance may be deducted against taxable profits, while costs associated with equity capital must be paid from after-tax income.

- Profit tax rates matter for foreign direct investment in the OECD; labor taxes matter for the formation of new firms.
- Sweden's largest firms report major tax obstacles at a significantly lower rate than do firms with fewer than 250 employees.
- Overall, one in five firms in Sweden reports not hiring due to tax or contribution rates.
- Gazelles are less likely to report not hiring for tax-related reasons.
- Firms seeking higher-skilled applicants are more likely to report not hiring due to taxes or contribution rates.

Some earlier research has found considerable differences in the marginal tax rates for debt- and equity-financed investments in Sweden, showing considerably lower effective marginal rates for the use of debt financing.⁷ Comparing the effective marginal rate for each type of financing, debt financing has been estimated to have a negative (and thus attractive) rate, while equity has a substantially higher (and positive) rate.⁸ Some analyses of the comparative attractiveness of different forms of financing suggest that the favorable tax treatment of debt may result in suboptimal leverage.⁹ Higher levels of leverage could increase the probability that businesses experience financial distress. In one report the aggregate costs of financial distress in Sweden were estimated to be around SKr 21.4 billion, equivalent to about 0.6 percent of GDP or 20 percent of corporate tax payments in 2010.¹⁰ This amounts to a large distortion, on top of which an estimated SKr 7.2 billion is lost due to inefficiencies in capital productivity resulting from the tax discrimination against equity finance.¹¹

The distortions mentioned above suggest that a move toward neutral taxation of debt and equity capital could induce a reallocation from debt-financed investments—with low pretax returns—toward equity-financed investments with higher pretax returns. In June 2014, the Committee on Corporate Income Taxation suggested a new corporate tax system to promote greater neutrality between the taxation of equity and debt, as well as a lower tax burden on risk capital.¹² The main proposal is twofold. First, deductions for interest expenditures and other financial costs would be limited to those financial expenses with corresponding income—no other financial costs would be deductible. Second, a standard deduction, known as a “financing allowance,” would be introduced at a rate of 25 percent of taxable profit, effectively lowering the statutory corporate income tax rate by 5.5 percentage points, from 22 percent

to 16.5 percent.¹³ The reform will have no effect on the national budget, the Committee has assessed.

While the literature presents ambiguous findings on reforms like the one proposed in Sweden, it is expected that such policies would redistribute corporate tax payments in the business sector. Researchers have generally estimated that removing or reducing tax deductions for interest will raise the cost of capital, thereby reducing investment.¹⁴ The impacts for individual businesses, though, would depend partly on their leverage and partly on their rates of returns. Companies with lower debt and higher returns would have larger financing allowances and thus pay lower corporate income taxes. But companies with higher debt and higher interest costs—such as many firms in the real estate and construction sector—would pay more in taxes than under the current tax regime.

INVESTMENT, ENTREPRENEURSHIP, AND TAXES IN THE OECD

The effects of both tax rates and tax complexity on private sector activity have been widely debated, with corporate income taxes receiving particular attention. Broadly, higher corporate income taxes have been found to hamper economic growth, though evidence suggests this effect is stronger outside of high-income OECD countries.¹⁵ Within OECD countries, some evidence indicates that lowering statutory corporate tax rates can result in large productivity gains by increasing the profitability of already-dynamic firms; indeed high corporate tax rates have been predicted to hinder firm productivity in all firms except the young and small.¹⁶ An OECD report in 2010 rated corporate income tax as the most harmful tax for economic growth, followed by personal income and consumption taxes.¹⁷

Tax rates may also have a notable relationship with patterns of investment and entrepreneurship, two important forces for private sector growth. Higher total tax rates have been shown to be correlated with lower levels of private sector investment and the formation of new firms.¹⁸ This remains true across a global sample of countries. Among European countries specifically, lower corporate tax rates have been associated with not only increased flows of foreign direct investment (FDI), but also with better quality FDI, resulting in higher tax revenue and increased labor income.¹⁹

Using the most recent data available, analysis for this current report finds similar evidence in OECD countries: over the period 2004–12, a higher effective TTR is significantly associated with lower FDI inflows and new-firm formation, in line with earlier work using *Doing Business* data (table A4.1).²⁰ A high labor tax rate in particular is associated with lower levels of firm creation,²¹ whereas the profit tax rate does not seem to matter—a possible reflection of the labor intensity of start-up firms (table A4.2).

By contrast, labor tax rates do not appear to be significantly correlated to foreign investment flows; rather it is the corporate tax rate (profit tax rate) that has a significant negative relationship with FDI inflows (table A4.1). This finding suggests that profit taxes may well enter into foreign firms' decisions to locate a branch or affiliate in a country. Indeed, a 2014 PwC survey showed the majority of CEOs worldwide consider the competitiveness of tax regimes when deciding where to operate.²² This effect is stronger in Nordic countries, and in Sweden in particular. Though no significant result is found between the labor tax rate and FDI flows, previous research has found that the differential between labor tax rates matters for multinationals' investment decisions, a possible indication that firms choose to

locate subsidiaries based on labor tax rates relative to their home country of operations.²³

Interestingly, no such tax rate effect is seen when it comes to gross capital formation, a measure of within-firm investment, suggesting that some firms' investment decisions are more associated with their business needs and expectations regarding the policy environment and economic conditions within a country (see table A4.3).

The complexity of a tax system, as indicated by the number of tax payments, has also been shown to be negatively related with entrepreneurship but not necessarily with investment flows.²⁴ And while greater tax system complexity is not necessarily correlated with lower FDI inflows, a more complex system may have an inhibiting effect on the presence of foreign investment in the first place.²⁵ There is also evidence that tax rates are related to firms' decisions on issues such as location and the capital or labor intensity of production. Evidence from OECD countries, for instance, has shown that lower social security contribution rates result in higher labor intensity but also in lower total factor productivity.²⁶

PERCEPTIONS OF TAX COMPLEXITY, CHANGES, AND RATES AS CONSTRAINTS

The recently collected *Enterprise Survey* data in Sweden contain information on firms' experiences with the current tax system in the country. One in ten firms cites either changes to the tax code or the code's complexity as a major obstacle to operations, while 9 percent cite tax rates as a major constraint.

While nominally low at a national level, these constraints differ notably by firm size (figure 4.1). Generally as firm size increases, so does the proportion of firms reporting that the complexity of

and changes to the tax code, as well as tax rates, represent major obstacles. However for the largest firms—those with at least 250 employees—the proportion of firms reporting each aspect of the tax system as a major constraint is significantly lower; in the aggregate, there appear to be negative scale effects to firms' ability to navigate the tax system for all but very large firms.

Likewise, the so-called "gazelle" firms—those that are 10 years or younger and fast-growing²⁷—cite both tax-related issues as major constraints at a rate well below that of older firms (figure 4.2). A notably larger proportion of older firms cite the complexity or frequency of changes to tax rules as a major constraint; in fact, three times as many older firms cite tax rates as a major constraint compared to gazelle firms.

What is more, gazelles are significantly less likely to report tax rates as a major obstacle, even after taking several firm characteristics into account, including productivity (as measured by sales per worker). This means that young,

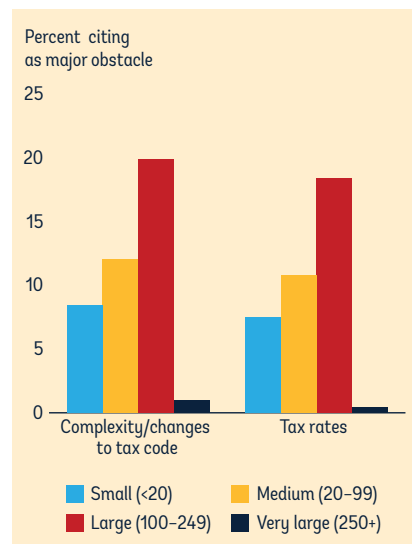
dynamic firms are less likely to report tax rates as a major constraint compared to their older counterparts, even if they are just as productive—a finding in line with evidence elsewhere.²⁸

REQUIRED MEETINGS WITH TAX OFFICIALS ARE A LOW BURDEN

According to the *Enterprise Survey* data, only 9 percent of firms in Sweden are required to meet with tax officials, and when they do, typically only one interview occurs. This finding is unsurprising given Sweden's e-tax system, though the likelihood that a firm is required to meet with tax officials does vary notably.

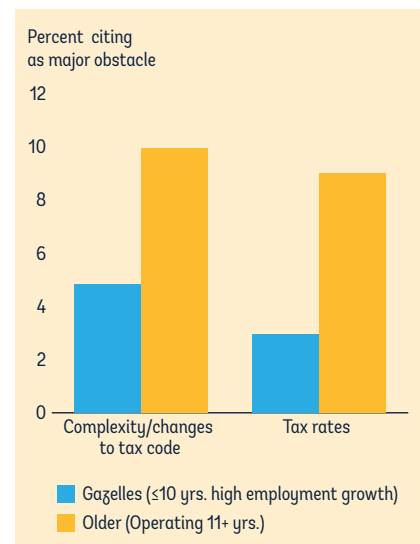
In particular, after taking certain firm characteristics²⁹ into account, there is a significant correlation between a firm's size and the likelihood that it will be required to meet with tax officials. This relationship, however, does not hold for the largest firms; only 6 percent of firms with 250 or more employees are required to meet with

FIGURE 4.1 Larger firms in Sweden report tax-related obstacles at higher rates, though this does not hold for the largest firms (250+ employees)



Source: *Enterprise Surveys* database.
Note: Size categories according to the number of employees

FIGURE 4.2 Gazelles report tax-related obstacles as major constraints less than their older counterparts



Source: *Enterprise Surveys* database.

tax officials, compared to 9 percent of firms with fewer workers (figure 4.3).²⁹ Interestingly, 10 percent of service firms are required to meet with tax officials, as compared to 4 percent of manufacturing firms (figure 4.4), a finding that holds even after accounting for firm size.

The reduction of compliance times through the use of the e-tax system, as noted in last year's *Sweden's Business Climate* report, has allowed the Swedish Tax Agency to focus on audits of questionable or problematic returns. Smaller firms, which have a relatively higher compliance cost compared to their larger peers,³¹ do benefit in practice from less frequent meetings with the tax authority. On the other end of the spectrum, the fact that very large firms also meet less frequently with tax authorities, relative to medium and large firms, may indicate a more sophisticated navigation of the tax system.

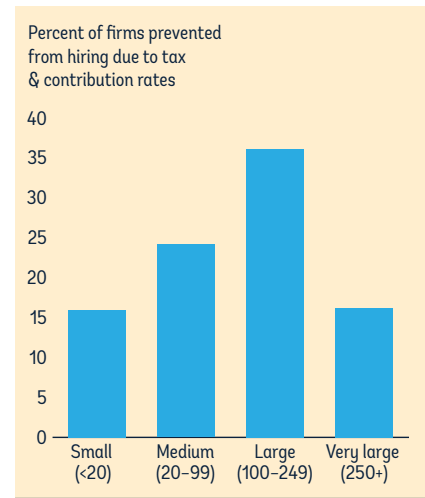
There is little evidence in the *Enterprise Survey* that tax administration is applied arbitrarily: young firms are no more likely to need to sit down with tax officials than older firms; nor are female-managed firms more likely to

be required to meet with tax officials than their male-operated counterparts. Businesses in the southern region are required to meet more frequently with tax officials than are firms in the western region, but this difference is explained in part by the greater presence of very large firms in the capital. Underlying this evenness is a minimal presence of corruption, with a negligible percentage of firms reporting a request for a bribe over the course of these meetings.³²

TAXES, CONTRIBUTION RATES, AND HIRING

One notable area where taxes have an evident effect is in Sweden's private sector labor market. Over 20 percent of firms report having been prevented from hiring due to tax or contribution rates. This rate is lowest among Sweden's smallest firms, with 16 percent reporting foregoing hiring due to taxes, compared to 24 percent for medium and 36 percent for large firms (figure 4.5). Once again, Sweden's largest firms, with 250 or more employees, appear able to mitigate tax policy effects on their operations: only 16 percent of these firms report not hiring due

FIGURE 4.5 A lower proportion of the very largest firms report being constrained due to tax or contribution rates

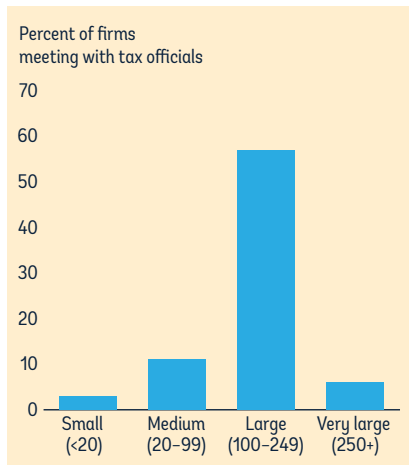


Source: Enterprise Surveys database.

to tax or contribution rates, compared to an average of 21 percent of firms with fewer employees. And 12 percent of gazelles report not hiring due to tax or contribution rates, compared to an average of 21 percent of older firms and young, slow-growing firms (figure 4.6).

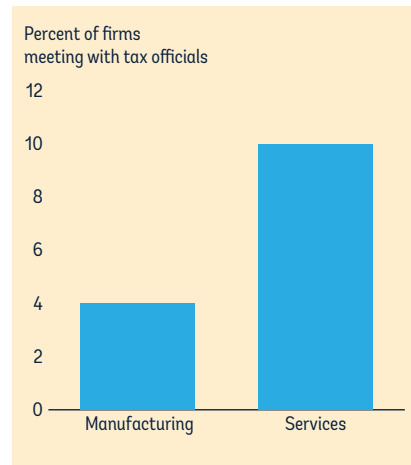
One possible explanation for this pattern is the impact of the tax wedge—the difference between the wage costs to employers and the net income that workers receive—on both the demand and supply sides of the labor market. Employer-paid social security contributions and payroll taxes can affect the demand for labor by increasing the cost to employers, curtailing demand for hiring the highest earners.³³ At the same time, employee-paid personal income taxes and social security contributions may affect labor supply, specifically the choices in allocating time between labor and leisure; higher employee-paid taxes imply less disposable income.³⁴ This “substitution effect” may have a particularly strong impact on low-income workers, married women, and single mothers.³⁵

FIGURE 4.3 The very largest (and the smallest) firms are required to meet with tax officials less frequently than their counterparts



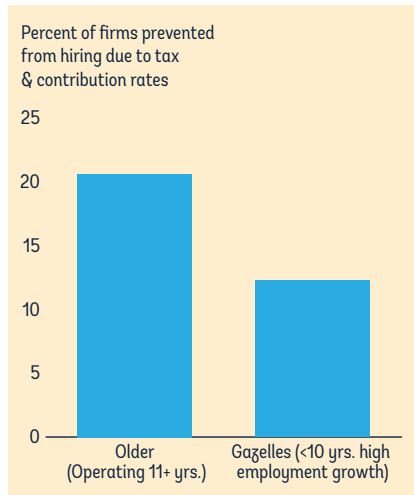
Source: Enterprise Surveys database.

FIGURE 4.4 Manufacturers are required to meet with tax officials less frequently than services firms



Source: Enterprise Surveys database.

FIGURE 4.6 A lower proportion of gazelles report not hiring due to tax-related constraints



Source: Enterprise Surveys database.

HIRING FRICTIONS, SKILLS, AND TAXES

Frictions due to tax and contribution rates may vary depending on the type of positions employers are seeking to fill. A larger proportion of firms seeking to fill higher-skill positions, which are likely to have higher wage costs, report being constrained in hiring for tax-related reasons compared to firms seeking lower-skilled, and presumably lower-paid, employees. Firms in which a majority of vacancies are for skilled positions are nearly twice as likely to report being constrained in hiring for tax-related reasons than are firms in which a majority of the vacancies are for unskilled positions (figure 4.7).³⁶ The result in figure 4.7 appears to be in line with recent findings that the cost of hiring or dismissing skilled workers—defined in the research as “white collar” workers—is higher and so less responsive to efforts such as the recently enacted tax subsidy for young workers.³⁶ This would also hold if wage costs for skilled workers are above optimal levels, including for instance, minimal employment effects of targeted tax policies (see box 4.1).

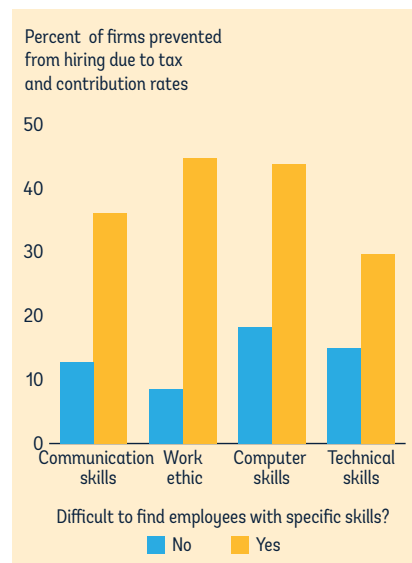
FIGURE 4.7 Firms seeking to hire skilled workers are more likely to be constrained in hiring by tax rates



Source: Enterprise Surveys database.

Likewise, firms that report difficulties in finding specific skills among applicants are also significantly more likely to report being unable to hire due to tax or contribution rates (figure 4.8). This relationship holds across several types of skills: firms that report difficulty finding communication skills, a strong work ethic, computer skills, and other

FIGURE 4.8 Firms with difficulty in finding skilled workers are more likely to be constrained in hiring by taxes or contribution rates



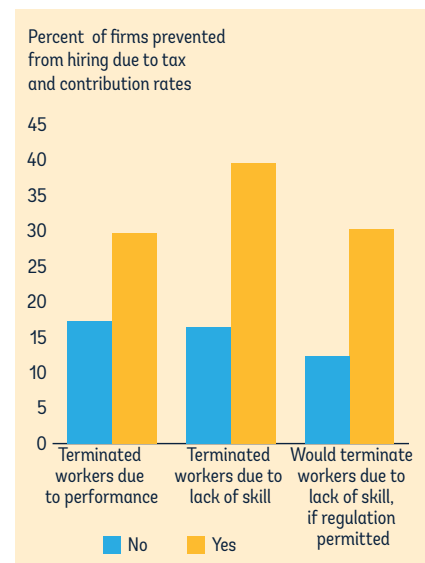
Source: Enterprise Surveys database.

technical skills all report in significantly higher proportions being prevented from hiring for tax-related reasons (see table A4.4A).³⁸

The relationship between tax and contribution rates and employment frictions appears to exist when it comes to dismissing workers as well. Firms that have terminated workers due to poor performance or lack of skills—both indicators of fluid employment and a possible need for more skilled labor—report in higher proportions being unable to hire due to tax or contribution rates (figure 4.9). Likewise, firms reporting that they would have dismissed workers due to lack of skill if regulations permitted are significantly more likely to report being constrained in hiring due to tax or contribution rates.

A firm’s average wage bill—that is, the total wage and social security contributions paid per worker—also appears to play a role in hiring frictions. There is a strong inverse relationship between the average wage cost and a firm’s likelihood of being prevented

FIGURE 4.9 Firms dismissing workers due to poor performance or lack of skill are more likely to be prevented from hiring due to tax or contribution rates



Source: Enterprise Surveys database.

BOX 4.1 Payroll tax cuts for young employees

Since the severe recession that impacted Sweden in 1991–93, youth unemployment has been high in both absolute terms and relative to older workers.^a Between 2000 and 2005, when the overall unemployment rate for youths 15–25 years old rose from 15 percent to over 20 percent, youth unemployment became a central political issue, prompting the first Reinfeldt government to introduce a payroll tax cut for youths.

To lower the cost for employers to hire young workers, on July 1, 2007, the Swedish government cut the payroll tax rate from 32.42 percent to 21.32 percent for all individuals between 18 and 25 years old. On January 1, 2009, the government further reduced the tax rate to 15.49 percent,^b while expanding eligibility to anyone up to 26 years old.

Subsequent research on the outcome of these cuts indicates a modest positive effect—estimated to be around 2.7 percent—on youth employment.^c Specifically, modest positive effects on job creation were found in the retail sector, a key employer of young people.^d Though small in overall magnitude, this effect on the retail sector has been found to be larger for minimum wage employees.^e Similarly, research in all sectors finds only modest upticks in youth employment following these cuts, but with a greater effect on workers with vocational training.^f

In addition to employment effects, a key issue is whether the payroll tax cuts have increased wages and profits. If the rate cuts are passed on to employees in the form of higher wages, this can in turn dampen the positive impact on employment by increasing the cost of labor. Alternatively, the tax cut gains might benefit firms through higher profits, which might then open possibilities for hiring unemployed workers through higher demand for labor. Earlier research found weak evidence for positive effects on wages and small positive effects on the profitability of large retail firms.^g A recent 2015 study finds no significant relationship between the youth payroll tax cut and firm profitability among all Swedish firms (Table B4.1.1).^h

Table B4.1.1 Main research results on the payroll tax cut

Study	Employment	Wages	Profits	Examined population
Egebark and Kaunitz 2014	Small increase	Small increase	n.a.	All workers
Skedinger 2014	Small increase	Small increase	Small increase	Retail workers and firms
Malm and others forthcoming	n.a.	n.a.	No significant relationship	All workers and firms

Source: Malm and others forthcoming.

Note: n.a. refers to "not applicable."

One possible reason for the small increases in employment following these targeted tax cuts is that the cost per worker remains above optimal levels, even with payroll tax cuts.ⁱ Indeed, some of the initial research following the cuts found that the new jobs added tended to bring higher costs to the employer—and this relationship may be exacerbated if new workers are expensive relative to their productivity, such as by requiring extensive training.^j

- a. A significant portion of youth unemployment was attributable to students looking to enter the labor market.
- b. The rate takes into account the general payroll tax cut that was enacted at the same time.
- c. Egebark and Kaunitz 2014. The authors considered the estimate of 2.7 percent to be on the high end, as it did not take into account possible crowding out effects on workers who are not eligible for a payroll tax cut.
- d. Skedinger 2014.
- e. Skedinger 2014.
- f. Egebark and Kaunitz 2014.
- g. Egebark and Kaunitz 2014; Skedinger 2014.
- h. Malm and others forthcoming.
- i. Egebark and Kaunitz (2014) suggest this as one possible explanation for their findings.
- j. Egebark and Kaunitz 2014.

from hiring due to tax or contribution rates. This is unsurprising: firms that pay more on average have less difficulty overcoming tax-related obstacles in hiring. However it is notable that after taking the average wage bill into account, firms that seek more skilled applicants are *still* more likely to report being prevented from hiring due to tax or contribution rates (see table A4.4B).

Interestingly, productivity and performance indicators, including labor productivity, sales, and employment growth, are not significantly correlated with firms reporting tax-related impediments to hiring—an indication that firms at all performance levels face tax-related hiring constraints at a similar level, though possibly for different underlying reasons. Nor do these relationships change by a firm's location within Sweden—again, a suggestion that firms face tax-related

hiring constraints uniformly across the country.

Together, these indicators suggest inefficient frictions between the private sector labor market and the Swedish tax system, particularly in the market for skilled labor.

CONCLUSION

Firms in Sweden pay 49.4 percent of commercial profit in taxes, more than the average in Nordic, OECD high-income, EU-27, and G-7 countries. While all governments need revenue, the size of the tax burden on business has an impact on investment and growth. Recent data show that among high-income OECD countries higher profit taxes result in lower FDI, while higher labor taxes result in lower rates of new-firm formation.

In terms of Swedish firms' experiences with the tax system, gazelles and very large firms with more than 250 employees cite tax-related obstacles at significantly lower rates than do firms of other sizes. Firms also report that taxes have a clear effect on the labor market. One in five Swedish firms reports not hiring due to tax or contribution rates; gazelles, however, are less likely to report not hiring for tax-related reasons. Notably, the applicants' skill levels are shown to be a factor; firms that seek mainly skilled applicants are twice as likely to report being constrained in hiring for tax-related reasons compared to firms seeking mainly unskilled workers. These firm-level experiences provide valuable insight into the effects of taxes on the Swedish private sector.

ANNEX

TABLE A4.1 FDI inflows (percent of GDP), OECD high-income economies															
Total tax rate (t-1)	-0.176* (0.096)	-0.174* (0.096)	-0.181* (0.094)	-0.193** (0.087)	-0.178* (0.097)										
Labor tax rate (t-1)						-0.013 (0.085)	0.005 (0.086)	0.003 (0.086)	-0.006 (0.082)	0.016 (0.090)					
Profit tax rate (t-1)											-0.392*** (0.134)	-0.421*** (0.127)	-0.425*** (0.128)	-0.424*** (0.118)	-0.435*** (0.128)
No. of tax payments (log)	-0.355 (1.575)	0.272 (1.736)	0.176 (1.781)	-0.070 (1.656)	0.108 (1.866)	0.358 (1.938)	0.962 (2.184)	0.937 (2.218)	0.758 (2.139)	0.687 (2.300)	-1.350 (1.529)	-0.746 (1.547)	-0.817 (1.597)	-0.984 (1.506)	-1.207 (1.600)
Procedures to start a business	-0.320 (0.261)	0.002 (0.358)	-0.034 (0.378)	-0.178 (0.386)	-0.048 (0.402)	-0.441 (0.270)	-0.135 (0.341)	-0.149 (0.366)	-0.278 (0.368)	-0.195 (0.386)	-0.502** (0.204)	-0.118 (0.237)	-0.151 (0.256)	-0.284 (0.243)	-0.203 (0.261)
GDP growth (t, t+1, t+2 avg.)		0.510 (0.312)	0.365 (0.401)	0.242 (0.361)	0.369 (0.399)		0.657 (0.394)	0.605 (0.506)	0.498 (0.466)	0.619 (0.496)		0.710*** (0.259)	0.599* (0.338)	0.505 (0.315)	0.597* (0.322)
GDP per capita (log)		4.070 (3.263)	3.914 (3.345)	5.083 (3.608)	3.915 (3.362)		3.904 (3.683)	3.842 (3.797)	4.857 (4.169)	3.872 (3.827)		4.767 (3.335)	4.645 (3.418)	5.660 (3.743)	4.671 (3.405)
Crisis (= year 2007-11)			-1.823 (1.367)	-2.442* (1.216)	-1.821 (1.365)			-0.666 (1.748)	-1.180 (1.551)	-0.677 (1.728)			-1.464 (1.294)	-1.936 (1.221)	-1.556 (1.272)
Nordic				-5.484* (2.936)					-4.866 (3.015)					-4.792** (2.320)	
Sweden					-1.225 (2.540)					-3.903 (2.984)					-5.326*** (1.672)
Constant	15.431** (5.731)	-30.753 (35.496)	-26.702 (37.270)	-35.170 (39.099)	-26.535 (37.619)	7.513 (5.291)	-37.259 (42.920)	-35.825 (45.317)	-43.473 (47.822)	-35.366 (45.728)	18.286*** (5.381)	-35.068 (36.564)	-32.010 (38.104)	-39.941 (40.349)	-30.559 (37.925)
R-squared	0.123	0.186	0.193	0.250	0.193	0.030	0.098	0.099	0.144	0.106	0.215	0.308	0.312	0.356	0.327
n	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177

Source: World Development Indicators, Doing Business

Note: OLS regression with robust S.E., clustered at the country level. Unit of analysis is country at time t. dependent variable is the three-year average over t, t+1, t+2.

* p < 0.1

** p < 0.05

*** p < 0.01

TABLE A4.2 New firms (per 1,000 people), OECD high-income economies

Total tax rate (t-1)	-0.098*** (0.035)	-0.099** (0.037)	-0.104** (0.040)	-0.105** (0.041)	-0.103** (0.0410)														
Labor tax rate (t-1)																			
Profit tax rate (t-1)																			
No. of tax payments (log)	0.253 (0.983)	0.225 (1.073)	0.140 (1.097)	0.120 (1.157)	0.122 (1.173)	0.701 (1.102)	0.660 (1.187)	0.617 (1.214)	0.603 (1.258)	0.644 (1.293)	0.865 (1.150)	0.855 (1.229)	0.826 (1.254)	0.823 (1.293)	0.704 (1.298)				
Procedures to start a business	-0.589** (0.256)	-0.595* (0.332)	-0.616* (0.343)	-0.630 (0.379)	-0.620* (0.363)	-0.572** (0.234)	-0.589* (0.303)	-0.604* (0.315)	-0.616* (0.350)	-0.599* (0.330)	-0.658** (0.258)	-0.675* (0.337)	-0.684* (0.350)	-0.687* (0.385)	-0.700* (0.366)				
GDP growth (t, t+1, t+2 avg.)		-0.043 (0.216)	-0.149 (0.290)	-0.163 (0.315)	-0.149 (0.290)		-0.031 (0.213)	-0.100 (0.283)	-0.111 (0.303)	-0.100 (0.285)		0.056 (0.191)	0.022 (0.250)	0.020 (0.270)	0.019 (0.247)				
GDP per capita (log)		-0.096 (1.481)	-0.260 (1.585)	-0.177 (1.426)	-0.263 (1.598)		-0.229 (1.425)	-0.341 (1.524)	-0.266 (1.374)	-0.338 (1.537)		-0.201 (1.570)	-0.254 (1.648)	-0.235 (1.483)	-0.268 (1.653)				
Crisis (t= year 2007 -11)			-1.121 (0.984)	-1.180 (1.100)	-1.122 (0.988)			-0.743 (0.972)	-0.793 (1.063)	-0.740 (0.985)			-0.367 (0.886)	-0.379 (0.960)	-0.402 (0.903)				
Nordic				-0.458 (1.974)					-0.417 (1.980)					-0.104 (2.155)					
Sweden					-0.311 (1.884)														
Constant	11.944*** (3.374)	13.133 (19.018)	16.397 (21.156)	15.864 (19.866)	16.480 (21.499)	8.900** (3.365)	11.523 (18.228)	13.589 (20.186)	13.075 (18.888)	13.474 (20.548)	6.114* (3.056)	8.233 (18.389)	9.272 (20.031)	9.138 (18.677)	9.970 (20.509)				
R-squared	0.254	0.255	0.262	0.263	0.262	0.263	0.264	0.267	0.268	0.267	0.174	0.176	0.177	0.177	0.180				
n	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144				

Source: World Development Indicators, Doing Business.
 Note: OLS regression with robust S.E., clustered at the country level. Unit of analysis is country at time, t. dependent variable is the three-year average over t, t+1, t+2.

* p < 0.1
 ** p < 0.05
 *** p < 0.01

TABLE A4.3 Capital formation (percent GDP), OECD high-income economies													
Total tax rate (t-1)	-0.015 (0.043)	0.019 (0.032)	0.015 (0.032)	0.015 (0.032)	0.023 (0.034)								
Labor tax rate (t-1)				0.011 (0.037)	0.037 (0.034)		0.035 (0.034)	0.048 (0.035)					
Profit tax rate (t-1)									-0.054 (0.064)	-0.041 (0.053)	-0.045 (0.054)	-0.045 (0.054)	-0.050 (0.053)
No. of tax payments (log)	-0.539 (1.009)	-0.595 (1.040)	-0.656 (1.039)	-0.661 (1.033)	-0.847 (1.036)	-0.485 (0.969)	-0.701 (0.966)	-0.960 (0.945)	-0.712 (1.010)	-0.828 (1.033)	-0.899 (1.024)	-0.905 (1.017)	-1.139 (1.012)
Procedures to start a business	0.281 (0.240)	0.176 (0.197)	0.159 (0.202)	0.155 (0.211)	0.122 (0.202)	0.261 (0.244)	0.145 (0.202)	0.099 (0.202)	0.263 (0.233)	0.190 (0.187)	0.165 (0.193)	0.159 (0.206)	0.134 (0.191)
GDP growth (t, t+1, t+2 avg.)		0.885*** (0.197)	0.809*** (0.261)	0.805*** (0.265)	0.820*** (0.260)		0.835*** (0.242)	0.850*** (0.238)		0.870*** (0.187)	0.783*** (0.252)	0.779*** (0.257)	0.781*** (0.249)
GDP per capita (log)		-2.009 (1.232)	-2.084* (1.225)	-2.055 (1.269)	-2.080 (1.231)		-2.018* (1.165)	-1.987* (1.146)		-1.914 (1.210)	-2.002* (1.178)	-1.962 (1.218)	-1.985 (1.176)
Crisis (1= year 2007-11)			-0.927 (0.941)	-0.944 (0.953)	-0.921 (0.931)		-0.897 (0.919)	-0.908 (0.900)			-1.119 (0.982)	-1.137 (0.994)	-1.178 (0.965)
Nordic				-0.143 (1.249)					-0.072 (1.308)			-0.195 (1.272)	
Sweden					-3.270*** (1.076)			-3.854*** (1.153)					-3.161*** (0.902)
Constant	22.278*** (3.701)	41.403*** (14.201)	43.467*** (14.516)	43.262*** (14.785)	43.878*** (14.616)	21.395*** (2.962)	42.754*** (13.336)	43.211*** (13.106)	23.071*** (3.392)	42.396*** (13.618)	44.723*** (13.615)	44.414*** (13.947)	45.599*** (13.653)
R-squared	0.035	0.357	0.362	0.362	0.379	0.034	0.372	0.395	0.044	0.360	0.367	0.367	0.384
n	167	167	167	167	167	167	167	167	167	167	167	167	167

Source: World Development Indicators, Doing Business.

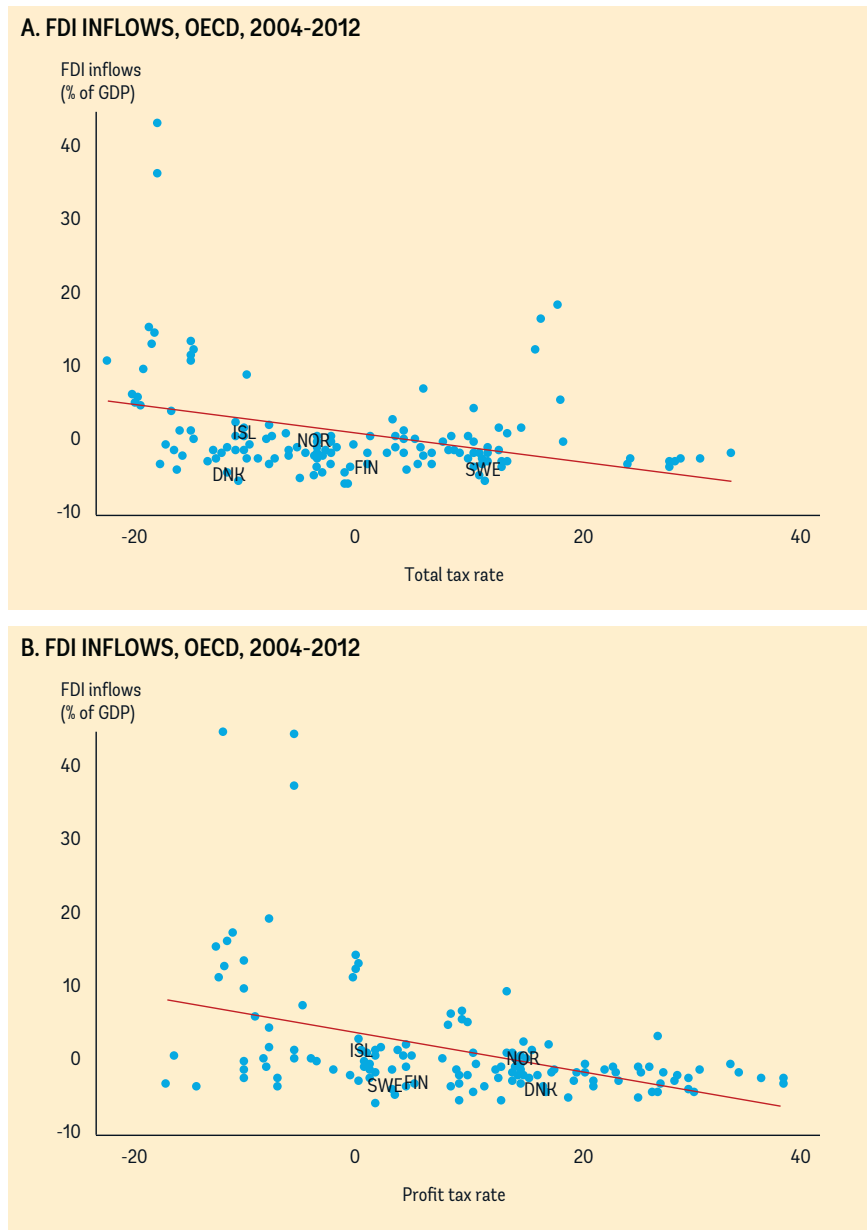
Note: OLS regression with robust S.E., clustered at the country level. Unit of analysis is country at time t. dependent variable is the three-year average over t, t+1, t+2.

* p < 0.1

** p < 0.05

*** p < 0.01

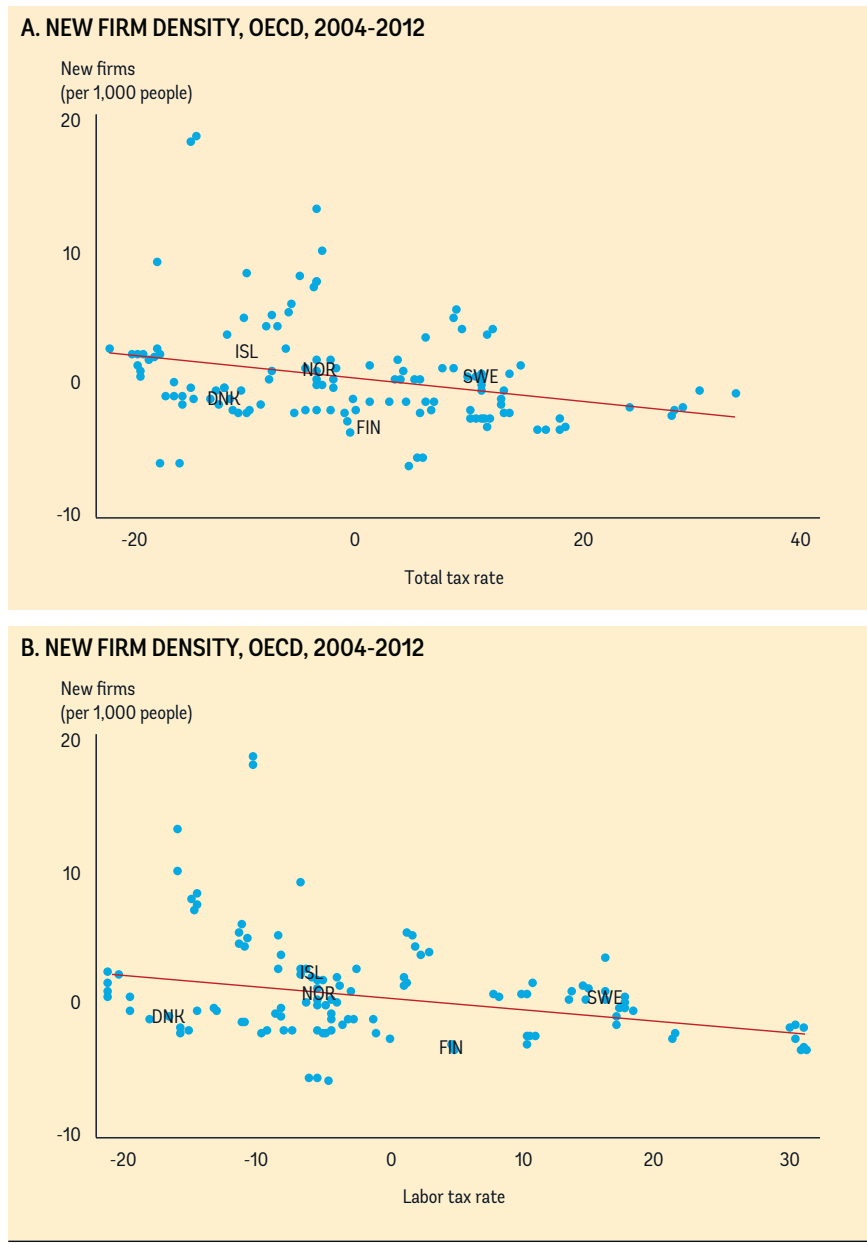
FIGURE A4.1 FDI inflows in the OECD



Source: World Development Indicators and Doing Business databases.

Note: The dependent variable is the average over t , $t+1$, $t+2$. Controlling for the (log of) num. of tax payments and procedures to start a business, lagged at $t-1$. Residuals after controls shown. Results remain significant after controlling for GDP per capita and GDP growth.

FIGURE A4.2 New-firm formation in the OECD



Source: World Development Indicators and Doing Business databases.
 Note: The dependent variable is the average over t, t+1, t+2. Controlling for the (log of) num. of tax payments and procedures to start a business, lagged at t-1. Residuals after controls shown. Results remain significant after controlling for GDP per capita and GDP growth.

TABLE A4.4A Firm-level regressions: Percent of firms stating that they have been prevented from hiring due to tax or contribution rates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size (log)	0.066 (0.085)	-0.013 (0.098)	0.052 (0.091)	0.023 (0.087)	0.080 (0.084)	0.044 (0.092)	-0.012 (0.094)	0.011 (0.086)	-0.023 (0.092)
Percent of vacancies that are skilled		0.780** (0.349)							
Difficult to find: Communication skills ^a			0.763*** (0.239)						
Difficult to find: Work ethic and commitment ^a				1.218*** (0.229)					
Difficult to find: Computer/IT skills ^a					0.804** (0.330)				
Difficult to find: Other technical skills ^b						0.513** (0.237)			
Workers dismissed: Due to performance							0.478* (0.265)		
Workers dismissed: Due to lack of skill								0.729** (0.292)	
Would fire workers absent regulation									0.665** (0.258)
Constant	-1.005*** (0.371)	-1.617*** (0.467)	-1.416*** (0.434)	-1.352*** (0.421)	-1.022*** (0.370)	-1.192*** (0.418)	-0.927** (0.385)	-1.060*** (0.361)	-1.048*** (0.361)
Observations	591	437	591	591	591	591	581	581	588

Source: Enterprise Surveys.

Note: Survey-weighted probit estimations. All include sector and location fixed effects.

a. Firms reporting skill was difficult or very difficult to find over the past two years. Skill categories shown as they appeared in the questionnaire.

b. "Technical skills, other than computers, vocational, or job-specific skills"

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A4.4B Firm-level regressions: Percent of firms stating that they have been prevented from hiring due to tax or contribution rates (controlling for wage bill)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size (log)	0.061 (0.098)	0.013 (0.114)	0.035 (0.107)	0.019 (0.100)	0.080 (0.099)	0.031 (0.109)	-0.021 (0.110)	0.008 (0.099)	-0.034 0.109
Wage + contribution (per worker)(log)	-0.301 (0.199)	-0.434* (0.237)	-0.225 (0.195)	-0.227 (0.197)	-0.258 (0.182)	-0.358* (0.215)	-0.362* (0.195)	-0.310* (0.188)	-0.318* (0.188)
Percent of vacancies that are Skilled		0.993** (0.413)							
Difficult to find: Communication skills ^a			0.746*** (0.257)						
Difficult to find: Work ethic and commitment ^a				1.251*** (0.248)					
Difficult to find: Computer/IT skills ^a					1.181*** (0.305)				
Difficult to find: Other technical skills ^b						0.570** (0.269)			
Workers dismissed: Due to performance							0.481* (0.280)		
Workers dismissed: Due to lack of skill								0.711** (0.314)	
Would fire workers absent regulation									0.666** (0.285)
Constant	2.860 (2.644)	3.806 (3.148)	1.484 (2.615)	1.575 (2.659)	2.245 (2.398)	3.432 (2.871)	3.769 (2.604)	2.937 (2.451)	3.100 (2.498)
Observations	531	396	531	531	531	531	529	529	529

Source: Enterprise Surveys.

Note: Survey-weighted probit estimations. All include sector and location fixed effects.

a. Firms reporting skill was difficult or very difficult to find over the past two years. Skill categories shown as they appeared in the questionnaire.

b. "Technical skills, other than computers, vocational, or job-specific skills"

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

ENDNOTES

This chapter was written by David C. Francis and Nan (Charlotte) Jiang.

1. These reforms are described in detail in World Bank (2014a).
2. Thomann (2014) calculated the average 2012 statutory corporate income tax rate for the EU.
3. The *Doing Business* total tax rate (TTR) expresses the amount of taxes borne by businesses as a share of commercial profit. The TTR differs from the statutory tax rate, which merely provides the factor to be applied to the tax base. Commercial profit is essentially net profit before all taxes borne. See World Bank (2014b) for detailed methodology definitions.
4. The TTR excludes social security contributions paid by employees and personal income tax.
5. *Doing Business* measures administrative cost through number of payments and time to comply with taxes. See World Bank (2014b) for detailed methodology definitions.
6. The number of payments takes into account electronic filing. Where full electronic filing and payment is allowed and is used by the majority of businesses, the tax is counted as paid once a year even if filing and payments are more frequent.
7. Agell, Englund, and Södersten 1998; Sørensen 2008, 2010.
8. Södersten (2014) suggests that the effective marginal tax rate for debt-financed investments is negative (-18.3 percent), while the effective marginal tax rate for equity-financed investments is positive (20 percent).
9. Gordon and Lee (2001) found that a 1 percentage point increase in the corporate income tax rate raises the debt-to-asset ratio by about 0.36 percentage points in the United States. Similarly, using a meta-analysis of several studies, De Mooji and Ederveen (2008) estimate that the removal of interest deductions would reduce firm leverage by approximately 10%, assuming a corporate tax rate of 33%.
10. Sørensen 2010.
11. Sørensen 2010.
12. The Committee also delivered an alternative proposal, as well as a number of proposals for financing the reform. The administration is not bound by the proposal. It may decide to proceed with the proposal or to discard it.
13. Swedish Committee on Corporate Taxation (Företagsskattekommittén) 2014. In principle, banks and financial institutions have net financial income. While the Committee proposed that they should receive financing allowances, a yield tax of 0.24 percent of the amount of debt on the balance sheet was also proposed for banks and financial institutions to compensate for this.
14. For instance, De Mooji and Devereux (2011) use a general equilibrium model to simulate the effects of the elimination of interest deductibility under so-called CBIT reforms in Europe. They find general evidence of reduced investment in the face of an increased cost of capital, including in their simulation for Sweden.
15. Lee and Gordon (2005) find both cross-sectional and fixed-effect evidence to suggest a negative correlation between tax rates and growth. They find a zero-magnitude effect, controlling for OECD countries, and evidence that the effect is stronger in Sub-Saharan Africa and Latin America. See also Garrison and Lee (1992) for a similar distinction.
16. Johansson and others 2008.
17. OECD 2010.
18. Djankov and others 2010.
19. Becker, Fuest, and Riedel 2012. They define 'quality' FDI by the degree to which these investments contribute to job growth and tax revenue.
20. Analysis replicating results for Djankov and others (2010) using updated *Doing Business* data for OECD countries. This result controls for the number of tax payments, procedures to start a business, and GDP growth, and (log) GDP per capita. For more details, refer to tables A4.1 and 4A.2.
21. Measured by new limited liability corporations per 1,000 people. This is only one definition of entrepreneurship. Hansson (2012), for example, uses data on self-employed entrepreneurs, finding a negative relationship between income tax rates and rates of self-employment.
22. PwC 2014.
23. Egger and Radulescu (2011) and Hansson and Olofsdotter (2014), for instance, find evidence that rate differentials matter for country-pair FDI flows; in particular the latter find evidence that the incidence of these taxes matter, finding that lower employer-borne rates are negatively related to FDI.
24. Djankov and others 2010.
25. Lawless 2013.
26. Vartia 2008.
27. Fast-growing as indicated by firms with above-median employment growth rates.
28. See, for instance, Johansson and others (2008).
29. The result is significant after controlling for firm location and sector
30. The relationship between size and meeting with tax officials is significant when applied to firms with fewer than 250 employees.
31. Pope and Rametse 2001; Pope 2001; EC 2004; Crain and Crain 2010.
32. Only one firm in the sample reported a request for an informal gift or payment when meeting with tax officials.
33. EC 2013a.
34. This, of course, depends largely on the tax incidence in practice that is, whether employees or employers bear the burden of the tax, or conversely, receive relief in terms of tax cuts.
35. Meghir and Phillips 2010.
36. This result is significant after accounting for firm location, sector, size, and age, see TABLES A4.4A-B.
37. Evidence from Skedinger (2014) finds a greater employment effect of a 2009 tax subsidy for young employees among those earning the minimum wage; the movement of higher-skilled white collar workers in and out of the workforce at a higher cost, by contrast, is a possible explanation for a smaller effect among those workers.
38. All differences are significant and remain so in probit estimations after controlling for firm size, age, sector, and location. For full results, refer to table A4.4A.



R&D, innovation, and productivity:

A comparative analysis of innovative versus non-innovative firms

- Innovative firms outperform non-innovative firms in terms of R&D, employees with a university education, technology licensing, foreign ownership share, exports, and imported inputs.
- There is no difference between innovative and non-innovative firms in the share of employees who were separated or are newly hired.
- Labor market regulations, tax complexity, and transport-related issues seem to be more significant obstacles for innovative firms than non-innovative firms.
- There is no difference in labor productivity between innovative firms and non-innovative firms, but non-innovative firms tend to have higher growth rates for sales and labor productivity.
- The share of exports in sales is positively associated with the probability of both innovation and radical innovation in the manufacturing sector. No such relationship exists in the services sector.
- The probability of radical innovation in the manufacturing sector is positively associated with R&D intensity, while the probability of innovation in the services sector is positively associated with the share of employees with a university education.
- There is no significant relationship between labor productivity and innovation in either the manufacturing or services sector; however, in the services sector, there is a positive association between radical innovation and labor productivity for larger firms and firms with a higher rate of technological catch-up.

Sweden has one of the highest rates of research and development (R&D) investment globally and its firms are among the most innovative and export-oriented in a wide range of industries.¹ Sweden also has more scientific publications and patents per capita than most OECD countries and ranks consistently among the top economies in global innovation indexes, even though its position has declined slightly in the most recent rankings.²

The majority of R&D investment in Sweden is undertaken by large private sector firms and higher education institutions. Virtually all corporate R&D is funded by the business sector itself, with a minimal contribution from the government.³ Although large firms dominate R&D in manufacturing industries, smaller firms make a larger contribution in the services sector.⁴ In recent years the Swedish economy has been shifting toward smaller, more service-oriented and diversified firms, which employ a significant share of the creative labor force in Sweden.⁵

As in many other countries, studies show that large firms in Sweden are more innovative than small firms, although small firms tend to have higher levels of innovation per employee.⁶ Large innovative firms also utilize technology diffusion from foreign investors more effectively to increase innovation than do small firms.⁷ Across all sizes, innovative firms in Sweden have significantly more skilled labor,

higher profits, better access to finance, and are more capital- and technology-intensive than non-innovative firms.⁸ Moreover, studies analyzing the linkages between R&D, innovation, and productivity in Sweden generally show a positive relationship between innovation input (including R&D) and innovation outcomes, and between innovation and labor productivity.⁹

In spite of Sweden's strong position at the global innovation frontier, some challenges remain. The mismatch between high levels of innovation inputs and low levels of high-tech products in the manufacturing sector has been pointed out by researchers as worrisome for Sweden's long-term global competitiveness.¹⁰ The low growth rate of innovation from 2006 to 2013, the declining trend in dominant sectors, and weak service innovation compared to other leading innovative economies are also causes for concern.¹¹ In addition, private sector R&D is almost entirely financed by firms using their own resources and Sweden is one of the few OECD countries with no tax incentives for R&D, making R&D investment more expensive and less attractive than in its international competitors.¹² Lastly, weak collaboration between the private sector and higher education institutions and the decreasing impact of Sweden's scientific research as measured by citations and commercial outcomes might undermine the country's position as a global innovation powerhouse.¹³

Using World Bank Enterprise Surveys (ES) data this chapter provides a comparative analysis of innovative and non-innovative firms in Sweden in terms of the main indicators explored in the theoretical and empirical innovation literature. The analysis also investigates the relationship between R&D and the probability of innovation and the relationship between innovation and labor productivity.¹⁴

CHARACTERISTICS OF INNOVATIVE AND NON-INNOVATIVE FIRMS

Research draws attention to several distinctive characteristics of innovative firms. They are shown to have higher technological capacity, transfer more technology through closer linkages to the global economy, and tend to be larger and more productive than non-innovative firms.¹⁵ This section provides a comparative analysis of innovative and non-innovative firms using indicators widely employed in the literature: technological capacity, technology transfer, employment composition, production costs, sales and productivity, market structure, and the regulatory business environment.

Following previous studies, “innovative firms” are defined as firms with product or process innovation, which constitute 80 percent of all firms in Sweden.¹⁶ This section analyzes the descriptive statistics of indicators across innovative and non-innovative firms without taking into account the effect of other factors on these statistics.

Technological capacity and technology transfer

As would be expected, innovative firms significantly outperform their non-innovative counterparts on most indicators of technological capacity (table 5.1). On average, an innovative firm in Sweden allocates 0.6 percent of sales to R&D expenditures and spends

around SKr 12,200 in R&D per worker. In contrast, a non-innovative firm allocates close to 0.1 percent of sales to R&D and spends approximately SKr 1,800 per worker. Innovative firms are also twice as likely to own an internationally recognized quality certification (such as ISO) and have twice the share of employees with a university education. However, though innovative firms have a higher share of skilled labor than non-innovative firms, the difference is not significant.

Many studies point to technology transfer as a critical determinant of innovation.¹⁷ As seen in table 5.1, innovative firms significantly surpass non-innovative firms in six of the seven indicators on technology transfer channels. They have nearly five times the share of foreign ownership; export twice as much of their sales—both directly and indirectly; import nearly twice as much of their inputs; are six times more likely to license technology;

and are nearly twice as likely to be part of a multi-establishment firm.

To put the above figures in perspective, in Israel—the only innovation frontier for which recent ES data are available—only 19 percent of firms identified themselves as innovators, compared to 80 percent in Sweden. In addition, out of four indicators on technological capacity for which data were available for Israel, innovative firms outperform non-innovative firms only in two: the percent of firms spending on R&D and the percent of firms that own an ISO certification. There is no difference between innovative and non-innovative firms in terms of the share of employees with a university education and skilled employees. Moreover, out of six indicators on technology transfer, innovative firms in Israel have significantly higher values than non-innovative firms only in three: the percent of firms that import their inputs and the share of direct

TABLE 5.1 Innovative firms outpace non-innovative firms in most of the indicators on technological capacity and technology transfer

Indicator	Innovator	Non-innovator	Ratio of innovator to non-innovator
Technological capacity			
R&D expenditure per employee (SKr)	12,243.0	1,795.0	6.8
Share of R&D expenditure in sales (%)	0.6	0.1	7.4
Firms investing in R&D (%)	32.2	18.0	1.8
Firms with ISO certificate (%) ^b	44.0	18.9	2.3
Employees with university education (%)	14.9	6.7	2.2
Skilled employees (%) ^a	78.3	70.0	1.1
Technology transfer			
Firms using technology licensing (%) ^b	16.8	2.9	5.9
Foreign ownership share (%)	30.9	6.4	4.8
Share of direct exports in total sales (%)	8.5	3.4	2.5
Share of indirect exports in total sales (%)	2.2	1.1	1.9
Firms importing their inputs (%) ^{a,b}	82.1	88.8	0.9
Share of foreign inputs in total inputs (%) ^b	48.6	31.2	1.6
Firms that are part of a multi-establishment firm (%)	0.5	0.3	1.5

Source: Enterprise Surveys database.

a. The difference between innovator and non-innovator firms is not significant.

b. Available only for manufacturing sector.

and indirect exports, as a percentage of sales.

Employment structure

Innovative firms tend to be larger than non-innovative firms.¹⁸ Several linkages between firm size and innovation have been highlighted in the literature. Large firms have easier access to external financing, enabling them to invest in large R&D projects and to commercialize their innovation.¹⁹ They also have bigger markets with larger profit margins, making innovation more attractive and R&D investment less risky.²⁰

According to the ES data, innovative firms in Sweden have an average of 46 employees compared to 22 employees for non-innovative firms, and are seven times more likely to be large (100 or more employees) than non-innovative firms (table 5.2). More interestingly, innovative firms begin operations with a markedly higher number of employees than non-innovative firms (an average of 21 and 10 employees, respectively), implying a strong positive association between firm size at start-up and the probability of being an innovator. Although the share of firms that are large is higher among innovative firms than among non-innovative ones, 9 out of 10 innovative firms are small (5-19 employees) and medium-sized (20-99) enterprises (SMEs), in line with findings from several other economies.²¹ Furthermore, even though large firms have traditionally played a critical role in the Swedish economy, recent studies show that SME presence in innovation activities has been increasing over time.²²

In addition to requiring highly educated employees, innovative firms need to be able to swiftly adjust the skill level and composition of the labor force in response to the rapid changes in technology and the demand of the global economy. As seen in table 5.2, although the shares of employees who have been made redundant or left the company

TABLE 5.2 Innovative firms are larger than non-innovative firms; there is no significant difference between them in terms of the share of separations and new hires

Employment structure	Innovator	Non-innovator	Ratio of innovator to non-innovator
Total employment (number of employees)	46.4	21.9	2.1
Employment at startup	20.5	10.0	2.1
Large firms (100+ employees)	8.7	1.3	6.8
SMEs (5-99 employees)	91.3	98.7	0.9
Share of new hires (%) ^a	19.7	19.7	1.0
Share of young new hires (%) ^a	7.5	6.7	1.1
Share of adult new hires (%) ^a	17.2	16.6	1.0
Share of employees fired or left (%) ^a	17.1	14.2	1.2
Employment growth (%) ^a	1.3	1.3	1.0

Source: Enterprise Surveys database.

a. Difference between innovator and non-innovator firms is not significant.

and the share of new young and adult employees are higher in innovative firms, the difference is not statistically significant.

Production cost, sales, and productivity

According to existing studies, innovative firms tend to have higher sales and productivity rates than non-innovative firms as the former are more likely to have larger markets and more sophisticated production methods. However, whether or not they also have a cost advantage over non-innovative firms is unclear, as innovators tend to use more technology and skill-intensive inputs, which are costly. As shown in table 5.3, innovative firms in Sweden have higher production cost per worker than non-innovative firms and a similar wage bill per worker, suggesting that they do not have a cost advantage over non-innovative firms.

Surprisingly, in contrast with the findings in the literature, there is no significant difference between innovative and non-innovative firms in terms of their sales, value added, or labor productivity (table 5.3). Moreover, the sales and labor productivity growth rates are

much higher for non-innovative than for innovative firms—despite the fact that innovative firms operate for longer hours and are further below their full capacity than non-innovative firms.

These findings suggest that although innovative firms outperform their non-innovative counterparts in the majority of the activities related to innovation, they appear unable to translate this into higher sales and productivity. This is consistent with recent findings indicating a mismatch between the high level of innovation activities in Swedish firms and the low number of new high-tech products.²³

Market structure and business environment

The market structure faced by firms in Sweden is examined using two indicators in ES data: the number of competitors and whether a firm's main product is sold in local, national, or international markets. The effects of competition on innovation have been explored in depth in the literature. Theory asserts two opposing impacts of competition on firm innovation: high competition can push firms to be more productive and innovative; conversely, it can drive

TABLE 5.3 There is no difference between innovative and non-innovative firms in terms of their wage bill per employee, sales, value added, and labor productivity; however, non-innovative firms have higher growth rates of sales and labor productivity

Production cost, sales, and productivity	Innovator	Non-innovator	Ratio of innovator to non-innovator
Cost of production per 1,000 employees (SKr) ^b	1770.0	1368.0	1.3
Wage bill per 1,000 employees (SKr) ^a	721.0	835.0	0.9
Total sales (million SKr) ^a	195.0	147.0	1.3
Value added (million SKr) ^a	79.0	77.0	1.0
Labor productivity (1,000 SKr) ^a	5441.0	6574.0	0.8
Labor productivity growth (%)	-1.0	2.7	-0.4
Sales growth (%)	-0.4	4.4	-0.1
Capacity utilization (%) ^b	70.7	84.6	0.8
Hours of operation ^b	66.8	51.6	1.3

Source: Enterprise Survey database.

a. Difference between innovator and non-innovator firms is not significant.

b. Available only for manufacturing sector.

potentially innovative firms with high-costs and long-term returns out of the market. An increasing number of empirical studies show that competitive markets are more conducive to innovation than uncompetitive markets.²⁴ In line with these results, innovative firms in Sweden face a higher degree of competition than non-innovative firms: a typical innovative firm in Sweden has seven competitors, compared with five competitors for a typical non-innovative firm (table 5.4).

Having access to large markets not only increases a firm's potential sales by making new products more profitable, but is also likely to promote its productivity and innovation through higher competition and exposure to the practices of other firms. According to the ES data, innovative firms in Sweden are more likely to compete in international markets than non-innovative firms: 18 percent of innovative firms sell their main product in international markets, compared to 7 percent of non-innovative firms. Innovative firms also have larger domestic markets than non-innovative firms. Specifically, 67 percent of innovative firms compete

in the national market, compared with 42 percent of non-innovative firms. It seems that non-innovative firms mainly compete in the local market: 51 percent of non-innovative firms sell their main products in the local market, while this is true only for 16 percent of innovative firms (table 5.4).²⁵

As widely discussed in the literature, a well-functioning business environment increases firm innovation and productivity.²⁶ The ES data collect a large amount of perception-based data on the regulatory and non-regulatory business environment.²⁷ Among the areas of the regulatory business environment included in the ES, the perceptions of managers differed significantly between innovative and non-innovative firms on three of them. As seen in table 5.4, 21 percent of innovative firms point to labor market regulations as a major obstacle for their operations, compared with about 5 percent of non-innovative firms.²⁸

Innovative firms also rate the complexity of taxes and the two-year cap on fixed-term contracts as greater obstacles to their operations than non-innovative firms. Regarding the aspects of the non-regulatory business environment, only transport seems to be a greater obstacle to innovative firms than to non-innovative firms.²⁹ An interesting outcome of the comparison of the responses to questions about perceptions of the business environment is that there was no area

TABLE 5.4 Innovative firms compete in larger markets, have more competitors, and are more sensitive to regulatory business environment than non-innovative firms

Indicator	Innovator	Non-innovator	Ratio of innovator to non-innovator
Market structure			
Number of competitors in the market ^b	6.9	4.8	1.5
Main market of sales: Local (%) ^b	15.5	50.7	0.3
Main market of sales: National (%) ^b	66.9	42.0	1.6
Main market of sales: International (%) ^b	17.5	7.3	2.4
Perceptions of the business environment			
Firms expressing labor market regulation as a major obstacle (%)	20.9	5.2	4.0
Degree of obstacle of complexity of taxes ^c	0.9	0.5	1.6
Degree of obstacle of two-year fixed-term contract ^c	0.9	0.6	1.6
Firms identifying transport as a major obstacle (%)	0.1	0.0	11.1

Source: Enterprise Survey database.

b. Available only for manufacturing sector.

c. Index is based on the scores given by the manager on the specified subject ranging from 0 (indicating that it is not an obstacle for firms) to 4 (indicating the highest degree of obstacle).

where non-innovative firms expressed more concern than innovative firms—an indication that innovative firms are more sensitive to the business environment. These results are supportive of the findings from recent research on the relationship between regulation and innovation in Sweden and other European economies.³⁰

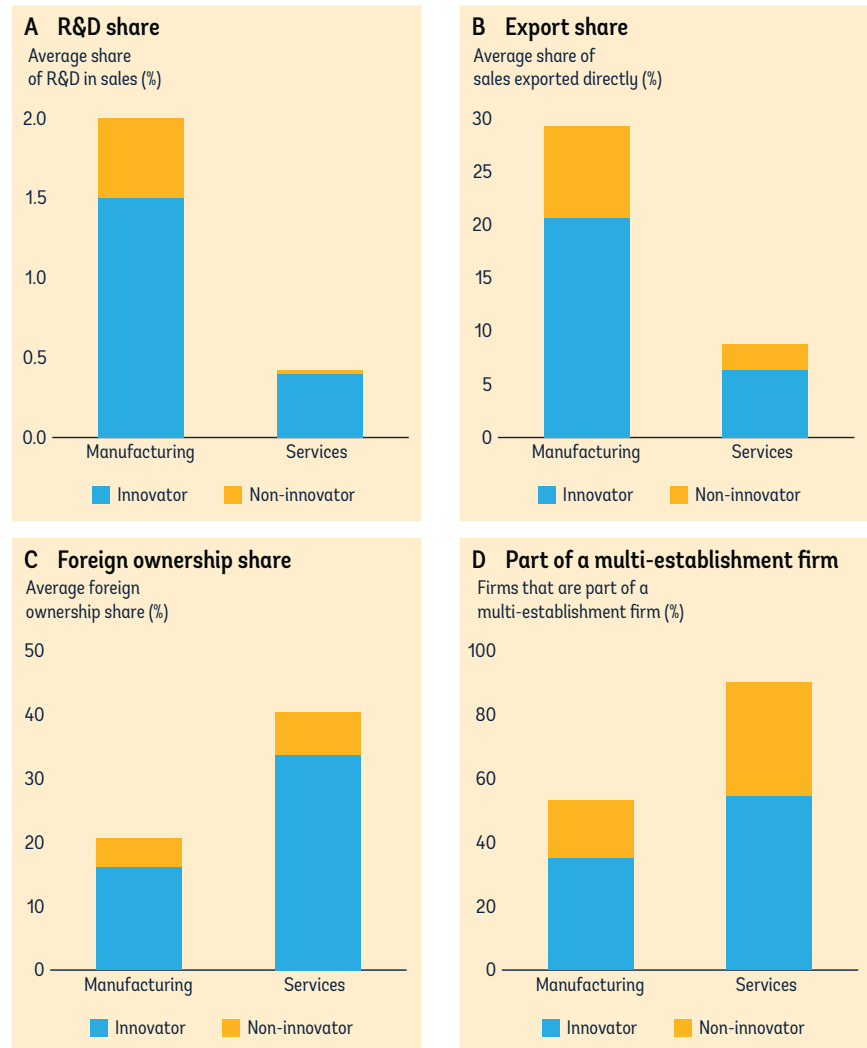
COMPARISON OF INNOVATIVE AND NON-INNOVATIVE FIRMS AT THE SECTOR LEVEL

It is highly likely that the nature of innovation activity differs between manufacturing and the services sector, given fundamental differences in their operations.³¹ For example, according to a study using Community Innovation Surveys (CIS) data from OECD economies, innovation in the services sector is driven less by in-house R&D than in the manufacturing sector. The study shows that although both manufacturing and service firms rank acquisition of machinery and equipment as the primary activity for innovation, manufacturing firms rank internal R&D second, whereas service firms rank worker training second.³²

R&D and technology transfer

Panels A through D of figure 5.1 report the average values of R&D and exports as a share of sales, share of foreign ownership, and the share of firms that are part of a multi-establishment firm for firms in the manufacturing and service sectors.³³ In the manufacturing sector, innovative firms outstrip non-innovative ones in all four indicators, significantly for all except the percentage of firms that are part of a multi-establishment firm. Innovative services firms, as well, report higher shares across each measure, with significant differences for all but the share of exports as a percentage of sales. More specifically, in the manufacturing sector, innovative firms allocate three

FIGURE 5.1 In both the manufacturing and the services sectors, innovative firms have higher shares of R&D and foreign ownership



Source: Enterprise Surveys database.

times as much to R&D, as a share of sales, compared to non-innovative firms. Notably, this is much higher in the services sector (figure 5.1A). Likewise, the foreign ownership share of innovative firms in both sectors is markedly higher than non-innovative firms—five times and seven times in the manufacturing and services sector, respectively (figure 5.1C).

Intersectoral differences are also substantial: innovative firms in the manufacturing sector have a significantly higher share of R&D and exports, as a percentage of sales, than corresponding firms in the services sector—nearly

four times and three times more, respectively (figure 5.1A-B). Conversely, innovative firms in the services sector have double the foreign ownership share and are nearly two times more likely to be part of a multi-establishment firm than innovative firms in the manufacturing sector (figure 5.1C-D).

Employment, skills, wage bill, and productivity

Highly educated and skilled employees are a driving force behind technological capacity and the innovation process. As seen in panels A and B of figure 5.2, in both the manufacturing and the services sectors, innovative firms not only

have a higher level of employment than non-innovative firms, but they have a markedly higher share of employees with university education—nearly three times the share in the manufacturing and twice the share in the services sector. In addition, innovative firms in the manufacturing sector have a higher wage bill per employee than non-innovative firms, while in the services sector the wage bill per employee is about the same.³⁴

Comparison of labor productivity and sales across firms in the two sectors reveals that average labor productivity does not differ significantly between innovative and non-innovative firms in either sector. Nevertheless, total sales of innovative firms are significantly higher in the services sector than those of non-innovative firms, while the growth rates of labor productivity and sales are higher for non-innovative firms than for innovative firms. No such differences between the innovative and non-innovative firms exist in the manufacturing sector (see annex table A5.2 for the descriptive statistics of these variables).

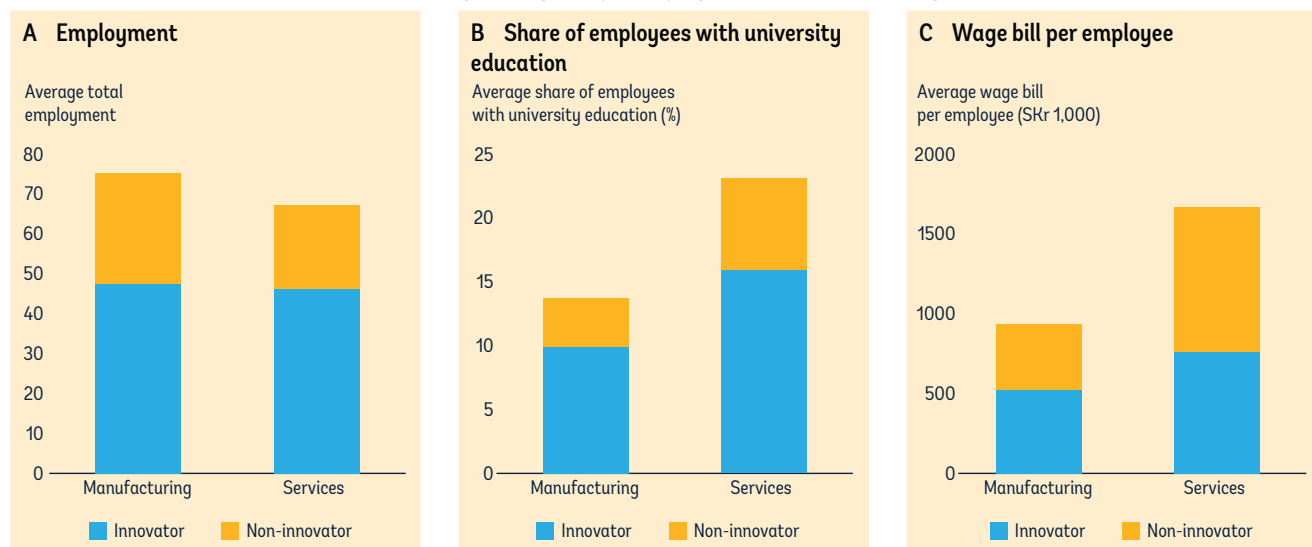
Taken together, the ES data confirm the theoretical and empirical literature pointing out that innovative firms, regardless of their sectors, invest larger resources in R&D, have higher share of university-educated employees, and tap into technology transfer channels to a greater extent than non-innovative firms. The results also confirm the findings of studies showing that innovative manufacturing firms have higher shares of R&D compared to the innovative service firms. Moreover, while export shares as a percentage of sales is higher for manufacturing firms than for service firms, the latter have higher foreign ownership share and are more likely to be part of a multi-establishment firm than the former.

Despite having higher technological capacity and better access to foreign knowledge sources compared to non-innovative firms, innovative firms in either sector do not seem to be able to translate these advantages into higher productivity (annex table A5.2). This appears to be in line with one recent study that found diminishing returns to high R&D investment in fast-growing

manufacturing and services sectors in Sweden. Slow-growing or declining sectors did not exhibit such diminishing returns, indicating that the Swedish paradox is not due to the failure of a national innovation system, but rather diminishing marginal returns for a very specific subset of fast-growing industries.³⁵

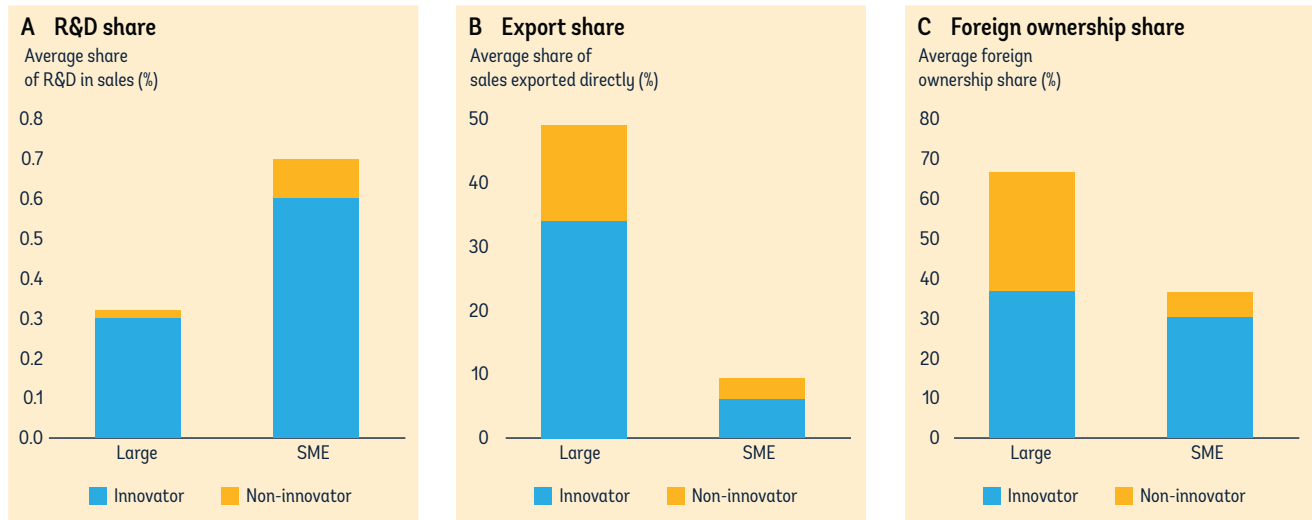
Similarly the OECD Economic Surveys published in 2015 showed that Sweden's productivity growth has slowed in recent years, as a result of cyclical and structural factors, recommending policies to eliminate barriers to competition and entrepreneurship as well as tackling bottlenecks in road and rail transport. The OECD surveys also called attention to increasing the quality of education and the flexibility of labor markets as well as adopting public support for innovation to a changing economy where services and SMEs play a growing role.³⁶

FIGURE 5.2 Innovative firms have a higher share of employees with university education in both the manufacturing and services sectors than the non-innovative firms and a higher wage bill per employee in the manufacturing sector



Source: Enterprise Surveys database.

FIGURE 5.3 Both innovative SMEs and large firms have higher R&D shares of sales than non-innovative firms, and innovative SMEs have higher foreign ownership share than non-innovative SMEs



Source: Enterprise Survey database.

Note: Large firms are those with 100 or more employees; SMEs have 5-99 employees.

COMPARISON OF INNOVATIVE AND NON-INNOVATIVE LARGE FIRMS AND SMEs

Whether large firms are different from small firms in their innovative activities and performance has long been discussed in the literature following the seminal work of Schumpeter (1942).³⁷ Large firms' advantage over small firms in terms of innovation activities mainly stems from the fact that they have a larger pool of internal knowledge, easier access to financial resources for innovation, and sell their products in larger markets than smaller firms, decreasing the risk of long term investment in R&D and increasing the profitability of new products.³⁸ However, in competitive markets where barriers to entry are low, small firms have been shown to exhibit better innovation performance compared to large firms.³⁹

R&D and technology transfer

Not surprisingly, the share of R&D as a percentage of sales is markedly higher for both innovative large firms and innovative SMEs (0.3 and 0.6, respectively) than for their non-innovative counterparts (0.02 and 0.1,

respectively). In addition, in line with previous studies, the ES data show that SMEs have higher R&D as a share of sales than innovative large firms (figure 5.3A).⁴⁰ Although innovative firms of both sizes tend to have a larger share of exports than their non-innovative counterparts, these differences are not statistically significant (figure 5.3B). However, the export share of innovative large firms is six times higher than that of innovative SMEs.

Share of foreign ownership is expected to be higher for innovative large firms and SMEs than their non-innovative counterparts, as well as for innovative large firms than innovative SMEs. However, as seen in figure 5.3C, although innovative firms of both sizes have higher foreign ownership share than their non-innovative counterparts, the difference is significant only between the innovative and non-innovative SMEs.

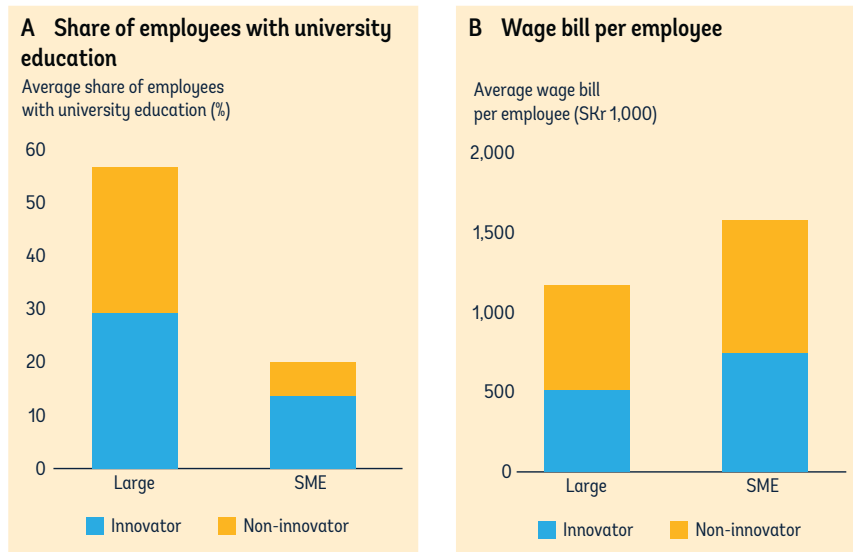
Skills, wage bill, and productivity

The share of employees with a university education and the wage bill per employee for innovative and non-innovative large firms and SMEs

are reported in figure 5.4. Observed differences in the share of employees with a university education between innovative and non-innovative firms within either size category are not significant: among large firms and among SMEs the share of university-educated is about the same for innovative and non-innovative firms (figure 5.4A). Nonetheless, innovative large firms have a significantly higher share of university-educated employees than innovative SMEs. Moreover, even though SMEs have a lower share of highly educated employees than large firms, they spend greater resources per employee than do their large counterparts, suggesting that large firms have an advantage over smaller firms in labor cost (figure 5.4B).⁴¹

Consistent with the results documented in the previous sections, ES data show no significant difference between the labor productivity of innovative large firms and SMEs compared with their non-innovative counterparts. However, considering only the group of innovative firms in Sweden, innovative SMEs have substantially higher labor productivity than innovative large firms. In addition, sales of non-innovative large firms

FIGURE 5.4 Both innovative and non-innovative large firms have a significantly higher share of employees with university education than corresponding SMEs; innovative SMEs have higher wage bill per employee than innovative large firms



Source: Enterprise Surveys database.

Note: Large firms are those with 100 or more employees; SMEs have 5 to 99 employees.

are substantially higher than those of innovative large firms, while there is no significant difference between the sales of innovative and non-innovative SMEs (see annex table A5.2).

Moreover, in terms of the growth rate of labor productivity, only non-innovative large firms outperform their innovative counterparts, no such difference exists between the innovative and non-innovative SMEs. When it comes to the growth rate of sales, only non-innovative SMEs have an advantage over innovative SMEs, there is no such difference between the innovative and non-innovative large firms.

LINKAGES BETWEEN R&D, SKILLED LABOR, INNOVATION, AND PRODUCTIVITY IN MANUFACTURING AND SERVICES SECTORS

This section employs a regression analysis of innovation to take account of the interaction among all indicators of interest. Following the relevant

theoretical and empirical body of work, the R&D share of sales (referred to hereafter as R&D intensity) is expected to be highly positively associated with innovation, as well as university education and technology diffusion channels. It is also expected that innovation, university education, and technology diffusion channels are positively associated with firm productivity.

The analysis is carried out separately for manufacturing and services sectors and is divided into two parts. The first examines the relationship of the standard indicators with the probability of innovation. The second examines the association of the probability of innovation and other relevant indicators with labor productivity.⁴²

Which indicators are related to the probability of innovation?

Two different measures of innovation are used to ensure reliable results. The first measure, used in the preceding sections, defines firms as “innovators” if they introduced a new or significantly improved product or process during the three years preceding 2014, when

the ES data were collected. The second measure includes only those firms that introduced a product or process innovation that was not only new to the firm but also new to the market. These firms are referred to as “radical innovators,” and in turn make up 73 percent of the innovative firms.⁴³

The results of the analysis of innovation and radical innovation in the manufacturing sector are shown in annex table A5.3. As seen in the first three columns of the table, the probability of innovation is positively associated with the share of exports as a percentage of sales. It is not associated with the share of university-educated employees, R&D intensity, the share of foreign ownership, or industry level R&D spillovers.⁴⁴

The last three columns of annex table A5.3 document the findings for the analysis of radical innovation in the manufacturing sector. The probability of radical innovation is highly positively associated with R&D intensity, as well as the share of exports in sales. However, contrary to the findings of the theoretical and empirical literature, there is a negative relationship between the foreign ownership share and the probability of radical innovation.

Finally, as seen from the last three columns of annex table A5.3, manufacturing firms with higher rates of technological catch-up are less likely to be radical innovators possibly due to greater competition close to the innovation frontier, where the innovation impact of R&D intensity appears be hampered. Another interesting result concerning radical innovation in the manufacturing sector is that only firms in east Sweden—the region that includes Stockholm and Solna—are more likely to be radical innovators compared to the firms in central Sweden.⁴⁵

Findings of the analysis for the services sector documented in annex table A5.4 reveal that R&D intensity is not associated with the probability of either type of innovation, while the share of employees with a university education is positively associated with the probability of innovation. In addition, although firms with a higher rate of technological catch-up are more likely to be innovators, there is some evidence that they are less likely to be radical innovators, indicating the difficulty of introducing radical innovation at the innovation frontier.

Taken together, these findings suggest that in the manufacturing sector R&D intensity is an important catalyst for the probability of radical innovation. In the services sector, the share of employees with university education and being closer to the technology frontier seem to play an important role for the probability of innovation.

Similar to the results obtained from the Enterprise Surveys, a recent study of innovation shows that exports are an important determinant of innovation for both small and large firms. The study also shows that skilled labor is a critical determinant of innovation for small firms but not for large firms, while foreign ownership share and imports from G7 countries are important determinants of innovation for large firms but not for small firms.⁴⁶ Another research finds that innovation inputs, which includes R&D, are positively associated with innovation output only at the macro level and when using a broad measure of innovation; when looking only at radical innovation, the relationship becomes insignificant.⁴⁷

Labor productivity, innovation and skilled labor

The findings of the regression analysis of labor productivity in the manufacturing sector with respect to innovation and radical innovation and other relevant variables are reported in annex

table A5.5. Two consistent results arise across all regression models: first, neither type of innovation is significantly associated with labor productivity; second, firms located in west Sweden have significantly higher labor productivity than firms in center region. In addition, in the regression model of labor productivity with respect to innovation, the share of employees with a university education is negatively associated with labor productivity, while the share of direct exports is positively associated (first three columns of table A5.5). In the regression models of labor productivity with respect to radical innovation, all indicators except the dummy variable for west Sweden are insignificant (last three columns of table A5.5).

Regarding the results for services sector, as seen from annex table A5.6, virtually no indicator of interest is significant in the model with respect to innovation, while in the model with respect to radical innovation, only the interaction terms between the rate of technological catch-up and radical innovation and between employment and radical innovation are consistently significant. This suggests that in the services sector an increase in firm size and the rate of technological catch-up promotes the positive relationship between radical innovation and productivity.

In sum, the analysis of ES data provides no evidence for a positive correlation between productivity and innovation, but in the services sector there seems to be a positive association between radical innovation and productivity for larger firms than for smaller firms and for firms closer to the technology frontier. The lack of a positive relationship between innovation and productivity is also evident in the analysis conducted in the previous sections: in no circumstance did innovative firms have higher labor productivity than non-innovative firms, regardless of their sector and

size. In fact, non-innovative firms tended to outperform innovative firms with respect to the growth rate of labor productivity. These findings are in line with the recent debate on the "Swedish paradox," indicating a mismatch between the world-leading innovation activities of Swedish firms and the low level of new high-tech products.⁴⁸

According to existing studies, the relationship between innovation and productivity appears to depend on the sector and the type of innovation. For example, a recent study using Community Innovation Surveys (CIS) data reveals that the association between innovation and productivity in Sweden is around 0.16 percent; however, this relationship becomes insignificant when only radical innovation is used.⁴⁹ Another study indicates a close association between innovation and productivity measured as value added per worker. Although the study also finds a positive association between innovation and productivity growth in the services sector, in the manufacturing sector only radical innovation seems to be positively related to productivity growth.⁵⁰

CONCLUSION

The aim of this chapter was two-fold: to provide a comparative analysis of the key indicators of innovation activities across innovative and non-innovative firms and to analyze the innovation and productivity of firms using regression analysis. The main findings can be summarized as follows.

Innovative firms significantly outperform their non-innovative counterparts on most indicators of technological capacity and technology transfer, including R&D intensity, measures of foreign trade—for both exports and imports, the share of university-educated employees, and international licensing and quality certification.

Innovative firms also tend to be larger than non-innovative ones and begin operations with a higher number of employees at the time of start-up. What is more, innovators are able to penetrate beyond local markets to compete both nationally and internationally. In light of this finding, it is not surprising that innovative firms report higher sensitivity to business environment conditions, including obstacles from labor market regulations, the complexity of the tax code, and the two-year cap on fixed-term contracts.

Yet, in contrast with expectations from the literature, innovative firms in

Sweden do not have higher labor productivity compared to non-innovative firms, indicating that firms may be unable to realize higher productivity gains from innovative activity. This finding is in line with the so-called Swedish paradox, an observed mismatch between the country's world-class innovations and the low number of new, high-tech products. In-depth analysis using the ES data underscores the result, for both manufacturing and services, that firms closer to the technological frontier are less likely to realize radical, new-to-the-market innovations from R&D spending. Furthermore, the report does not find evidence of a positive

correlation between productivity outcomes and innovation.

Together these findings suggest that although innovative firms outperform their non-innovative counterparts in the majority of the activities related to innovation, innovators are unable to translate these activities into gains in sales and productivity. This mismatch appears to be related to substantial competition in high-tech industries as well as diminishing returns to R&D spending for firms in fast-growing sectors.

ANNEX A5

TABLE A5.1 Distribution of innovative firms, firms investing in R&D and R&D amount across different industries in the manufacturing and the services sectors

	Innovator (percent of sectoral total)	Firms investing in R&D (percent of sectoral total)	R&D amount (percent of sectoral total)
Manufacturing	100	100	100
Fabricated metal products	33.14	17.42	1.65
Machinery and equipment	31.04	46.50	5.88
Food	6.11	2.61	0.12
Furniture	4.76	2.11	0.04
Electronics	4.52	7.14	90.78
Wood	3.85	1.20	0.04
Plastics and rubber	3.44	2.60	0.37
Precision instruments	2.46	4.53	0.76
Paper	2.31	2.09	0.03
Publishing, printing, recording	2.25	2.81	0.02
Chemicals	1.88	3.13	0.18
Nonmetallic mineral products	1.67	3.15	0.11
Textiles	0.75	1.42	0.00
Transport machines	0.75	1.18	0.01
Other transport equipment	0.75	0.70	0.00
Refined petroleum product	0.32	1.42	0.00
Services	100	100	100
Retail	37.39	35.86	23.58
Services of motor vehicles	30.39	24.46	15.81
Wholesale	14.16	16.46	46.50
Construction	5.97	5.77	5.01
Information technology (IT)	4.58	13.25	8.83
Transport	3.77	1.74	0.16
Hotel and restaurants	3.75	2.46	0.13

Source: Enterprise Surveys database.

TABLE A5.2 Comparison of the means of labor productivity and sales across innovative and non-innovative firms of different sizes and sectors

Variables	Sector and size category	Innovator	Non-innovator	Result of significance test
Labor productivity (1,000 SKr)	Manufacturing	5148.0	2442.0	Only the difference between non-innovative firms in manufacturing and the services sector is significant.
	Services	5497.0	7215.0	
Sales (million SKr)	Manufacturing	164.0	410.0	Only the difference between innovative and non-innovative firms in the services sector is significant.
	Services	200.0	106.0	
Labor productivity growth (%)	Manufacturing	1.2	2.5	Only the difference between innovative and non-innovative firms in the services sector is significant.
	Services	-1.4	2.7	
Sales growth (%)	Manufacturing	1.5	6.4	Only the difference between innovative and non-innovative firms in the services sector is significant.
	Services	-0.8	4.0	
Labor productivity (1,000 SKr)	Large	3704.0	8111.0	Only the difference between innovative large and innovative SMEs is significant.
	SME	5604.0	6554.0	
Sales (million SKr)	Large	894.0	3974.0	Differences between innovative large and non-innovative large firms, and between large firms and SMEs are significant.
	SME	129.0	96.0	
Labor productivity growth (%)	Large	-3.3	12.3	Only the difference between innovative large and non-innovative large firms is significant.
	SME	-0.7	2.6	
Sales growth (%)	Large	-1.0	9.8	Only the difference between innovative SMEs and non-innovative SMEs is significant.
	SME	-0.4	4.3	

Source: Enterprise Surveys database.

TABLE A5.3 Probit regression analysis of the probability of being an innovator (marginal effects), manufacturing sector

Dependent variable: innovation dummy	(1)	(2)	(3)	(4)	(5)	(6)
	Innovation			Radical innovation		
R&D intensity	-0.02 (0.206)	-0.27 (0.286)	-0.22 (0.289)	0.32* (0.176)	0.47** (0.234)	0.72** (0.307)
Share of employees with university education	0.06 (0.035)	0.04 (0.027)	0.04 (0.026)	0.01 (0.036)	0.02 (0.037)	0.02 (0.038)
Share of direct exports in sales	0.05** (0.025)	0.04* (0.021)	0.04** (0.021)	0.09** (0.039)	0.08** (0.038)	0.08** (0.039)
Foreign ownership share	0.00 (0.024)	-0.01 (0.021)	-0.01 (0.020)	-0.07** (0.032)	-0.07** (0.032)	-0.07** (0.032)
Industry level R&D spillovers	-0.09 (0.196)	-0.08 (0.176)	-0.10 (0.183)	0.14 (0.159)	0.12 (0.152)	0.13 (0.159)
Size of firms (total employment)	-0.03 (0.046)	0.01 (0.035)	0.02 (0.039)	0.06 (0.059)	0.07 (0.059)	0.09 (0.069)
Rate of technological catch-up		0.49 (1.644)	2.05** (1.031)		-1.36* (0.695)	-0.95* (0.535)
Interaction of technological catch-up with R&D intensity		0.55 (0.507)			0.30 (0.351)	
Interaction of size with R&D intensity			-0.06 (0.036)			-0.06 (0.053)
East	0.18 (0.121)	0.16 (0.113)	0.17 (0.115)	0.40** (0.185)	0.39** (0.183)	0.37** (0.184)
West	-0.06 (0.084)	-0.01 (0.065)	-0.03 (0.065)	0.02 (0.125)	0.01 (0.123)	-0.01 (0.123)
South	0.13 (0.104)	0.12 (0.107)	0.13 (0.109)	-0.02 (0.146)	-0.06 (0.152)	-0.06 (0.153)
Observations	265	261	261	221	219	219

Source: Enterprise Surveys database.

Note: All explanatory variables except for dummy variables for regions are in natural logs. Omitted region is central Sweden. All regressions include two-digit industry dummies and a constant term. Standard errors are in parentheses. Industry level R&D spillovers is defined as the total R&D intensity at the 2 digit industry level minus the firm's R&D intensity.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A5.4 Probit regression analysis of the probability of being an innovator (marginal effects), services sector

Dependent variable: innovation dummy	(1)	(2)	(3)	(4)	(5)	(6)
	Innovation			Radical innovation		
R&D intensity	0.52 (0.358)	0.45 (0.290)	-0.21 (0.211)	0.02 (0.145)	0.53** (0.242)	0.11 (0.253)
Share of employees with university education	0.06 (0.041)	0.07* (0.043)	0.08* (0.043)	0.01 (0.053)	0.0 (0.051)	0.01 (0.052)
Share of direct exports in sales	-0.02 (0.049)	-0.02 (0.051)	-0.02 (0.052)	-0.01 (0.049)	0.0 (0.048)	0.0 (0.049)
Foreign ownership share	0.03 (0.026)	0.03 (0.029)	0.03 (0.029)	-0.02 (0.033)	-0.02 (0.031)	-0.02 (0.032)
Industry level R&D spillovers	-0.02 (0.081)	-0.01 (0.085)	-0.01 (0.090)	0.02 (0.135)	-0.08 (0.137)	-0.05 (0.140)
Size of firms (total employment)	0.04 (0.055)	0.03 (0.057)	0.03 (0.058)	-0.01 (0.088)	-0.03 (0.086)	-0.02 (0.091)
Rate of technological catch-up		0.98** (0.434)	0.70* (0.385)		-0.89 (0.588)	-1.24** (0.505)
Interaction of technological catch-up with R&D intensity		-0.92* (0.473)			-0.66 (0.436)	
Interaction of size with R&D intensity			0.13 (0.092)			0.06 (0.083)
East	-0.08 (0.136)	-0.08 (0.146)	-0.09 (0.149)	0.05 (0.172)	0.03 (0.166)	0.02 (0.170)
West	-0.08 (0.133)	-0.09 (0.144)	-0.1 (0.147)	0.19 (0.200)	0.15 (0.188)	0.15 (0.194)
South	0.0 (0.118)	0.0 (0.127)	0.0 (0.129)	-0.15 (0.189)	-0.19 (0.189)	-0.19 (0.192)
Observations	192	192	192	141	141	141

Source: Enterprise Surveys database.

Note: All explanatory variables except for dummy variables for regions are in natural logs. Omitted region is central Sweden. All regressions include two-digit industry dummies and a constant term. Standard errors are in parentheses. Industry level R&D spillovers is defined as the total R&D intensity at the 2 digit industry level minus the firm's R&D intensity.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A5.5 Ordinary least squares regression analysis of labor productivity, manufacturing sector^a

Dependent variable: labor productivity	(1)	(2)	(3)	(4)	(5)	(6)
	Innovation			Radical innovation		
Innovation ^b	0.1 (0.105)	0.03 (0.127)	-0.08 (0.379)	-0.50* (0.300)	-0.59 (0.373)	-1.65 (1.122)
Share of employees with university education (%)	-0.09* (0.047)	-0.09** (0.046)	-0.09* (0.047)	0.0 (0.066)	0.0 (0.066)	-0.03 (0.079)
Foreign ownership share (%)	0.05 (0.036)	0.05 (0.037)	0.05 (0.036)	0.06 (0.039)	0.06 (0.039)	0.05 (0.043)
Share of direct exports in sales (%)	0.14*** (0.054)	0.14** (0.055)	0.14** (0.055)	0.08 (0.082)	0.08 (0.084)	0.12 (0.102)
Industry level R&D spillovers	0.0 (0.062)	-0.07 (0.134)	-0.03 (0.130)	-0.04 (0.078)	-0.27 (0.215)	-0.28 (0.228)
Size (total employment)	-0.03 (0.134)	-0.01 (0.135)	-0.08 (0.145)	-0.01 (0.122)	0.01 (0.119)	-0.27 (0.296)
Rate of technological catch-up		-2.19 (1.329)	-0.14 (0.490)		-1.45 (1.119)	-0.95 (0.791)
Interaction term of technological catch-up rate with innovation ^b		1.98 (1.239)			0.76 (0.765)	
Interaction of size with innovation ^b			0.07 (0.120)			0.38 (0.290)
East	0.26 (0.205)	0.29 (0.204)	0.28 (0.207)	0.21 (0.245)	0.26 (0.241)	0.25 (0.242)
West	0.53** (0.232)	0.57** (0.235)	0.54** (0.229)	0.54** (0.264)	0.54** (0.255)	0.49** (0.227)
South	0.18 (0.133)	0.22* (0.128)	0.21* (0.129)	-0.07 (0.137)	-0.04 (0.135)	-0.11 (0.157)
R-squared	0.29	0.29	0.28	0.32	0.32	0.36
Observations	290	286	286	227	225	225

Source: Enterprise Surveys database.

a. Labor productivity and all explanatory variables except for dummy variables for regions are in natural logs. Labor productivity is defined as sales per worker. Omitted region is central Sweden. All regressions include two-digit industry dummies and a constant term.

b. In the first three columns "innovation" refers to "innovator dummy"; in the last three columns it refers to "radical innovator dummy." Standard errors are in parentheses.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

TABLE A5.6 Ordinary least squares regression analysis of labor productivity, services sector^a

Dependent variable: labor productivity	(1)	(2)	(3)	(4)	(5)	(6)
	Innovation			Radical innovation		
Innovation ^b	0.0 (0.234)	0.04 (0.225)	-0.27 (0.815)	0.15 (0.202)	0.12 (0.207)	-0.59 (0.464)
Share of employees with university education (%)	0.08 (0.135)	0.07 (0.130)	0.07 (0.130)	-0.08 (0.104)	-0.08 (0.104)	-0.09 (0.100)
Foreign ownership share (%)	0.04 (0.047)	0.03 (0.046)	0.03 (0.047)	0.06 (0.041)	0.06 (0.041)	0.07* (0.040)
Share of direct exports in sales (%)	-0.03 (0.086)	-0.03 (0.085)	-0.03 (0.086)	0.03 (0.071)	0.03 (0.074)	0.05 (0.068)
Industry level R&D spillovers	0.34* (0.190)	0.01 (0.221)	0.01 (0.221)	0.17 (0.157)	0.21 (0.234)	0.1 (0.267)
Size (total employment)	-0.03 (0.127)	-0.02 (0.122)	-0.12 (0.282)	0.05 (0.134)	0.05 (0.135)	-0.08 (0.140)
Rate of technological catch-up		-0.6 (0.829)	-1.36*** (0.483)		-0.75 (0.701)	-0.47 (0.911)
Interaction term of technological catch-up rate with innovation ^b		-0.79 (0.796)			1.56** (0.604)	
Interaction of size with innovation ^b			0.11 (0.303)			0.23* (0.128)
East	-0.14 (0.265)	-0.15 (0.261)	-0.13 (0.253)	0.03 (0.262)	0.03 (0.258)	-0.04 (0.258)
West	0.07 (0.252)	0.07 (0.246)	0.09 (0.228)	0.08 (0.234)	0.10 (0.226)	-0.01 (0.228)
South	-0.22 (0.291)	-0.26 (0.293)	-0.25 (0.293)	-0.18 (0.335)	-0.15 (0.341)	-0.23 (0.324)
R-squared	0.41	0.42	0.4215	0.47	0.48	0.49
Observations	197	197	197	141	141	141

Source: Enterprise Surveys database.

a. Labor productivity and all explanatory variables except for dummy variables for regions are in natural logs. Labor productivity is defined as sales per worker. Omitted region is central Sweden. All regressions include two-digit industry dummies and a constant term.

b. In the first three columns "innovation" refers to "innovator dummy"; in the last three columns it refers to "radical innovator dummy." Standard errors are in parentheses.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

ENDNOTES

This chapter was written by Hulya Ulku.

1. Balaguer and others 2008; OECD 2013b.
2. Cornell University, INSEAD and WIPO 2014; Edquist and Henrekson 2013; OECD 2013b; WEF 2014a. World Economic Forum's Global Competitiveness Report 2014 ranked Sweden third in per capita patent applications, after Switzerland and Japan; sixth in capacity of innovation; and fourteenth in the quality of scientific research institutions. In the WEF (2014a) innovation index, Sweden ranked seventh among 144 countries. In the global innovation index published by Cornell University, INSEAD, and WIPO (2014), it ranked third among 143 countries. From 2013 to 2014, Sweden dropped two places in the first and one in the second ranking.
3. Balaguer and others 2008; Chaminade, Zabala, and Treccani 2010; Hollanders and Es-Sadki 2014; IVA 2008; OECD 2013b. According to Edquist and Henrekson (2013), in 2011, the ten largest firms accounted for 55 percent of total R&D investment in the private sector.
4. Balaguer and others 2008; IVA 2008; Chaminade, Zabala and Treccani 2010; OECD 2013b. According to IVA (2008), R&D carried out in high tech and medium high-tech industries makes up 90 percent of R&D in the manufacturing sector.
5. Chaminade, Zabala and Treccani 2010.
6. Andersson and Löf 2012; Löf and Heshmati 2003.
7. *Ibid.*
8. *Ibid.*
9. Löf and Heshmati 2003; IVA 2008.
10. Balaguer and others 2008; Bitard and others 2008.
11. Hollanders and Es-Sadki 2014; OECD 2013b. The European Innovation Scoreboard 2014, prepared by Hollanders and Es-Sadki, reported that Sweden was among the countries with the lowest innovation growth rates between 2006 and 2013, along with the United Kingdom and Croatia, and indicated that Sweden's performance lead in innovation over the EU declined from almost 50 percent in 2006 to 35 percent in 2013.
12. IVA 2008.
13. Löf and Heshmati 2003; OECD 2013b.
14. A minimum threshold of expenditure is used to "trim" self-reported R&D spending. For small firms this threshold is the annual cost of one researcher (33,000 SKr); for medium firms it is the annual cost of one researcher and one technician (58,000 SKr); for large firms the threshold cost covers two researchers and two technicians (116,000 SKr).
15. Altomonte and others 2013; Baldwin and Johnson 1996; Geroski and Machin 2013.
16. In addition to new or significantly improved product and processes, Enterprise Surveys also collect data on new or significantly improved organizational structure and management practices, supporting activities, marketing methods and logistics during the past three years preceding 2014 when ES data was collected.
17. See, for example, Wang and Blomström, (1992) and Borensztein, De Gregorio, and Lee (1998). Among technology transfer channels, technology licensing is the most direct, giving the licensee access to the blueprint of another company's technology. Foreign ownership transfers knowledge from foreign to domestic firms through the demonstration effect, labor mobility, and linkages between the foreign and domestic firms, while being part of a multi-establishment firm facilitates knowledge transfer between the different branches of the parent company. Exporting exposes domestic producers to the practices of international customers and producers, and importing introduces firms to the new technology embodied in the imported goods.
18. Andersson and Löf 2012; Löf and Heshmati 2003.
19. Acs and Audretsch 1988; Bhattacharya and Bloch 2004; Schumpeter 1942.
20. Schumpeter 1942.
21. The ES definition of large firms and SMEs is different from the definition of the European Union (EU), which defines large firms as those with 250 or more employees and SMEs as those with 10 to 49 employees.
22. Balaguer and others 2008; IVA 2008; Chaminade, Zabala, and Treccani 2010.
23. Balaguer and others 2008; Bitard and others 2008; OECD 2013b.
24. Aghion and others 2012.
25. An overwhelmingly large percentage of both innovative and non-innovative firms operate in the services sector—around 85 percent. Among the four regions of Sweden covered in ES, the east has the largest percentage of innovative firms (43 percent), followed by the west (25 percent), south (17 percent), and center (15 percent).
26. See World Bank (2013a) for a detailed review of the effect of the regulatory business environment on economic performance.
27. For each of the business areas covered, firm managers are asked to state whether and/or to what extent the areas in question pose an obstacle to their business.
28. In three out of eight OECD high-income economies covered by ES, including Czech Republic, Latvia, and Slovenia, innovative firms are more likely to rate labor market regulations as posing a major obstacle to their businesses than non-innovative firms.
29. Other areas of regulatory and non-regulatory business environment included in ES data are: obtaining business, construction and import licenses, high tax rates, frequency of changes in corporate income tax rates, regulations on redundancy of employees, access to finance, land and housing, corruption, courts, crime, electricity, education and skill sets of workforce, political instability, and informal competitors.
30. Braunerhjelm, Ding, and Thulin 2014; Braunerhjelm and Eklund 2014; Braunerhjelm and Henrekson 2015.
31. Hughes and Wood 2000; Rubalcaba, Gago and Gallego 2010.
32. Sheehan 2006.
33. See table A5.1 in annex A5 for the distribution of innovative firms and R&D across two-digit industries in manufacturing and services sectors.
34. The share of skilled employees in the manufacturing sector is significantly higher in innovative than in non-innovative firms, while there is no significant difference between the shares of skilled employees in innovative and non-innovative firms in the services sector.
35. Ejerma and others 2011.
36. OECD 2015.
37. Definition of large and SMEs shown here is based on ES methodology.
38. Vaona and Pianta 2008; Cohen and Klepper 1996.
39. Acs and Audretsch 1987.
40. Andersson and Löf 2012; Löf and Heshmati 2003.
41. Differences in production cost per employee across innovative and non-innovative firms within SMEs and large firms are not significant.
42. Sensitivity analyses are conducted by excluding resource based products and sectors with the highest R&D share. Findings are robust to these specifications.
43. Since all these indicators of innovation are yes/no variables, the analysis will examine the "probability of innovation" or the "probability of a firm being an innovator," rather than the amount, rate, or the intensity of innovation.
44. Industry level R&D spillovers is defined as the total R&D intensity at the 2 digit industry level minus the firm's R&D intensity.
45. Center region includes Örebro, Karlstad, and Västerås. Among the remaining regions in the analysis, west includes Borås, Göteborg, Jönköping, Trollhättan, and south includes Malmö and Lund.
46. Andersson and Löf 2012.
47. Löf and Heshmati 2003.
48. Bitard and others 2008.
49. Löf and Heshmati 2003.
50. Löf and Johansson 2014.

Access to finance

A bundant evidence from around the world suggests that small and medium enterprises (SMEs) are more financially constrained and have less access to formal sources of external finance than large firms.¹ With limited access to formal financial services, SMEs need to rely on their own retained earnings to invest and grow. Some of the main barriers to formal financing for SMEs include lack of collateral, difficulties in proving creditworthiness, high risk premiums, and underdeveloped banking relationships, as well as high transaction costs—most of them fixed. When hindered by limited access to finance during the early stages of development, new entrants to the market, which tend to be small, cannot take full advantage of existing growth opportunities. Recent research shows that on average constraints with regard to access to finance reduce firm growth by 6 percentage points for large firms and by 10 percentage points for small firms.² Although obstacles to accessing finance are more growth constraining for small firms, they constrain firms of all sizes.³ Moreover the size of a firm is a significant predictor of the probability of being credit constrained.

The creation and growth of new firms is imperative to sustaining a healthy economy. While firms of all sizes substantially contribute to overall economic development and job creation, in 48 of the 76 nations covered by recent research, SMEs accounted for more than 50 percent of the formal workforce. In the developing world, SMEs account for over 60 percent of

total manufacturing employment.⁴ Moreover, new and young businesses in the developed world significantly contribute to both net and gross job creation.⁵ In the United Kingdom, for instance, about one-third of all new employment is created by recent market entrants. Depending on the year and the sector, small British firms (those with fewer than 100 employees) account for about 50–70 percent of newly created jobs.⁶ SMEs account for 75 percent of total gross job creation and employ about 65 percent of the total workforce in 18 member-states of the Organisation for Economic Cooperation and Development (OECD).⁷ In Sweden, 65.4 percent of private sector jobs are provided by SMEs.⁸

Understanding and eliminating the barriers to finance faced by firms, especially after economic and financial downturns, is also critical for establishing a dynamic and sound economy. Evidence shows that a well-functioning financial system that provides broad access to a variety of financial services, combined with adequate credit depth, enables the private sector to thrive and innovate.⁹

Sweden has recognized the importance of financial services. Within the framework of the Europe 2020 strategy, it has focused on the development of growth promoting measures, emphasizing the importance of inclusive access to finance for firms of all sizes through national-level structural regulatory reform.¹⁰ Sweden's National Reform Programme prioritizes access

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- Sweden has a healthy financial market.
 - Small firms are more likely to be credit constrained than large ones.
 - SME innovators are more credit constrained than SME non-innovators and large firms.
 - Non-credit constrained firms spend more on research and development.
 - Credit constrained firms have declining sales growth.
 - Most firms use internal finance for fixed asset investments.

to finance for small and medium-size enterprises as a means of achieving smart, sustainable, and inclusive growth. Based on the premise that financial and banking systems that address the needs of SMEs will serve as engines for inclusive growth, in 2013 the corporate tax rate was cut by 4.3 percent.¹¹ Several funds were pooled to increase the regional supply of equity for new and growing enterprises and to improve access to capital in forms other than subsidies, including loans, guarantees, and venture capital. These efforts have borne fruit in Sweden, as the results of this chapter will show. However, Sweden's performance on credit information and legal rights, as measured by the *Doing Business* indicators, has been relatively weak.¹²

SWEDEN'S FINANCIAL SYSTEM

With total assets equivalent to around 400 percent of gross domestic credit, the Swedish banking sector is the third largest in Europe relative to the size of the economy, after Switzerland and the Netherlands.¹³ The sophisticated Swedish banking sector has been a leader and a best-practice model among Nordic countries since the 1990s.¹⁴ Sweden has an advanced and complex financial system that employs around 2 percent of the total workforce and accounts for assets equivalent to 5.5 times gross domestic product.¹⁵ As of December 2013, a total of 118 bank offices were operating in Sweden.¹⁶ The prominent players in the financial system include commercial banks, mortgage credit institutions, insurance companies, and to a lesser extent mutual fund companies and state-administered pension insurance funds. Apart from investment banks and brokerage firms, financial firms from outside the Nordic region have not yet gained significant market share in Sweden. The four largest banks—Swedbank, Nordea, SEB,

and Handelsbanken—account for 86 percent of banking sector assets. Commercial bank lending is concentrated predominantly in Sweden and other Nordic countries, although cross-border operations also exist in the Baltics.¹⁷

Sweden has a tradition of state intervention in the financial sector.¹⁸ After a period of strong growth and high liquidity between 1997 and 2007, Sweden's financial sector was negatively impacted by the international financial crisis of 2008. The economic downturn deeply upset the business and financing environment in the OECD area as a whole, where GDP contracted by 3.6 percent, as well as in the Euro Area, where it fell by 4.3 percent.¹⁹ In Europe from 2010 to 2011, cross-country recovery of overall financial conditions was uneven, with some economies growing at a sustainable pace, while others lost growth momentum and continued contracting. In Sweden, government policies were able to safeguard public finances and played a decisive role in a relatively rapid recovery. The most targeted government measure to strengthen SME access to credit was through increased support to the Swedish development bank, ALMI. Thanks to timely policy responses, Sweden had the lowest level of SME bankruptcies from 2007 to 2012 relative to other countries in the Nordic region.²⁰ Moreover, during the same period, the growth of new firms outnumbered the number of bankruptcies. In addition, competition in the banking sector in Sweden has led to low intermediation margins. In 2012–13, interest rate margins in Sweden remained low, while banks' funding costs and lending rates for new mortgages continued to decrease in 2013. The gross margin decreased from 1.21 to 1.18 percentage points, while the net margin decreased to 0.55 points.²¹

During the 2007–09 crisis, Swedish commercial banks generally fared

better than banks in other European Union (EU) economies, which were flooded with toxic assets.²² In October 2010, the Riksbank—Sweden's central bank—became the first central bank in the EU to end emergency loans for the banking sector, instead extending liquidity support and bolstering lending. In June 2011, the Ministry of Finance ended its bank-support program, a sign of confidence in the financial soundness of Swedish banks and their ability to withstand additional financial market turbulence. However, the Euro Area sovereign debt crisis and its potential impact on the already fragile banking sector discouraged bank lending, which contributed to a further tightening of credit to the private sector. The constricted lending conditions posed a direct risk to sustainable economic growth in Sweden. During the 2007–12 period, 2008 marked the lowest point for SME lending; loans to smaller businesses represented only 7 percent of all new loans.²³ From 2012 to 2013, SME lending slowly but steadily recovered. In 2012, loans to SMEs comprised around 12 percent of all new loans under 10 million SKr (around 0.9 million euros), up from only 7 percent in 2008.²⁴

Current Swedish programs to support SME access to finance are broadly focused and offer a variety of instruments and investment mandates. These programs are managed primarily by large public companies. For instance, Swedish entrepreneurs can acquire financing through Industrifonden, Inlandsinnovation AB (in the case of firms operating in the northern part of Sweden), and from the major player ALMI Företagspartner AB, a state-owned company that offers advisory services, loans, and venture capital through all phases of business growth. ALMI's main activity is the provision of SME loans.²⁵ It provides business development and financing with fewer collateral requirements but at higher interest rates than private banks, to

compensate for higher risk.²⁶ ALMI's loans are often cofinanced by other lenders, particularly commercial banks. Other players providing funding for start-ups and early stage businesses in Sweden include Partner Invest Norr, Sydsvensk Saminvest and Entreprenorfond. In addition, SMEs with fewer than 250 employees can take advantage of grants of up to 50 percent of project costs through the Eurostars Joint Program, provided they partner with at least one other Eurostars member country.²⁷

Is access to finance a constraint for Swedish firms?

Despite all the programs to support SME finance, there is historical evidence to suggest that SMEs in Sweden face greater obstacles to accessing finance than large firms. During the financial crisis of 2008, SMEs in general suffered greater economic losses than did big businesses. The combination of lower demand for loans and tighter credit supply led to a decline in the annual growth rate of loans to the SMEs. From 2008 to 2012, large firms outperformed SMEs with respect to both value added and employment creation. Specifically, while SME employment and value added decreased by about 1 percent, large firms increased value added by more than 3 percent and employment by almost 1 percent.²⁸ SMEs may have suffered greater harm due to the financial crisis because they are more vulnerable to market shocks and are more directly affected by changes in everyday consumption patterns, as their small size precludes diversification of client markets. In addition, relatively few Swedish SMEs have credit ratings, which makes it difficult for investors to assess their credit risk.²⁹

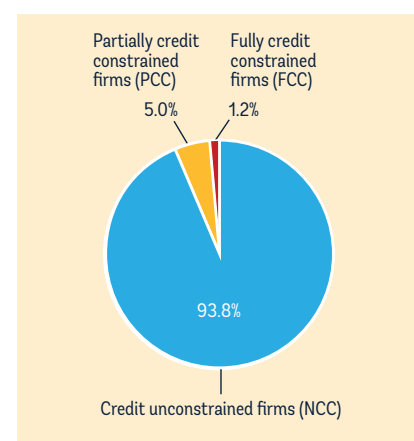
The data collected in Sweden in 2014 for the World Bank Group *Enterprise Surveys* can be used to analyze the extent to which policies undertaken in Sweden were successful in reducing or eliminating barriers to access

to finance for SMEs—and, indeed, for all firms. An indicator of credit constraint experienced by firms can be constructed using information about the use of credit during a fiscal year, either for working capital or for investment in fixed assets, and the outcome of applications to financial institutions for loans or lines of credit. The result is an evidence-based indicator of the degree of credit constraint faced by firms when trying to finance operations in fiscal year 2013. Figure A6.1 shows how external and bank finance usage and applications are used to compute the credit constraint indicator. Based on this indicator, three categories of firms are defined: fully credit constrained (FCC), partially credit constrained (PCC), and non-credit constrained firms (NCC). Credit constrained firms are defined as those that are fully (FCC) or partially credit constrained (PCC) (see figure A6.1 in annex A6 for a detailed explanation of how the categories are defined).

Fully constrained firms (FCC) are those that find it challenging to obtain credit. They have no source of external financing and typically fall into one of two categories: firms that applied for a loan and were rejected; or firms that did not apply for a loan because terms and conditions were unfavorable. Unfavorable terms and conditions include complex application procedures, unfavorable interest rates, high collateral requirements, insufficient loan amounts and maturities, and a firm's perception that the loan would not be approved.

Partially constrained firms (PCC) also have challenges in obtaining credit but are successful, to some extent, in raising external financing. Partially constrained firms include firms that have both external finance and have applied for a loan that was either partially approved or rejected; and firms that have external finance but did not apply for a

FIGURE 6.1 The majority of Swedish firms are not credit constrained, while a very low percentage of firms is fully credit constrained



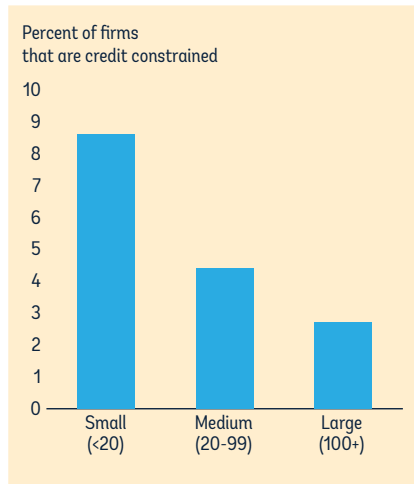
Source: Enterprise Surveys database.

loan from a financial institution due to unfavorable terms and conditions.

Non-credit constrained firms (NCC) are those that did not have difficulties accessing credit or do not need credit. Three types of firms fall into this category: firms that have sufficient capital and did not need any form of external finance; firms that applied for a loan and whose application was approved in full; and firms that obtained sufficient capital from other external sources and therefore did not need to apply for a loan. In Sweden, of the entire group of non-credit constrained firms, 24 percent were able to fully fund their working capital and investment on fixed assets completely with internal funds, 23 percent were approved in full, and 52 percent had sufficient funds internally and externally that they did not need to apply for a loan.

The results also reveal that only 6.2 percent of private firms in Sweden are credit constrained (figure 6.1). This clearly speaks to the merits of Sweden's financial markets. However, as figure 6.2 shows, SMEs in Sweden are more likely to be credit constrained than large firms: 8.6 percent of small firms and 4.4 percent of medium-size

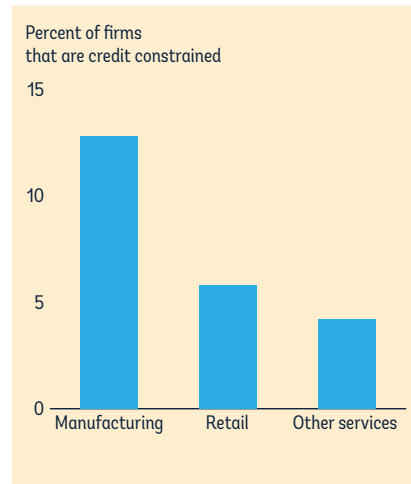
FIGURE 6.2 Small firms are more likely to be credit constrained than large ones



Source: Enterprise Surveys database.

firms are credit constrained; in contrast, only 2.7 percent of large firms are credit constrained. Manufacturing firms are also more likely to be credit constrained: almost 13 percent of firms that operate in the manufacturing sector are credit constrained, compared to over 5.8 percent in retail and around 4 percent in the other services (figure 6.3).

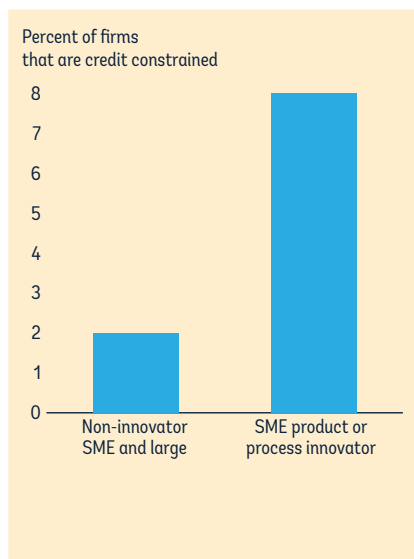
FIGURE 6.3 Manufacturing sector firms tend to be more credit constrained



Source: Enterprise Surveys database.

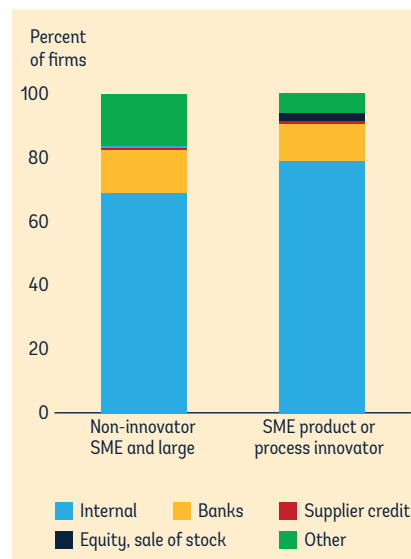
The correlation between credit constraints and structural features such as size of firm, age of the firm, sector of activity, and geographical location is jointly explored. The relationship between firm size and credit constraint status is found to be negative but not significant after accounting for these structural factors. However, once annual sales growth is accounted for, the relationship does become significant

FIGURE 6.4 SME non-innovators and large firms tend to be less credit constrained than SME innovators



Source: Enterprise Surveys database.

FIGURE 6.5 Innovators tend to rely more on internal financing than SME non-innovators and large firms



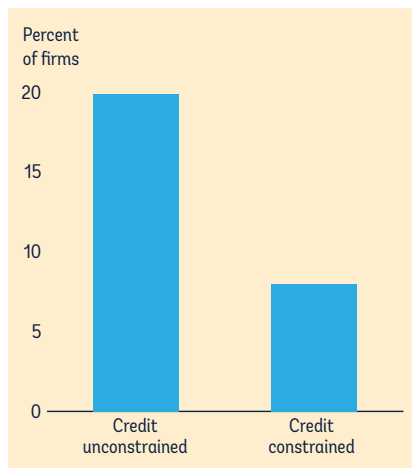
Source: Enterprise Surveys database.

(see table A6.1 in annex 6A).³⁰ The general finding that overall manufacturing firms are more credit constrained is also found to be significant after accounting for the other factors (see table A6.1, first and third columns in Annex A6). Exploring within industries, firms in other manufacturing sectors (a residual category that excludes fabricated metals, machinery, and equipment) are positively associated with being credit constrained relative to the other sectors (see table A6.1, second column).

Globally, access to finance constitutes a constraint for small firms, particularly for innovative endeavors. Both internal finance resources and access to external capital are key drivers of a firm's innovation activity, as innovation is often associated with risk and costly investment in knowledge and technology.³¹ The analysis of Enterprise Surveys data shows that in 2013 around 8 percent of innovative SMEs in Sweden were credit constrained (figure 6.4). This percentage is significantly higher than for non-innovator SMEs and large firms. Not surprisingly, compared to non-innovative SMEs and large firms, innovative SMEs tend to rely more on internal funds to finance their investments in fixed assets although this finding is not statistically significant (figure 6.5). These results hold even when considering the broader definition of SMEs used by the EU—those firms with up to 250 employees.

Almost 20 percent of non-credit constrained firms spend on research and development (R&D) activities, while only 8 percent of credit constrained firms do so (figure 6.6). This correlation remains significant when tested in a multivariate framework by accounting for other potential explanations for the difference in R&D, including firm size, firm age, location within Sweden, and sector of activity (see table A6.1, fourth column). This divergence in the incidence of R&D between credit

FIGURE 6.6 Non-credit constrained firms spend more on research and development than the credit constrained ones



Source: Enterprise Surveys database.

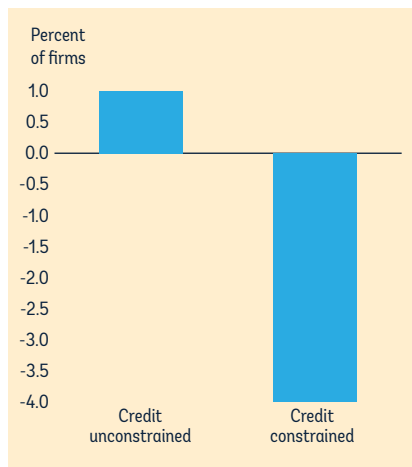
constrained and non-credit constrained firms is important, as it suggests that non-credit constrained firms tend to invest more in their future by creating new knowledge.

Credit constrained firms are associated with declining sales growth while non-credit constrained firms with positive sales growth. A simple comparison of averages indicates that non-credit constrained firms typically experience sales growth of about 1 percent, while

credit constrained firms experience negative sales growth of -4 percent (figure 6.7). This result is significant after the analysis is expanded to account for other potential explanations, including firm size, firm age, location, and sector (see table A6.1, third column). This finding is not surprising considering that in order to expand sales, firms commonly require access to additional financial resources.

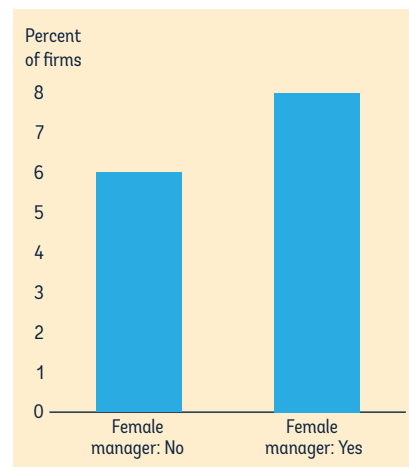
The negative relationship between credit constraint and sales growth is compelling, but this result does not demonstrate causality. It is plausible, for instance, that firms face credit constraints because credit providers consider these firms to lack credit-worthiness based on their relatively low sales growth. In such cases, financial intermediaries may have assessed these firms to be unworthy of credit. It is also plausible that a lack of access to credit could be causing low sales growth. Regardless of the causal effects, the negative and significant association between credit constraint and sales growth implies that credit is properly being allocated and financial markets are working properly.

FIGURE 6.7 Credit constrained firms have lower sales growth than credit unconstrained ones



Source: Enterprise Surveys database.

FIGURE 6.8 Slightly more firms with a female top manager are credit constrained



Source: Enterprise Surveys database.

A slightly higher percentage of female-run firms are credit constrained as compared to male-run firms (figure 6.8). While both percentages are low—the number of credit constrained firms is low overall—the finding is revealing in a country that has put great efforts into ensuring gender equality.

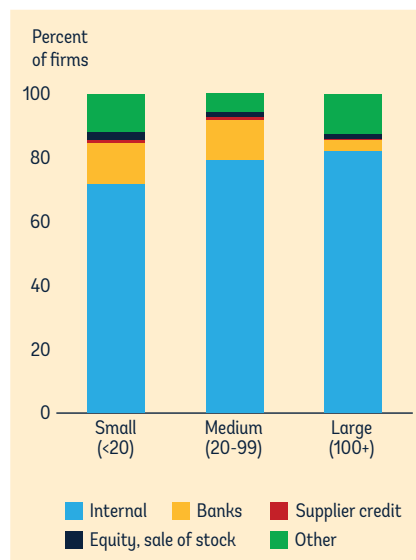
Which sources of financing do Swedish firms use most frequently?

Enterprise Surveys data show that most firms in Sweden, regardless of size, tend to rely mostly on internal funds to finance investment in fixed assets. Firms finance only about 12 percent of investment in fixed assets with bank credit. Small and medium-size firms finance a considerably larger share of their investment in fixed assets using bank finance (figure 6.9). These results hold even when the analysis is based on the EU's definition of SMEs (up to 250 employees). Results based on the EU definition show a larger share of SME investment financed through bank credit. Large firms tend to rely more on internal funds or other sources of financing.

The share of fixed asset investment financed by bank credit is negligible in the retail sector, but is considerably higher in the services sectors, including hospitality, transport, construction, and wholesale. Equity finance is negligible in the retail and other services sectors, but considerably more important in the manufacturing sector (figure 6.10).

Swedish female-led firms finance significantly larger shares of fixed asset investment using internal funds than do male-led firms. Only about 5 percent of the average investment in fixed assets is bank financed in female-led firms, in contrast to around 13 percent of the value of investments in male-managed firms (figure 6.11). While the data do not reveal whether this is by choice or due to lack of options,

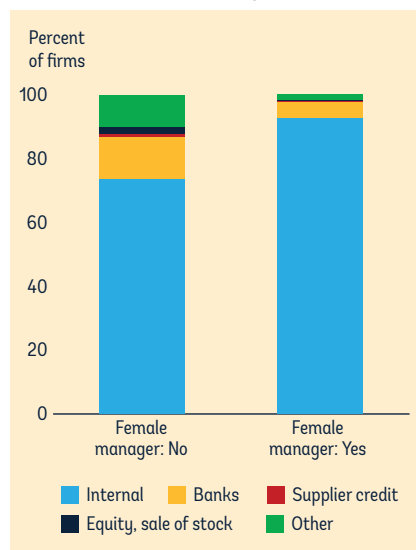
FIGURE 6.9 Large firms finance a smaller percentage of fixed asset investment through banks



Source: Enterprise Surveys database.

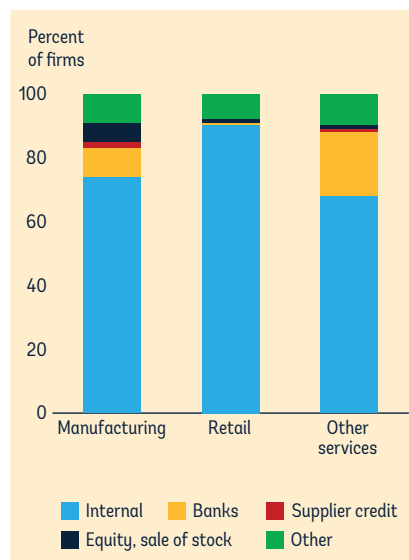
the result, coupled with the fact that female-led firms are slightly more likely to be credit constrained, seems to indicate a comparatively disadvantageous position for female-led firms in Sweden's financial markets.

FIGURE 6.11 For female-led firms, a small percentage of fixed asset investment is financed by banks



Source: Enterprise Surveys database.

FIGURE 6.10 Firms across all sectors rely heavily on internal funds for investment in fixed assets



Source: Enterprise Surveys database.

PERCEPTIONS AND RATINGS OF THE SWEDISH FINANCIAL SECTOR

The Enterprise Surveys also capture perception-based measures of the business environment. Firms are asked to identify which obstacle out of 15 options is the biggest obstacle they face. Thus the percentage of firms that perceive a particular obstacle to be the biggest constraint can be quantified; this is a relative measure of the perceived degree of constraint for each one of the 15 options.³² Only 6.7 percent of firms in Sweden identified access to finance as their top obstacle. In comparison, 27.8 percent of firms identified “inadequately educated workforce” as the top obstacle.

Firms can also rate the degree to which access to finance is a major obstacle independently of any other element of the business environment. In contrast to the previous measure, this is an absolute rating instead of a relative ranking; each element is evaluated independently. As expected, only 3 percent of firms in Sweden believe access

to finance to be a severe or very severe obstacle. More than half those firms are indeed credit constrained: perceptions seem to align with factual evidence—a result not always obtained with survey data. This result is consistent with the *Global Competitiveness Report*, which finds that about 11 percent of Swedish business leaders surveyed identify access to finance as a barrier to starting a business.³³

In general, Sweden consistently ranks high on a number of indexes related to access to financial services. According to World Economic Forum data, when it comes to financial market development, Sweden ranks 10th on ease of access to loans, 16th on affordability of financial services, and 20th on availability of financial services.³⁴ However, on the “getting credit” indicator of the *Doing Business 2015* report, Sweden ranks 61st in the world. This index looks at certain features that facilitate lending within the applicable collateral and bankruptcy laws. It is composed of two subindicators: depth of credit information, and strength of legal rights.

Sweden has a score of 5 out of a possible 8 when it comes to depth of credit information, lower than other Nordic economies and other OECD high-income economies. Several factors explain this result. Sweden does not receive a score on the distribution of positive and negative information on borrowers. While the primary credit bureau, UC AB, does distribute some positive information about individuals, it does not distribute any positive information about firms. Similarly, the credit bureau provides only some selected negative information, such as number of defaults, but fails to provide data on late payments or arrears. Additionally, UC does not provide certain services in its online platform, such as credit scoring. On the strength of legal rights index, Sweden scores 6 out of 12. The reason for the relatively low rank is the fragmented legal framework for

secured lending (for example, collateral laws) that limits the collateral options for borrowers.

CONCLUSION

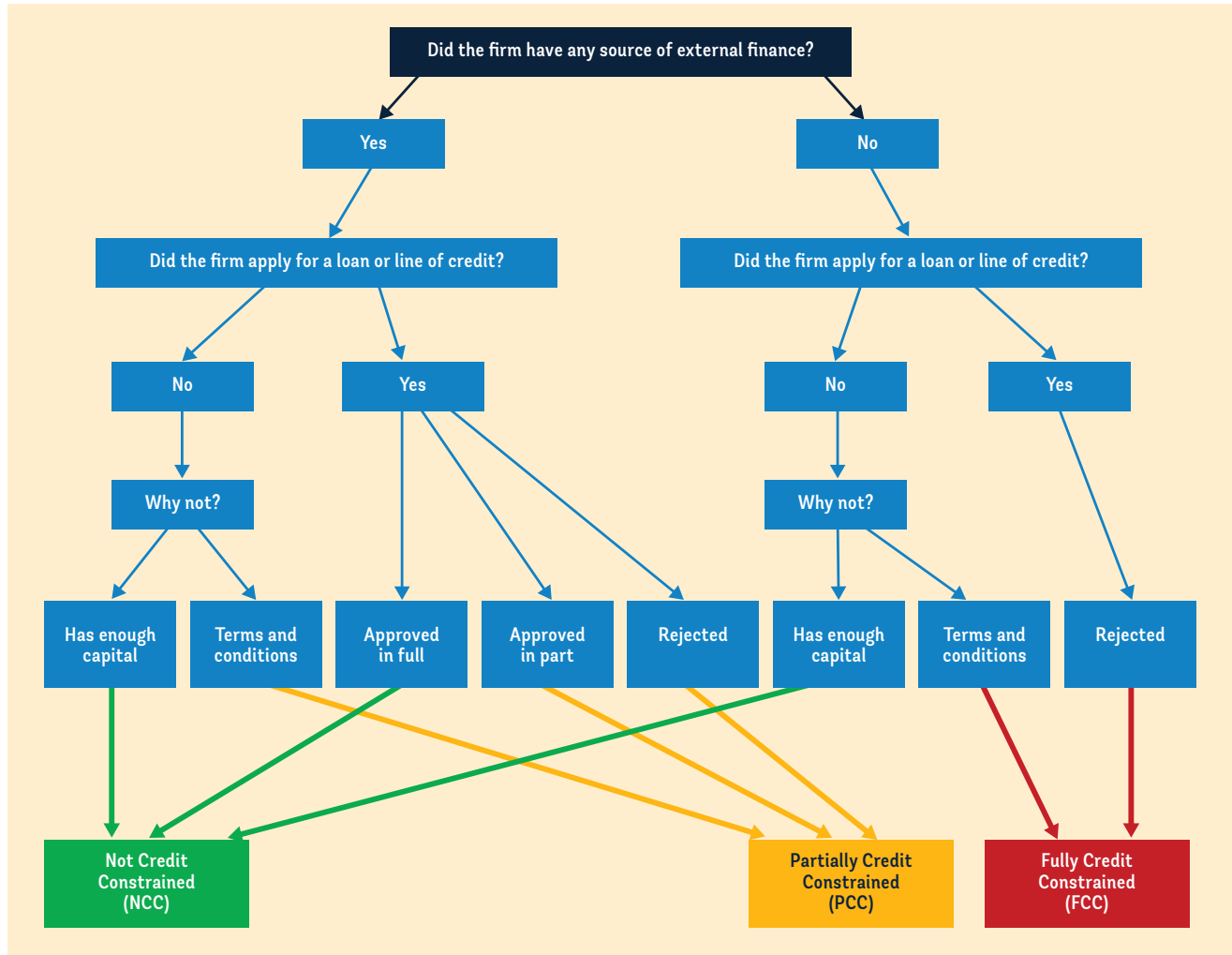
The historical evolution of Sweden's financial system explains its size and healthy contribution to the Swedish economy. SMEs have benefitted tremendously from government and EU programs aimed at increasing access

to finance, allowing firms to expand their business operations and grow. The data collected by the Enterprise Surveys seem to demonstrate that to a large extent Swedish authorities have been successful in creating an environment conducive to private firms' ability to obtain access to credit. However, SMEs and firms that are product or process innovators face greater challenges accessing credit. Not surprisingly, the data also show that firms that face higher credit constraints are

associated with declining sales growth. This result does not imply causality, but it does underline the importance of access to finance for credit constrained firms. By and large, this chapter's findings indicate that financial markets are working well in Sweden when it comes to allocating financial resources. The potential area for improvement remains in the area of getting credit, as measured by the *Doing Business* indicators.

ANNEX A6

FIGURE A6.1 Correspondence between credit-constrained groups and questions in enterprise surveys



Source: Methodology based on Kuntchev et al. 2014.

TABLE A6.1 Ordered probit analysis of credit constrained firms

Dependent Variable: Credited Constrained (1: Credit Unconstrained (NCC), 2: Partially Constrained (PCC), 3: Fully Constrained (FCC))	(1)	(2)	(3)
Real annual sales growth (%)			-0.020* (0.012)
Log of firm size (employment)	-0.164 (0.114)	-0.194 (0.119)	-0.187* (0.099)
Log of age of firm	0.119 (0.588)	0.218 (0.571)	-0.992 (0.726)
Square of log of age of firm	-0.022 (0.114)	-0.040 (0.109)	0.134 (0.131)
Manufacturing firm	0.567* (0.318)		0.704** (0.343)
Automotive services		-0.255 (0.415)	
Fabricated Metal Products		-0.059 (0.386)	
Machinery & Equipment		0.188 (0.368)	
Other Manufacturing		0.948** (0.446)	
Retail		0.181 (0.420)	
East	-0.105 (0.428)	-0.120 (0.438)	0.139 (0.439)
West	-0.556 (0.419)	-0.587 (0.397)	-0.300 (0.445)
South	-0.584* (0.328)	-0.581* (0.325)	-0.321 (0.387)
Number of observations	540	540	498

Source: World Bank calculations.

* $p < 0.1$

** $p < 0.05$

*** $p < 0.01$

ENDNOTES

This chapter was written by Asif Mohammed Islam, Jorge Luis Rodriguez Meza and Valentina Saltane.

1. Beck, Demirgüç-Kunt and Maksimovic 2005.
2. Beck, Demirgüç-Kunt and Maksimovic 2005; Beck and Demirgüç-Kunt 2006; Beck and others 2006.
3. Beck, Thorsten and Demirgüç-Kunt 2006; Kuntchev and others 2014.
4. Ayyagari, Beck and Demirgüç-Kunt 2007.
5. Birch 1987; Neumark, Wall and Zhang 2011; Haltiwanger, Jarmin and Miranda 2013.
6. Hijgen, Upward and Wright 2010.
7. See OECD 2011; <http://www.oecd.org/sti/young-SME-growth-and-job-creation.pdf>
8. OECD 2014b.
9. Parker 1999; Papadamou and Siriopoulos 2012.
10. Prime Minister's Office 2014.
11. Ernst & Young 2014.
12. For more information on Sweden's performance on the *Doing Business* indicators, please see World Bank 2014.
13. Economist Intelligence Unit 2014.
14. Economist Intelligence Unit 2014.
15. Swedish Bankers' Association; IMF 2011.
16. Swedish Bankers' Association 2013.
17. IMF 2011.
18. Parker 1999.
19. OECD 2012.
20. OECD 2014b.
21. See www.fi.se on interest rates and lending in 2013.
22. Economist Intelligence Unit 2014.
23. OECD 2014b.
24. OECD 2014b.
25. See ALMI's website, <http://almi.se>
26. EU Business 2009.
27. EuroNet 2014.
28. EC 2013.
29. Sveriges Riksbank 2013.
30. The first and second column test the correlation between being credit constrained and structural features, while the third column also accounts for firm productivity (annual sales growth). These results are obtained using an ordered Probit estimation model where the dependent variable is a categorical variable with values 1 for non-credit constrained firms, 2 for partially credit constrained firms, and 3 for fully credit constrained.
31. Andersson 2011.
32. The 15 options are: access to finance, access to land, licenses and permits, corruption, courts, crime, customs and trade regulations, electricity, inadequately educated workforce, labor regulations, political instability, informal sector, tax administration, tax rates and transportation.
33. See www.weforum.org
34. See www.weforum.org



Gender equality and opportunity for women in the Swedish private sector

- Sweden is one of the world's most gender-egalitarian countries, as indicated by composite and noncomposite measures of gender equality.
- However, women's representation in the upper levels of private sector responsibility and decision making is still very low.
- Despite their overall low presence, once in the playing field, female-managed or owned firms are as well established and experienced as their male-managed or owned counterparts.
- Female firms are as productive as male firms and exhibit similar growth rates.
- As the business environment does not seem to pose greater challenges to women, the low representation of women may be determined by factors outside the private sector.
- Women are also underrepresented in the Swedish private sector as employees. Women are more likely to work in female-run firms and in firms with more flexible working arrangements.

Gender equality is one of the foundations of Swedish modern society. Sweden is currently one of the world's most gender-egalitarian countries, as indicated by composite and noncomposite measures. Sweden ranks fourth in gender equality, after Iceland, Finland, and Norway, on the World Economic Forum Global Gender Gap Index,¹ a composite measure reflecting equality in achievement between women and men in health, education, economic participation and political empowerment. Sweden is also among the countries with the fewest regulatory restrictions on women's participation in economic activity, according to the World Bank Group Women Business and the Law project,² which examines laws and regulations that differentiate between men and women in 142 countries worldwide. Sweden also ranks highly when looking at noncomposite measures of gender equality. In 2013, the employment rate for women in Sweden was 73 percent, the highest within the EU-28 and notably higher than the EU-28 average of 59 percent. In Europe only three countries outside the European Union (EU)—Iceland, Norway, and Switzerland—show slightly higher employment rates for women. Moreover, Sweden exhibits a very small difference in employment rates between men and women: only 3.8 percentage points, compared to an average of 10.6 percentage points in the EU-28.³

Despite these achievements, women in Sweden still face a number of issues in

the labor market. First, gender-based horizontal segregation—the concentration of women in certain occupations or sectors—remains a problem. Women are underrepresented in the private sector and are concentrated in fewer occupations relative to men, working mostly in services. Although this is a common issue among EU countries, sectoral and occupational gender segregation in Sweden is above the EU-28 average.⁴ Second, women are also subject to vertical segregation, particularly in the private sector. In 2012, the share of women heading companies—private and public sector combined—was only 36 percent. Although 64 percent of managers in the public sector—at the municipal, county council, and central government levels—were women, female representation in publicly listed companies remains weak.⁵ In particular, women are severely underrepresented among entrepreneurs. Only one in three individually owned businesses is owned by a woman, and only 6 percent of working women are self-employed, compared to 15 percent of working men.⁶ Finally, a gender gap in wages persists, in line with the EU-28 average of 16 percent.

Using data from the World Bank Enterprise Surveys (ES) recently collected in Sweden, this chapter aims to contribute to the analysis of gender equality in Sweden by verifying the extent to which the business environment is characterized by the gender-related issues identified above. In particular, this chapter seeks first to determine

whether firms owned or managed by women are different in terms of characteristics and performance than those managed or owned by men. Second, the chapter looks at whether women face a more cumbersome business environment that prevents them from reaching their potential. Third, it looks at whether women workers are also underrepresented in the Swedish private sector. Finally, it analyzes where women tend to work.

The Enterprise Surveys data provide information on private sector firms disaggregated along several gender dimensions, which will help to answer these questions. For the purposes of this analysis, women-owned firms are defined as firms in which at least 50 percent of the shares are owned by women; women-managed firms are defined as firms in which the top manager is a female; and women workers are defined as female full-time permanent or fixed-term employees.

VERTICAL AND HORIZONTAL SEGREGATION IN THE SWEDISH PRIVATE SECTOR

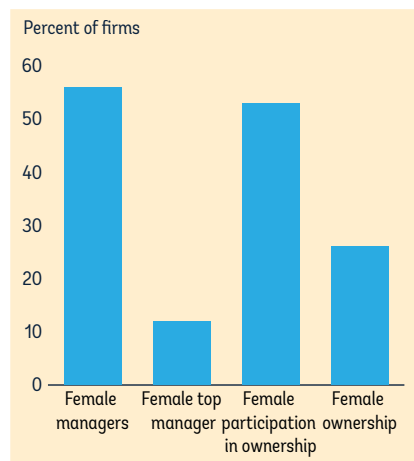
The ES data show that women appear to be very well integrated into the private sector in Sweden when broader measures of firm ownership and management are considered. Half of firms in Sweden have at least one woman among the owners. In 56 percent of firms, at least one manager is a woman. However, the picture changes dramatically when the focus shifts to upper levels of responsibility and decision making. The ES data confirm the existence of strong vertical segregation in the Swedish private sector; only 26 percent of firms have female participation in ownership that is equal to or greater than 50 percent and only 12 percent of firms have a female top manager (figure 7.1). In addition, women account for only 24 percent of all managers in a typical firm in Sweden.

The low representation of women in upper-level positions in the private sector is particularly surprising in a country where female participation in the labor force is close to that of male

participation, and where gender equality policies promote an environment in which women and men can enjoy the same opportunities, rights, and obligations in all areas of life. The vertical segregation of women in the Swedish private sector is even more surprising when compared to other high-income countries with ES data. Almost one in three firms is managed by a woman in Latvia and one in four in Estonia, compared to one in eight firms in Sweden (figure 7.2).

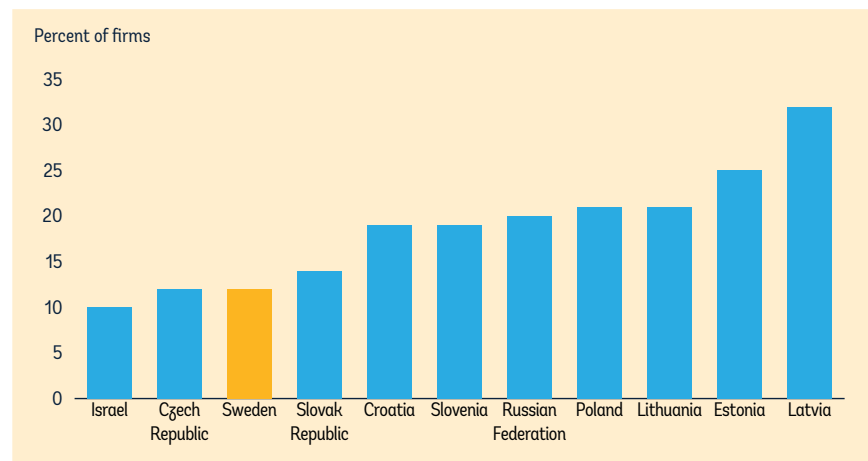
Vertical segregation comes at a cost for firms and for society as a whole,⁷ and this is so for several reasons. Studies show that the employment of women on an equal basis allows companies to make better use of the available talent pool, with potential growth implications.⁸ Women's presence on boards and in senior management enhances corporate governance by offering a wider range of perspectives.⁹ Additionally, it has been argued that more women in decision-making positions can reduce high-risk financial transactions, which are normally conducted by male traders.¹⁰ Understanding the reasons behind the vertical segregation of women and what needs to be done to reduce it is therefore particularly important,

FIGURE 7.1 Women in the Swedish private sector are underrepresented at the uppermost levels of responsibility



Source: Enterprise Surveys database.

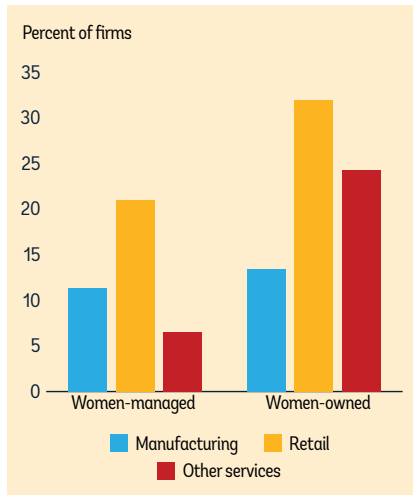
FIGURE 7.2 The percentage of firms with a female top manager is lower in Sweden than in other high-income countries with ES data



Source: Enterprise Surveys database.

Note: Data for countries other than Sweden refer to fiscal year 2013.

FIGURE 7.3 Horizontal segregation of women in the Swedish private sector



Source: Enterprise Surveys database.

not only from a gender equality and fairness perspective, but to promote private sector growth.

ES data also confirm an unequal distribution of men and women across sectors in Sweden. In particular, as in other developed and developing countries,¹¹ women-managed and owned firms in Sweden are concentrated in the services sector, and particularly in the subsector of retail. As figure 7.3 shows, the share of firms with a female top

manager is twice as high in the retail sector as in manufacturing, and more than three times the level found in other services. The same holds for firms owned by women, which account for 32 percent of total firms in retail and only 14 percent of firms in manufacturing.¹² The difference is smaller in magnitude and not significant for female-owned firms in retail versus other services.

ONCE ON THE PLAYING FIELD, FEMALE-MANAGED AND OWNED FIRMS ARE VERY SIMILAR TO THEIR MALE COUNTERPARTS

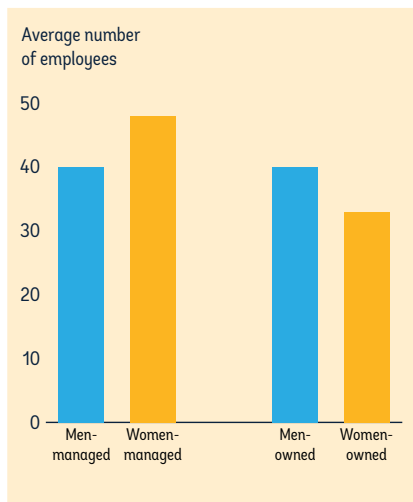
Despite the horizontal and vertical segregation of women in the Swedish private sector, those women-managed and owned firms that exist are very similar to their male counterparts in several aspects. First, women top managers are as experienced as their male counterparts (22 years versus 24 years of experience). Second, the firms women run or own are equally likely to be well established: on average, firms with a woman top manager in Sweden have been in operation for about 36 years, compared to 27 years

for men-managed firms, while women-owned firms have 24 years of operation on average versus 29 years for male-owned firms.

In addition, firms with female top managers and owners are as large as firms with male top managers and owners. Female-managed firms average 48 employees compared to 41 employees for men-managed firms, while female-owned firms have 33 employees on average versus 40 for male-owned firms (figure 7.4). The level of employment between men- and women-owned and managed firms show some variation by sector (figure 7.5). Differences between female- and male-owned firms are larger in magnitude but not statistically significant: men-owned firms are larger than female-owned firms in manufacturing and retail but smaller in other services.

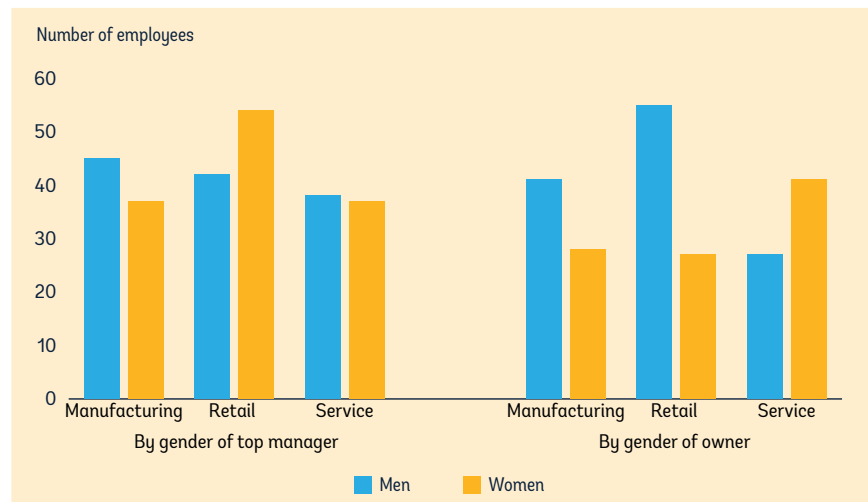
Firm size and years of experience in the market are important for assessing firm performance and the relationship to the business environment. Although larger and older firms do not grow as quickly as small and young firms, they are more likely to survive. The fact that female-managed and owned firms are

FIGURE 7.4 Women-managed and owned firms are as large as their male-managed and owned counterparts



Source: Enterprise Surveys database.

FIGURE 7.5 Some variation exists at the sectoral level, particularly for women-owned firms



Source: Enterprise Surveys database.

similar in size and age distribution to their male-managed and owned counterparts indicates that firm dynamics is perhaps gender-neutral; hence, issues related to firm-size, age and firm-dynamics are unlikely to explain the fact that there are fewer female than male firms.

Women are also as likely as men to manage or own firms with high ownership concentration. High ownership concentration is often considered a characteristic of family businesses and could be associated with negative traits such as a lower tendency to innovate, a higher risk of failure, and nepotism-related inefficiencies.¹³ Women in business have generally been presented as passive investors, or in the case where they are more active in day-to-day operations, as more likely than men to participate in family businesses. This does not seem to be the case in Sweden, where on the contrary, female managers are less likely to be running a family business than male managers. The largest owner owns an average of 66 percent of the firm in firms with a female top manager, as compared to 79 percent in firms with a male top manager.

In addition, women are as likely as men to manage shareholding companies with shares traded in the stock market (open shareholding companies). Twenty-six percent of women-managed firms are open shareholding companies versus 12 percent of men-managed firms. A slightly higher percentage of men-owned firms are open shareholding companies compared to women-owned firms (13 percent versus 8 percent, respectively), but the difference is not significant. Finally, women-managed and owned firms have similar or greater exposure to foreign technology and foreign ownership: 26 percent of women-managed firms and 27 percent of men-managed firms have at least 10 percent foreign ownership (with an average of 28

percent for women-owned firms versus 20 percent for men-owned firms); 16 percent of women-managed firms versus 14 percent of male-managed firms use technology licensed from foreign companies (while 16 percent of women-owned firms versus 13 percent of men-owned firms do the same).

Once established, women-managed and owned firms are not only as able as men-managed and owned firms to be well experienced and relatively large, but also as likely to attract foreign investment, benefit from existing technology, and be represented in the stock market.

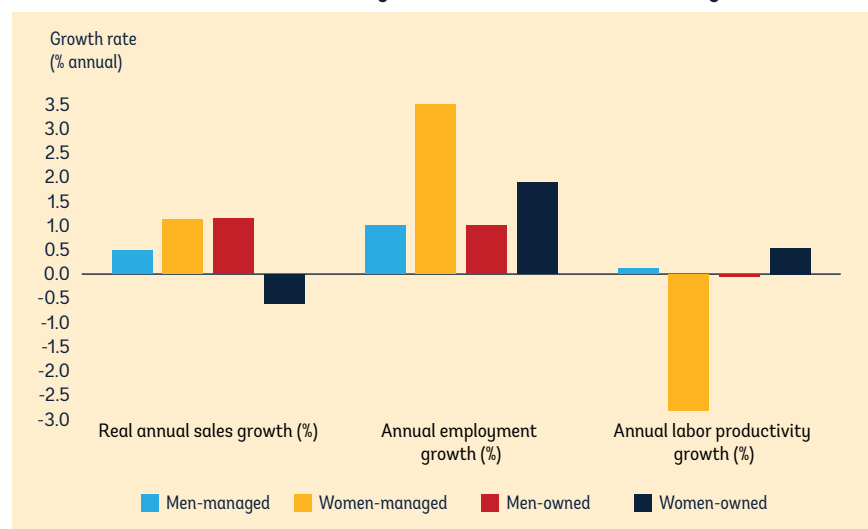
FEMALE-MANAGED AND OWNED FIRMS ARE AS PRODUCTIVE AS MALE-OWNED FIRMS, BUT THEY EXPORT LESS

Not only do women-managed and owned firms have similar characteristics compared to men-managed or owned firms, they also compare well in terms of performance. On average, women-managed and owned firms are as productive as their male counterparts when it comes to labor

productivity, defined as annual sales per employee.¹⁴ As labor costs are usually a significant portion of a firm's total costs, the productive use of labor is key for business efficiency and profitability. Higher productivity can lead to cost savings that may be passed on to consumers as lower prices; to higher output and employment; to improved competitiveness and trade performance; to higher profits that companies may reinvest to support long-term business growth; or to higher wages and incentives for workers to be more efficient. The fact that women-managed or owned firms are as productive as their male-managed and owned counterparts is an indication that such firms are just as efficient in using resources. Thus differences in efficiency are unlikely to explain the pattern of women's vertical segregation in the Swedish private sector.

In addition, women-managed and owned firms exhibit robust growth rates, in line with those of men-managed and owned firms (figure 7.6). Between 2011 and 2013, sales grew at an annual rate of 0.6 percent per annum for Swedish firms overall; for women-owned firms, the figure was -0.6 percent and 1 percent for men-owned firms. However,

FIGURE 7.6 Female- and male-managed and owned firms have similar growth rates



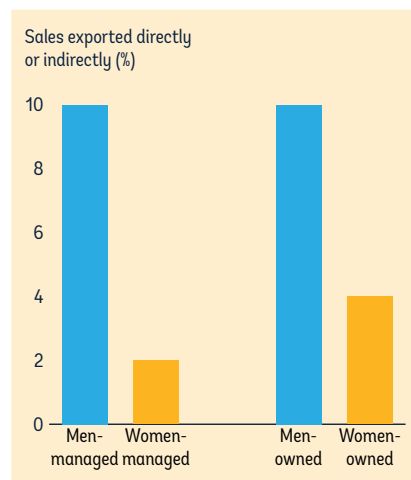
Source: Enterprise Surveys database.

FIGURE 7.7 Fewer women-managed and owned firms export

Source: Enterprise Surveys database.

the growth rate of sales was higher for women-managed firms compared with men-managed firms (1 and 0.5 percent, respectively). Neither of these differences between male and female firms are significant.¹⁵ No significant differences were found in terms of employment growth. Women-managed and men-managed firms added jobs at an annual rate of 3.5 percent and 2 percent respectively, while in women-owned and men-owned firms the annual employment growth rate was and 1 percent. Finally, women-owned firms and men-and owned firms exhibit roughly similar annual labor productivity growth.

Key factors used to explain firm productivity are the capital investment rate, research and development (R&D), the skills composition of the workforce, and management and organizational practices. The ES data provide information on some of these aspects and, once again, show substantial similarities between women-managed or owned firms and men-managed or owned-firms. The exception is R&D, where female firms seem to perform better than male firms. Women-managed and owned firms devote greater attention to R&D,

FIGURE 7.8 Female-managed and owned firms export a smaller share of total annual sales

Source: Enterprise Surveys database.

with 44 percent of women-managed and owned firms conducting R&D in 2013 as compared to 27 percent and 24 percent of men-managed and owned firms respectively.¹⁶ Seventy percent of firms with a female top manager and 71 percent of firms with a male top manager invested in fixed assets in 2013. The percentage for women-owned firms was slightly lower compared to men-owned firms (65 versus 75 percent, respectively), but not significantly so. Finally, women-managed and owned firms have the same or higher proportion of skilled workers compared to men-managed or owned firms.

Despite similar productivity levels and growth rates, women- and men-managed and owned firms are different in their export orientation, with women-managed and owned firms being significantly less likely to export. On average, 34 percent and 37 percent of men-managed and owned firms export their products or services, directly or indirectly, compared to only 14 percent of women-managed and owned firms (figure 7.7). In addition, the percentage of sales that is exported directly or indirectly is significantly lower: 2 and 4 percent of annual sales

for women-managed and owned firms respectively, compared to 10 percent of men-managed and owned firms (figure 7.8).

This poor export performance is not due to the prevalence of women-managed and owned firms in the retail sector, which is traditionally less integrated into the global economy. Women-managed and owned firms are significantly less likely to export even when accounting for the sector of activity and other firm characteristics, such size, age, and location. The literature connects export orientation to firm size and performance. Large firms are more likely to benefit from economies of scale, which in turn can increase productivity; productive and efficient firms are more likely to compete successfully in international markets.¹⁷ As women-managed and owned firms are no different in terms of size, productivity levels, and growth than men-managed and owned firms, size and productivity cannot explain the differences in export performance. Other factors may explain why women are less likely than men to engage in international markets. Empirical evidence suggests that the cost of acquiring information and undertaking efficient export transactions is relatively higher for women-managed and owned firms. Higher costs may result from gender differences in human or capital relationships, which may include: the composition of the management team and development of commercial networks, capitalization of the firm, managerial attitudes toward risk, and access to and cost of capital.¹⁸ Investigating the impact of these aspects on the export behavior of Swedish women-managed and owned firms goes beyond the scope of this report and beyond the analysis feasible using the ES data. However, a better understanding of the determinants of women-managed and owned firms' export performance is crucial to

developing their potential and adding to private sector growth.

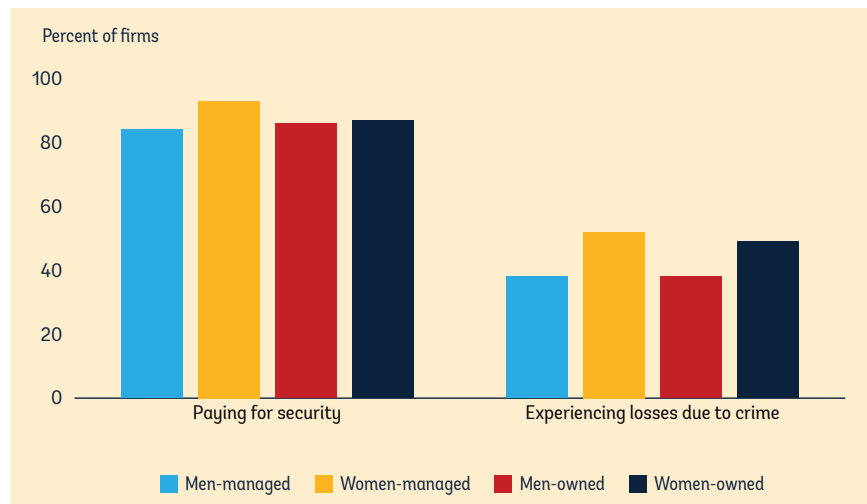
WHY ARE THERE NOT MORE WOMEN AT THE UPPER LEVELS OF RESPONSIBILITY IN SWEDEN?

Women-managed and owned firms in Sweden are as large, well established, and productive as men-managed and owned firms. Given their success, contribution, and potential to stimulate growth, why are there not more women in the upper levels of decision-making in the private sector? Do women face a more cumbersome business environment that poses greater challenges for them and therefore discourages other women from entering the playing field? Even if it is true that women-managed and owned firms perform as well as men-managed and owned firms, having to face a more cumbersome business environment may result in additional efforts in day-to-day operations that can be a deterrent to women's participation.

The Enterprise Surveys provide mixed evidence in this regard. Exposure to crime and access to finance are the only two elements of the Swedish business environment that appear to be more cumbersome for women than for men and thus may discourage female participation in top-level decision-making positions. Other aspects of the business environment, such as competition from informal firms and government requirements, are gender neutral, if not more favorable for women. The differences in access to finance are discussed in chapter 6 of this report dedicated to this topic, while this section will focus on exposure to crime, competition from informal firms, and the relationship with government.

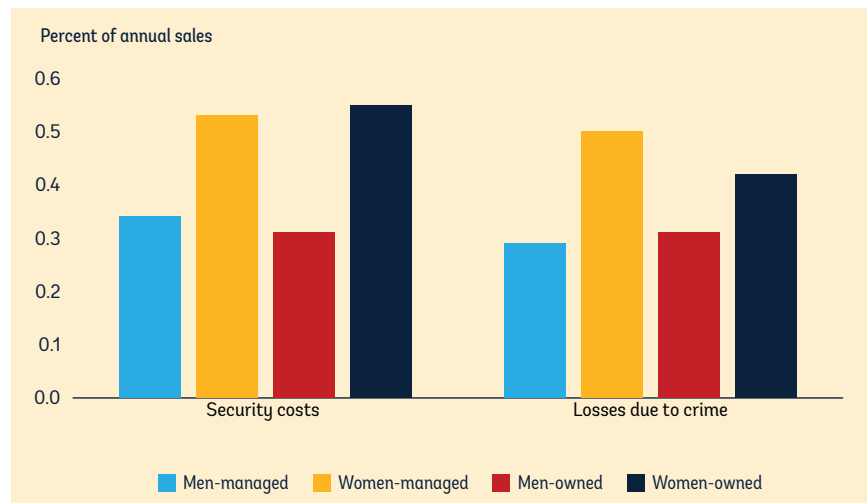
The percentage of firms that report losses due to crime—defined as theft,

FIGURE 7.9 Despite investments in security, more women-managed and owned firms experience losses



Source: Enterprise Surveys database.

FIGURE 7.10 Women-managed and owned firms report higher losses and higher security costs



Source: Enterprise Surveys database.

Note: Security cost and losses due to crime are conditional on the firm reporting losses or having paid for security services.

robbery, vandalism and arson, fraud, embezzlement, or cyber-attacks—is relatively high in Sweden, and higher than would be expected in a country with high GDP and positive GDP growth. Women-managed and owned firms are more exposed to crime in Sweden than men-managed and owned firms. They are also as likely or significantly more likely to pay for security services. Ninety-three percent and 87 percent of women-managed or owned firms, respectively, pay for security, including

equipment, personnel or security services, versus 84 and 86 percent of men-managed and owned firms. Additionally, about half of firms (52 percent) with a female top manager or female ownership (49 percent) report losses due to crime as compared to 38 percent of men-managed and owned firms (figure 7.9). Firms with a female top manager or female ownership also report higher security costs and losses due to crime compared to their male counterparts (figure 7.10). Some

of these gender-specific differences in crime and security appear to be driven by the heavier concentration of women in the retail sector, where crime and the security situation is worse than in the other sectors. While the existence of a correlation between the level of women-managed and owned firms and crime has been analyzed for developing countries,¹⁹ the case of a highly developed country like Sweden requires further investigation.

Other aspects of the business environment are more favorable to women. Women-managed and owned firms are less likely to be exposed to competition from unregistered or informal firms than their male counterparts. Twenty percent of women-managed firms reported competing against informal firms as compared to 31 percent of men-managed firms (28 percent versus 32 percent for women- and men-owned firms, respectively). Finally, there is no difference when looking at indicators of firm-government relations. On average, women- and men-managed and owned firms spend the same amount of time dealing with government requirements (about 5 percent of senior management time).

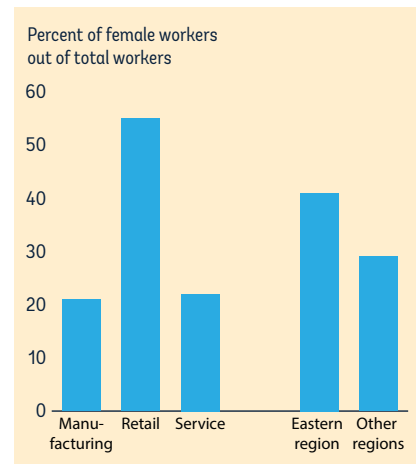
The similar amounts of time spent by women- and men-managed or owned firms in their interactions with the government and the lesser degree of exposure that female-run firms have to competition from the informal sector are clear indications that the business environment in Sweden is not gendered-biased. Are the disadvantages in access to finance and the relatively higher exposure to crime preventing more women from entering the upper levels of responsibility in the private sector, or are other factors involved, outside the business environment? One answer may lie in the availability of specific and effective work-life balance policies able to promote reconciliation of work and family life. Sweden is a pioneer in promoting policies in support

of women's labor force participation and, not surprisingly, companies in Sweden regard family friendliness and the adoption of family-friendly policies—such as flexible working times and work arrangements, part-time work, parental leave, and parental support—as extremely important.²⁰ A key question to understand is whether the availability of these policies is sufficient to support women's participation in the private sector at higher levels of responsibility and decision making, or whether they are effective only for women at lower levels of responsibility.

WOMEN EMPLOYEES IN THE SWEDISH PRIVATE SECTOR

Women account for 48 percent of the total labor force in Sweden.²¹ However, they are less represented in the private sector, where only 34 percent of the total work force is composed of women. As is the case when looking at the firms run and owned by women, women are significantly more likely to work in retail than in manufacturing or other services; they are also significantly more likely to work in the private sector when located in the eastern region, which includes Stockholm-Solna than in the rest of the country (figure 7.11).

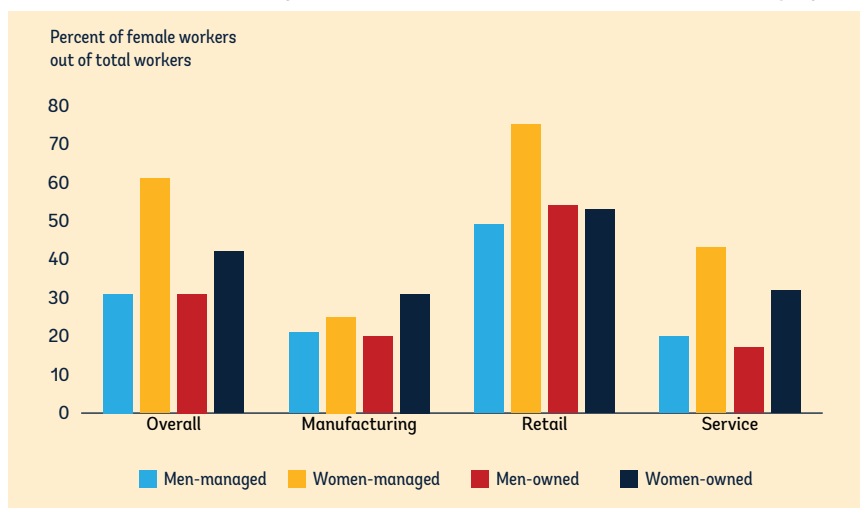
FIGURE 7.11 More women work in retail and in the eastern region, including the capital city



Source: Enterprise Surveys database.

Interestingly, women are significantly more likely to work in women-managed or owned firms than in men-managed or owned firms, and this result holds even after accounting for differences in firms' sector of operation and other firm characteristics, such as size, location, or years of operation.²² Overall, women account for 61 and 42 percent of the workforce in women-managed and women-owned firms respectively, compared to 31 percent in men-managed and men-owned firms (figure 7.12). The greatest gaps in the proportion of

FIGURE 7.12 Women-managed and women-owned firms have more women employees



Source: Enterprise Surveys database.

female workers between women- and men-managed firms are in retail and in other services. Interestingly, there is no difference in the labor force share of female workers in the retail sector between women-owned and men-owned firms—the difference appears only in the case of women-managed and men-managed firms. ES data do not allow for further investigation into the reasons behind the stronger presence of women workers in firms managed or owned by women in the Swedish economy.

Women are also more likely than men to work part time (50 percent of female workers versus 34 percent of male workers), with no difference in female part-time employment between women- and men-managed or owned firms. These findings are consistent with the use of part-time work arrangements

to reconcile work and family commitments, which are mainly used by women. Women are also significantly more likely to work part time in small and young firms, which suggests that more flexible working arrangements may be used more by less established firms to meet their labor needs.

Finally, there is a positive relationship between the use of fixed-term contracts by firms and the proportion of full-time workers that are female. That is, 39 percent of all full-time workers are women at a typical Swedish firm that has any fixed-term workers, compared with only 27 percent for a typical firm that does not use any fixed-term workers. Similarly, the percentage of full-time workers that are under fixed-term contracts and the percentage of full-time workers that are women are

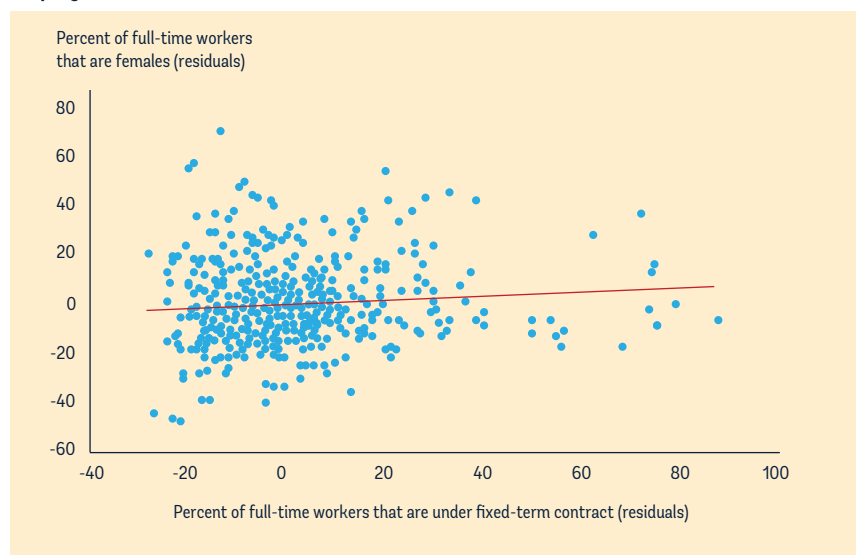
positively correlated at the firm level, and significantly so (figure 7.13).

CONCLUSION

A growing body of work documents how women's participation in the labor market contributes to the overall economic development and to the economic well-being of women. The participation can be as workers, top managers of firms, or owners of firms. Women's entrepreneurship in Sweden is characterized by strong and positive productivity and growth rates, but has not reached its full potential. Few women participate in the private sector at the upper levels of responsibility and decision making, even though the business environment does not appear to be more cumbersome for female-managed or owned firms than for male-managed or owned firms. Women are also underrepresented among employees in the private sector, and tend to work more in women-managed or owned firms.

Unlocking women's potential in the Swedish private sector is key to promoting more egalitarian economic participation, allowing women to benefit fully from economic opportunities and to contribute to overall growth. As the business environment does not seem to be gender-biased, constraints and disincentives outside the business environment must exist and may need to be removed. Identifying these constraints and addressing the remaining barriers to a more inclusive private sector seem to be the next challenges in a country that has already achieved remarkable results when it comes to family-friendly policies and women's overall economic inclusion.

FIGURE 7.13 Firms that hire more fixed term employees also tend to hire more women employees



Source: Enterprise Surveys database.

Note: The figure is a partial scatter plot of the residuals of percent of full-time workers that are females against residuals percent of full-time workers that are under fixed-term contract. The residuals are obtained after controlling for number of full-time employees at the firm (log values), firm's age (log values), dummy variables for the industry to which the firm belongs, and dummy variables for the region to which the firm belongs.

ENDNOTES

This chapter was written by Silvia Muži with the contribution of Mohammad Amin.

1. World Economic Forum 2014b.
2. World Bank 2014d.
3. Eurostat 2014.
4. EC 2014.
5. The Swedish Institute 2013.
6. OECD 2012a.
7. IMF 2013.
8. Barsh and Yee 2012; CAHRS 2011.
9. OECD 2012a; Lord Davies 2013.
10. Coates and Herbert 2008.
11. Dolado, Felgueroso and Jimeno 2004; ILO 2012a; Amin and Islam 2014.
12. Some of these differences across sectors are statistically significant.
13. Khan 2015.
14. Labor productivity is SKr 4.8 million in women-managed firms versus SKr 5.8 million for men-managed firms (US\$729,082 versus US\$889,345) and SKr 5.6 million versus SKr 5.7 million (US\$854,188 versus US\$871,732) for women- versus men-owned firms. The absence of significant differences between women-managed and owned firms is confirmed after controlling for firm characteristics, including size, sector, age, and location.
15. The absence of a significant difference in the sales growth rate between men- and women-managed and men- and women-owned firms is confirmed after controlling for firm characteristics, including size, sector, age, and location.
16. Differences are statistically significant for women vs. men-owned firms here in bivariate test and after controlling for size, sector, location, years in operation, and labor productivity.
17. Ricci and Trionfetti 2012.
18. Carter 2002; Cavusgil 1984; Reuber and Fischer 1997; Robb 2002.
19. Islam 2013.
20. German Federal Ministry for Family Affairs, Senior Citizens, Women and Youth 2010.
21. World Bank 2013b.
22. Similar results are found in the analysis of women's participation in the private sector in Latin America and the Caribbean (Amin and Muži 2014) and in the Middle East and North Africa (World Bank 2008).

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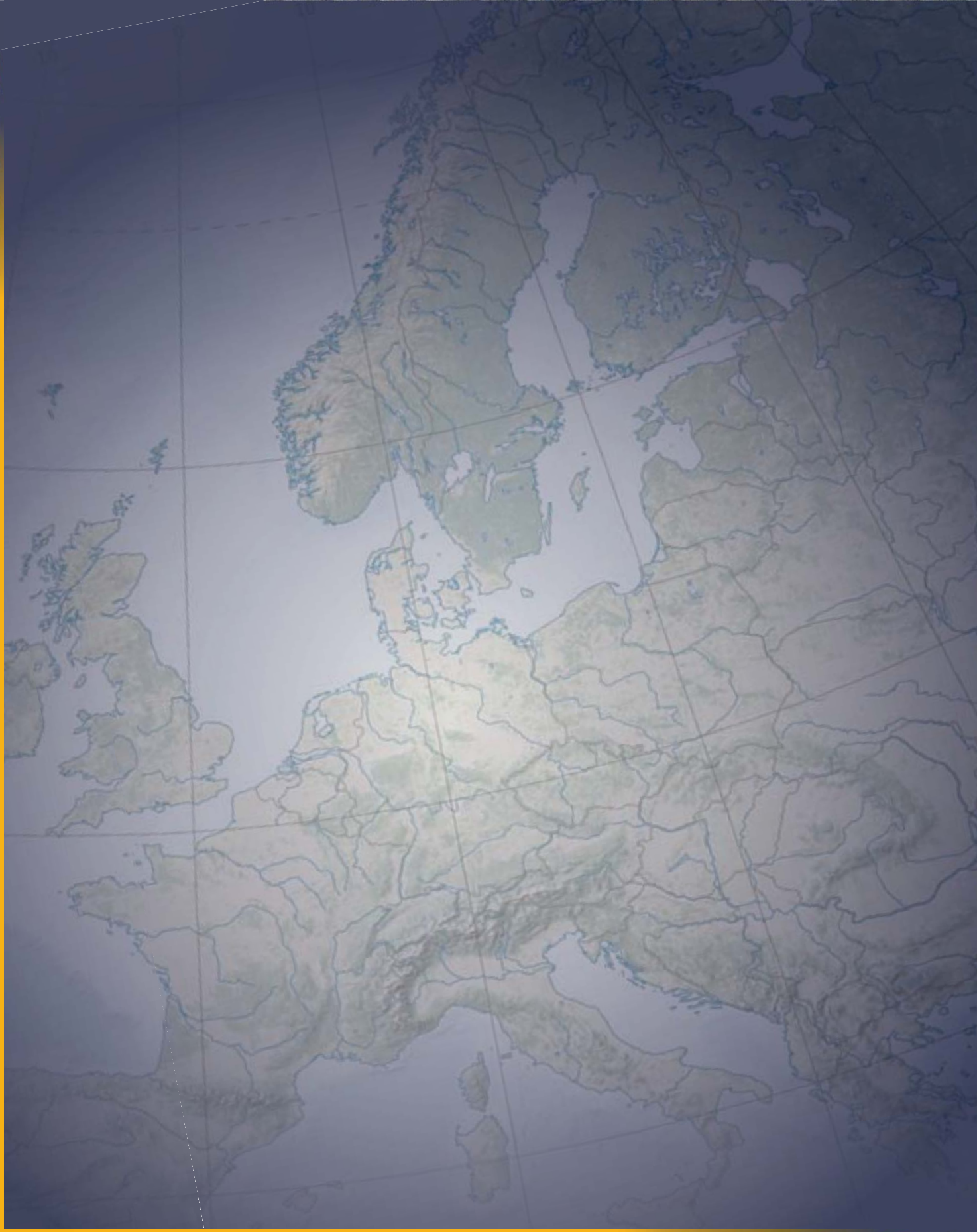
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