5. COMPETITIVENESS IN THE MENA REGION: TRADE, INNOVATION, AND MANAGEMENT PRACTICES

INTRODUCTION

Competitiveness is much talked about, but complex to define. There is neither a shared definition of competitiveness nor a consensus on how to measure it consistently across economies and over time—unsurprisingly, as it is firms rather than economies that compete in the global market.[1] At the level of a firm, competitiveness can be thought of as the ability to sustain market position by supplying quality products on time—at competitive prices[2]—and the ability to adapt quickly to changes in the external environment. It requires continuous increases in productivity, shifting from comparative advantages, such as low cost labor, to competitive advantages—competing on cost, quality, delivery, and flexibility.[3]

On average, the MENA ES economies are middle-income, though their performance in recent years has been disappointing. In the World Economic Forum *Global Competitiveness Report 2015-2016*, the highest ranked developing economy in the MENA ES region was Jordan, in 64th place (out of 140 economies). Moreover, economies in the region have on average regressed by five places in the rankings since 2012-2013. The average value of the global competitiveness index in the MENA ES region was below that of their middle-income peer economies.[4]

This chapter sheds light on the position of firms in the MENA ES economies in terms of labor productivity and competitiveness.[5] Perhaps surprisingly, the survey results reveal that the labor productivity of firms in the region compares favorably with that in economies with comparable incomes.[6] The proportion of firms with labor productivity above the median labor productivity in peer economies is higher than 50 percent in most MENA ES economies. Yet despite somewhat higher labor productivity levels, firms in the MENA ES economies remain small: everywhere except Morocco, a majority of firms employ fewer workers than the typical firm in similar economies. The fact that these firms are unable (or unwilling) to scale up their operations may indicate distortions and uncertainties underlying the competitiveness of these economies.

A wide variety of factors have been suggested as drivers of productivity and competitiveness. This chapter considers two broad areas: entrance and exposure to international markets through trade; and firms' innovation and management practices. These factors are interlinked. Innovation and management quality affect how inputs are employed and influence competitiveness. It is often only competitive firms that are able to be involved in a globalized system of production, allowing them to make the most of trading across borders.

TRADE PARTICIPATION AND COMPETITIVENESS

Exposure to international trade has long been viewed as a driver of competition both within and across economies. An extensive and diverse literature has found the existence of positive exporter size and productivity premia: firms that export are on average larger and more productive than their non-exporting competitors.[7] The two main mechanisms underlying this relationship are self-selection into the export market and "learning-by-exporting."

The self-selection mechanism implies that firms must incur sunk costs to enter the export market, which only a select few—presumably larger and more productive firms—find advantageous to bear. Lowering these barriers to entry, for example, through decreased regulatory time and procedures as well as transport costs, may ensure that this selection process works more efficiently: while the least productive firms, faced with expanded competition from home and abroad, will exit the market, more firms can enter and benefit from exporting.[8] In contrast, the presence of factors that affect entry costs for selected firms only—such as subsidies, access to cheaper inputs, regulatory capture, or preferential access to foreign markets—may distort which firms benefit from exporting.

Likewise, the learning-by-exporting mechanism argues that exporters gain knowledge from exposure to foreign markets and practices, allowing them to grow and increase their efficiency. Evidence of the significance of this mechanism for the greater size and productivity of exporters is mixed. Such forces may be increasingly important, however, with the presence of vertically integrated production, where firms export as part of a "global value chain" (GVC) and may gain knowledge from parent companies, partners, and competitors, or through reacting to the demands of foreign markets.[9] Studies have indeed confirmed the existence of similar size and productivity premia for importers: firms that import their inputs are on average larger and more productive than firms that do not use foreign inputs.

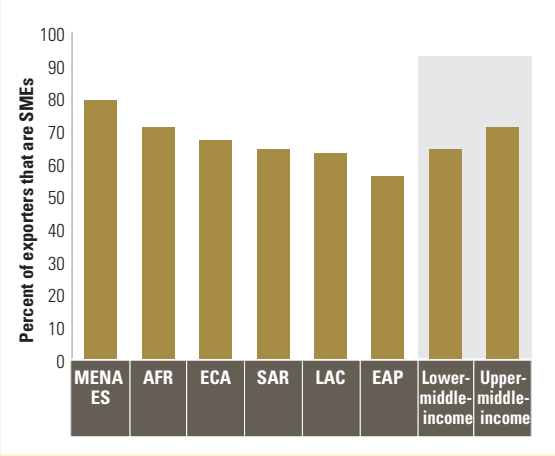
The presence of barriers to trade, either through non-tariff or tariff measures, is expected to reduce market competition and therefore average productivity in the market.[10] Under the right conditions, trade—whether exporting, importing, or both—presents an opportunity for firms to capitalize on and often improve their competitive position. But when those conditions are distorted and resources are allocated inefficiently, many productive firms might not be able to access foreign markets and reap the scale and efficiency benefits from trade.

Indeed, empirical work shows that the MENA region may be failing to realize such gains fully. Given its capacity and proximity to Europe, the region's exports are estimated to be roughly only a third of their potential level.[11] The literature also suggests that the profile of the region's traders is characterized by a large number of firms engaging in low-level trade, with a few solitary "superstars" facing few competitors.[12] This section assesses whether these suggestions are supported by the MENA ES data. It focuses on the size and labor productivity premia of exporting and importing firms, and on certain constraints faced by both types of firms in the business environment.

Exporting firms in the region are numerous but small

One in four manufacturers in the MENA ES region directly exports goods abroad, a proportion appreciably higher than averages for lower-middle-income and upper-middle-income economies (14 and 18 percent respectively).[13] This proportion varies considerably across the region. In Lebanon, Tunisia, and the West Bank and Gaza, exporters account for approximately 40 percent of all manufacturing firms, but this share is as low as 8 percent in Egypt and 5 percent in the Republic of Yemen. Although exporters are numerous in the MENA ES economies, they tend to be small firms. Nearly 80 percent of exporting manufacturers in the region employ fewer than 100 full-time employees, compared with 60 and 74 percent in lower-middle-income and upper-middle-income economies respectively (figure 5.1).

FIGURE 5.1: More of MENA ES exporters are small and medium-sized enterprises



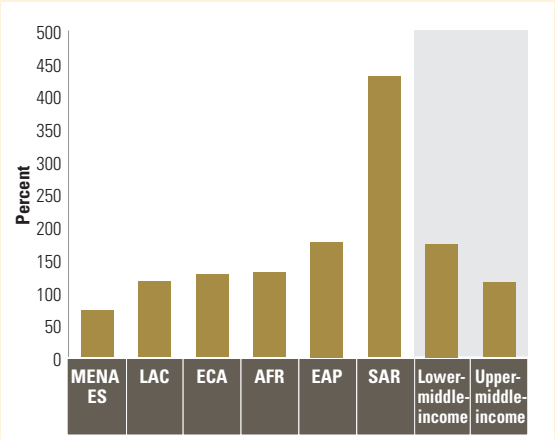
Source: Enterprise Surveys.

Exporter size and productivity premia are low compared with other regions

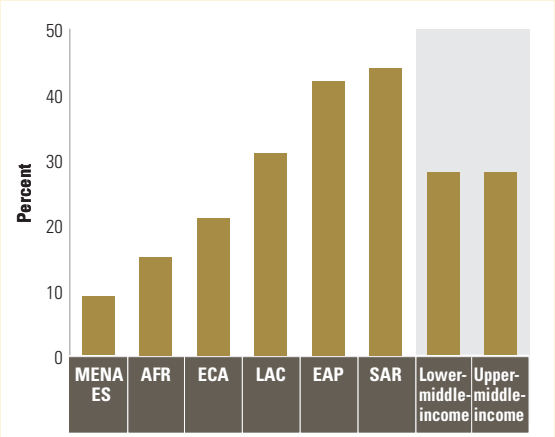
Reflecting the prevalence of small exporters, the so-called exporter size premium (figure 5.2, panel A)—the average size differential between exporting and non-exporting firms—is considerably smaller in the MENA ES region (71 percent more permanent full-time employees on average) than it is in all other regions in the world or in comparable income groups (see table A5.1). This low size premium is mirrored by a low labor productivity premium. Exporters in both lower-middle-income and upper-middle-income economies are on average 28 percent more productive than non-exporters, while MENA ES and Sub-Saharan Africa (AFR) are the only regions where on average exporters are not significantly more productive than non-exporters (panel B).

FIGURE 5.2: MENA ES exporters have lower size and productivity premia

PANEL A: Size premium of exporters vs. non-exporters

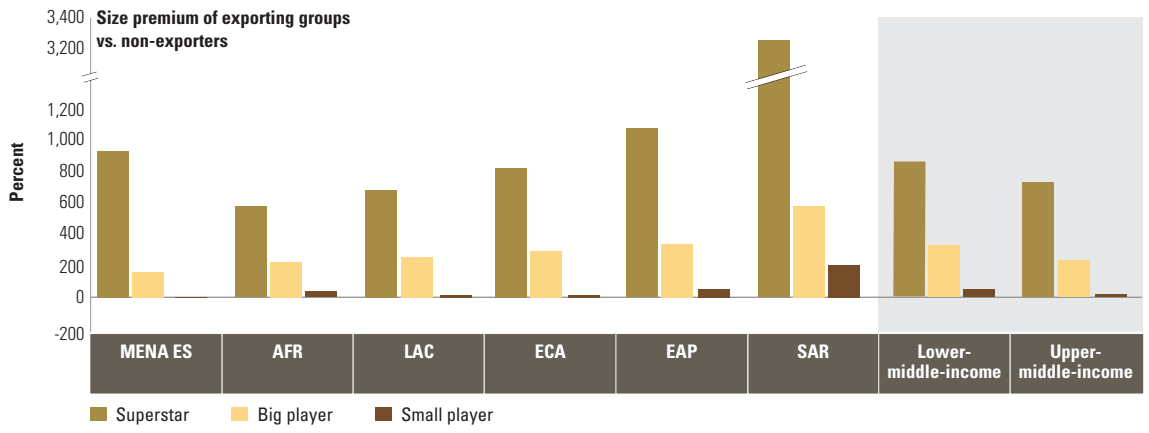


PANEL B: Labor productivity premium of exporters vs. non-exporters



Source: Enterprise Surveys.
Note: The figure for MENA ES is based on coefficients from table A5.1, columns 1 and 2. Comparable figures are based on identically specified regressions for regions (income groups) as indicated. Bars with patterned fill indicate that coefficients are not significant at a 10 percent level.

FIGURE 5.3: The smaller size premium in the MENA ES region is dampened by big and small player exporters



Source: Enterprise Surveys.
Note: The figure for MENA ES is based on coefficients from table A5.1, column 3. Comparable figures are based on identically specified regressions for regions (income groups) as indicated.

A few "superstar" exporters account for nearly all of the exporter size and productivity premia in the region; the numerous small player exporters experience no such premia

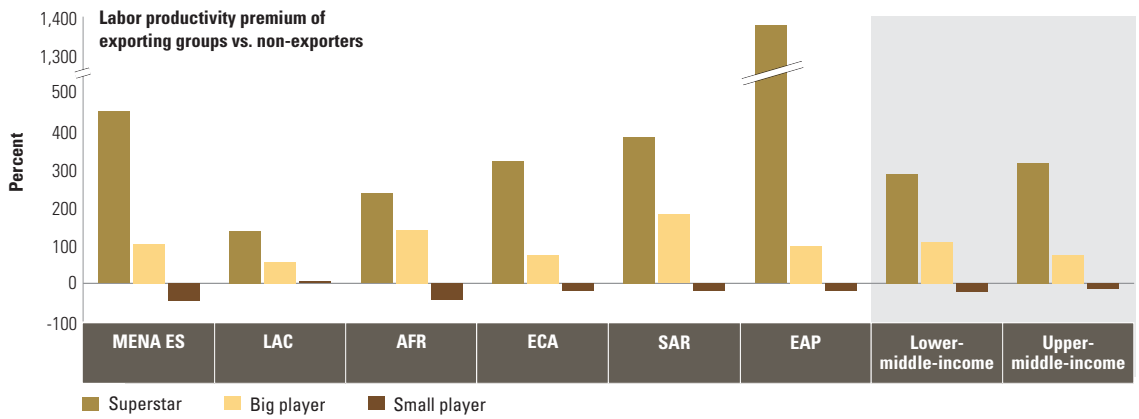
A striking picture emerges by differentiating exporting firms by their export sales volume into "superstar" exporters (the top 5 percent of firms), big player exporters (firms between the 50th and 94th percentile), and small player exporters (firms below the 50th percentile).[14] Figure 5.3 shows the size premia for all three groups. In line with findings from a World Bank Group report,[15] there is a wide gap between the superstar exporters and other exporting firms (and compared with non-exporters). Furthermore, the size premium for small player exporters in the MENA ES region is very marginally *negative*.

Looking at labor productivity, superstar exporters in the MENA ES region generate revenues per worker that are 4.5 times higher than non-exporters (and more than 3.5 times as big player exporters). Small player exporters are actually *less* productive than firms that do not export at all (figure 5.4). In other words, these firms generate less revenue per worker than their non-exporting peers. One reason for this negative productivity premium is that small player exporters are significantly less capital-intensive than other manufacturers, thus relying on more labor relative to their revenues.[16] Another possible explanation is that in expectation of increased productivity thanks to learning-by-exporting, some firms might be willing to accept entering the export market at a short-term cost for a long-term gain.

The relative abundance of SME exporters in the MENA ES economies coupled with all but the top-tier, superstar exporters, operating without an apparent ability or need to scale up their operations or improve their labor productivity may be linked to the subsidization and the selective lowering of export costs offered primarily to SMEs by export promotion agencies.[17] Such strategies that focus on SME-based exporting may draw firms into foreign markets through subsidized cost reductions, rather than the underlying efficiency of those firms. Indeed, one report argues that it is important to understand the reason why these exporting SMEs remain comparatively small. If the reason is their lower productivity, policies focusing on helping them to export may be misguided. If they are prevented from growing by distortions, the focus should be on policies that help eliminate such constraints.[18]

This relative abundance of low-volume exporters is also consistent with potentially overvalued exchange rates, which may dampen exports. Pegged exchange rates—such as those in Lebanon, Morocco, and Jordan—as well as "crawl-like" ones in Egypt and Tunisia may limit export volume and hurt exporters' international competitiveness if they keep tradable goods more expensive abroad.[19] If some exporting firms—particularly smaller ones—are

FIGURE 5.4: Small player exporters are less productive than non-exporters



Source: Enterprise Surveys.
Note: The figure for MENA ES is based on coefficients from table A5.1, column 4. Comparable figures are based on identically specified regressions for regions (income groups) as indicated.

disadvantaged in international markets by overvalued exchange rates rather than their underlying productive capacity, they may similarly lack incentives to scale up their operations.

The much higher superstar exporter premia may also be explained by the presence of policies favoring large exporters and privileging relative capital intensity—for example, through lines of credit as well as land and energy subsidies—and in lieu of other subsidies such as those for R&D. One World Bank Group report addresses this issue more directly, noting, "Discretion and lack of transparency in the allocation of subsidies or credit lines fuel the impression that less deserving firms are often the beneficiaries. Successful exporters, large firms, or multinationals receive subsidies, protection, and privileges they do not need. Institutional processes that involve the private sector in reviewing policies and identifying priorities have been largely absent."[20]

Table 5.1 provides some further context: superstar exporters begin with remarkably more employees at start-up (on average 111) and begin exporting much earlier in their lifecycle, on average after only three years of operation.[21] In other words, these top-tier firms start larger and are in a position to enter international markets sooner, reinforcing evidence that it is a firm's initial position in the market that allows it to retain its size as a dominant exporter.[22]

Superstar exporters in the MENA ES economies have on average seen a three-fold increase in their size over their lifecycle; the same factor for big players is less than 2.5 times. In contrast, small players grow from a starting size of nearly 20 employees to just over 30, even after being

TABLE 5.1: Superstar exporters start larger, while small player exporters are far less trade-intensive and take longer to begin exporting

Exporter type	Exported directly (% sales)	Age		Employees		Foreign ownership	Percentage of firms in high-tech sectors
		When firm began exporting	As of 2012	At start-up	As of 2012		
Superstars	85	3	20	111	340	29	14
Big players	64	4	21	39	94	16	3
Small players	41	7	19	19	31	12	1

Source: Enterprise Surveys.
Note: Indicators show values after controlling for industry and economy fixed effects.

in operation for nearly 20 years, indicating a comparatively flat growth trajectory, despite being exporters. Moreover, superstars are more likely to be foreign-owned than other exporters: 29 percent of superstar exporters are at least 10 percent foreign-owned, compared with only 16 and 12 percent for big and small player exporters respectively. The large initial size of superstar exporters could also be explained by the strong presence of firms that use technology intensively in this category: 14 percent of superstar firms are active in high-tech sectors.

When barriers to entry to exporting are low, they allow for the efficient entry of new and productive exporters into the market, as well as the exit of less competitive firms. Table 5.2 shows several proxy measures for the cost of firms to export. The table shows that, on average, the time and cost to export is lower in the MENA ES economies than in peer economies. The exceptions are Lebanon, the West Bank and Gaza, and the Republic of Yemen, where exporting is more timely and costly. Likewise, there are often indirect costs to trading, for example, the quality of domestic infrastructure. One proxy for this is the percentage of products lost due to breakage or spoilage, which is high in Djibouti, Lebanon, the West Bank and Gaza, and the Republic of Yemen. Moreover, in large economies such as Egypt, internal distance from borders can add further time and cost.

Manufacturers in the region are heavily import-reliant

Export activity is only one part of the story: manufacturing firms frequently realize productivity and size gains from importing their inputs as well. Increasingly, there has been a focus on the role of these imports and firms' position in international trade flows.[23] Analysis of trade in the MENA region has noted that while trade levels are possibly below their potential, they are not particularly low; in fact, these levels seem to be bolstered by imports to the MENA ES economies, which import goods and services at an average of 57 percent of GDP.[24]

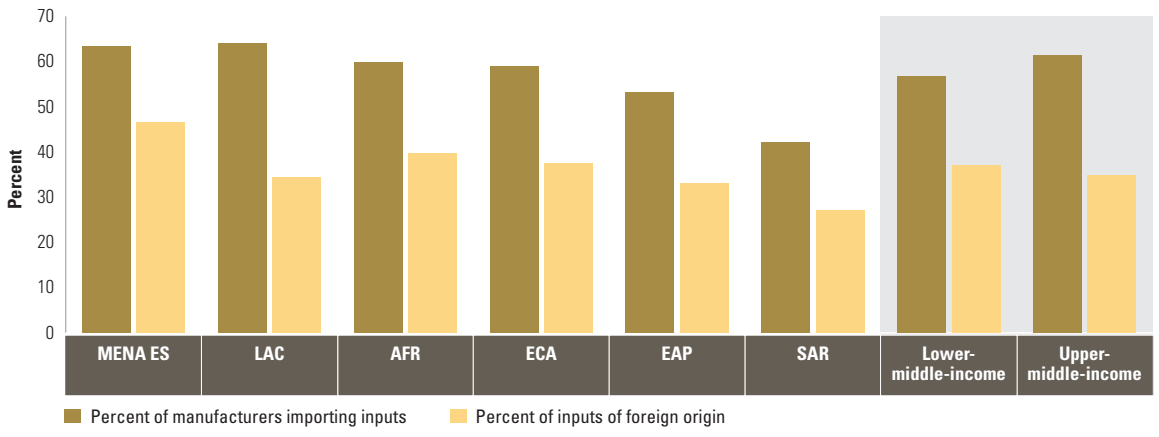
The MENA ES data show that manufacturers are particularly reliant on imports, with 63 percent importing material inputs, trailing only manufacturers in the Latin America and the Caribbean (LAC) region (figure 5.5). Moreover, firms in the MENA ES region use foreign inputs more intensively: 46 percent of manufacturers' inputs are of foreign origin, above the average in peer economies, possibly indicating that firms are unable to find inputs of sufficient quality on the domestic market. This pattern holds despite relatively high restrictions on imports (see below). This may be due to a combination of the lack of domestic alternatives as well as policies overvaluing currencies, for example, due to pegged rates to hard currencies, such as the dollar peg in Lebanon or the peg to a euro-dollar basket in Morocco.[25]

TABLE 5.2: Costs of exporting in the MENA ES region are comparable to peer economies

	De jure time to export (days)	De facto time to clear customs (days)	Cost to export (USD per container)	Percentage of products lost due to breakage/spoilage
Djibouti	20	10	886	1.6
Egypt, Arab Rep.	12	7	625	0.8
Jordan	13	5	825	0.8
Lebanon	22	5	1,080	1.2
Morocco	11	3	577	1.0
Tunisia	13	3	773	0.6
West Bank and Gaza	23	3	1,685	4.1
Yemen, Rep.	29	11	995	2.4
MENA ES	18	6	931	1.6
Lower-middle-income	26	9	1,665	1.2
Upper-middle-income	21	7	1,445	0.8

Source: Enterprise Surveys, Doing Business database for 2013.

FIGURE 5.5: The import reliance of manufacturers

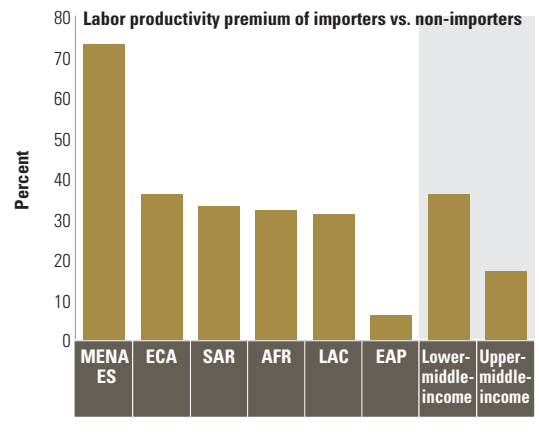


Source: Enterprise Surveys.

Importer size and productivity premia are high compared with other regions

Several works have examined the size and productivity premia related to importing intermediate inputs.[26] Indeed, MENA ES manufacturers that import inputs experience significant and comparatively large premia over non-importers in terms of both size and labor productivity. Firms that import their inputs are on average 55 percent larger in terms of the number of employees, compared with manufacturers that do not import (see table A5.2). Only in the South Asia region (SAR) is this size premium even greater. In addition, importing firms in the MENA ES region are nearly 75 percent more productive than non-importers, a premium that is also considerably larger than in peer economies (figure 5.6).

FIGURE 5.6: Manufacturers that import inputs are more productive than those that do not import



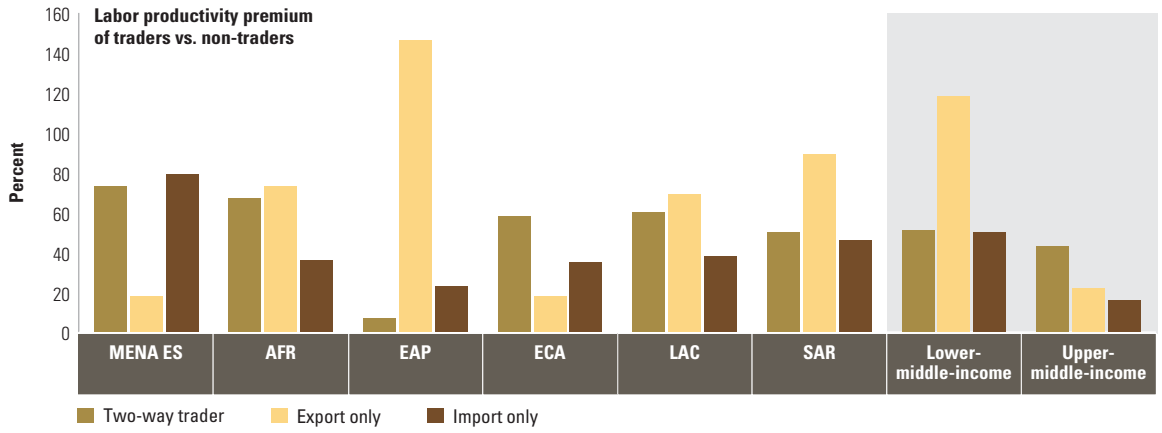
Source: Enterprise Surveys.
Note: The figure for MENA ES is based on coefficients from table A5.2, column 2. Comparable figures are based on identically specified regressions for regions (income groups) as indicated.

The importer size premium is driven by two-way traders, but the importer productivity premium is independent of export activity

Manufacturing firms that directly import inputs may export their final output as well. Comparing two-way traders with firms that only export, only import, or do not trade, it is clear that the size premium for manufacturing firms in the MENA ES region is driven by two-way traders. As in other regions, importing inputs alone has little association with larger size. Unsurprisingly, it is the larger firms that tend to be engaged in both importing and exporting, possibly within GVCs, and almost a quarter of them are at least 10 percent foreign-owned, compared with less than 10 percent of exporters only, importers only, or non-traders. This result holds even when superstar exporters are excluded (table A5.3, column 2).

Importers have a labor productivity premium whether or not they also export. Access to foreign inputs is strongly associated with higher labor productivity—revenue per worker (figure 5.7). For two-way traders, this association

FIGURE 5.7: Importing inputs drives productivity premium in the region



SSource: Enterprise Surveys.
Note: The figure for MENA ES is based on coefficients from table A5.3, column 3. Comparable figures are based on identically specified regressions for regions (income groups) as indicated.

is driven largely by superstar exporters. Once these are excluded, the association with higher labor productivity is larger for firms that only import their inputs, again confirming that large and small player exporters in the region seem to be unable to reap the efficiency gains that emerge from exporting (table A5.3, column 4).

The business environment is not conducive to importing

While manufacturers in the MENA ES economies are comparatively import-reliant, and while those that import tend to be larger and more productive than those that do not, the region maintains substantial restrictions on trade from abroad through higher tariffs and non-tariff restrictions.[27] Tariff rates vary substantially within the region (table 5.3), as do the average usage of foreign inputs and the time to clear customs. Average tariff rates are highest in Djibouti and Tunisia, economies where manufacturers use foreign inputs at comparatively high rates (63 and 55 percent respectively), though in Tunisia the offshore sector's low-tariff access to inputs and well-documented tariff evasion have played a role.[28] Moreover, waiting times at

TABLE 5.3: Restrictions on imports from abroad vary substantially

	Average manufacturing tariff rate (2008–12)		Percent of inputs that are of foreign origin	De jure time to import (days)	De facto time to clear imports through customs (days)	Cost to import (USD per container)
	Intermediates	Raw materials				
Djibouti	3.6	3.0	63.3	18	5.2	911
Egypt, Arab Rep.	4.5	2.4	28.8	15	9.2	755
Jordan	1.9	7.6	42.3	15	5.3	1,335
Lebanon	n.a.	n.a.	51.6	30	9.7	1,365
Morocco	11.6	19.9	47.7	15	7.6	950
Tunisia	11.5	15.4	55.3	17	7.4	858
West Bank and Gaza	n.a.	n.a.	56.6	38	17.0	1,295
Yemen, Rep.	3.2	6.1	26.5	25	8.0	1,623
Lower-middle-income	4.0	5.8	37.0	33	13.1	669
Upper-middle-income	4.2	6.4	34.9	21	9.3	762

Source: Authors' calculations based on UNCTAD Trade Analysis Information System (TRAINS); Enterprise Surveys, Doing Business database for 2013.
Note: n.a.—not available.

customs for manufacturers importing inputs directly are roughly on par with peer economies.[29] In addition, while costs to import are also comparable, they are generally more expensive than those to export shown in table 5.2.

Given this combination of factors, it is somewhat surprising that manufacturers in the MENA ES are so import-reliant. This pattern is consistent with a pattern of "under-export/over-import" previously noted in the region.[30] Furthermore, this import reliance may translate into higher input costs for the MENA ES region's manufacturing, eroding the gains from more sales per worker (labor productivity). This can be a constraint on the growth of efficient firms, and may result in low value-added or what has been called "just-in-time production" rather than high value-added production.[31]

INCREASING FIRM PRODUCTIVITY THROUGH INNOVATION AND BETTER MANAGEMENT

Many firms in the MENA ES region compete in the international market but do not appear to achieve the maximum benefits from doing so. This may reflect an inability to improve their productivity continuously. One way to improve productivity is through innovation. A positive correlation between the introduction of a new or significantly improved product ("product innovation") and firms' performance has been established for European firms, but evidence for developing economies has been mixed.[32] Similar studies do not exist for MENA economies.

Firms can also increase their productivity through other means, such as making better use of excess capacity (provided there is any) or by improving management or business practices. Studies show that there is a strong correlation between the quality of management practices and firms' performance, and this also applies to developing economies.[33] Furthermore, lack of management skills has been shown to be one explanation for the low productivity of state-owned firms or politically connected firms in the absence of regulations that target their competitors.[34]

To account for factors that may affect both firms' productivity and the decision to innovate, this chapter uses a modified version of a well-known model devised by Crépon, Duguet, and Mairesse (the "CDM model") that links acquisition of knowledge, innovation, and labor productivity (see box 5.1 for more details).[35]

Two in every five firms in the region innovate, but product innovation is dominated by the adoption of existing technologies

Innovation is often associated with groundbreaking technology: the type that advances the global production frontier, typically in high-tech sectors. Innovation is also a much broader concept, which includes the introduction of new products and processes (technological innovation) as well as new organizational and marketing methods (non-technological innovation)—see box 5.2 for examples. Moreover, most new products (as well as processes) are based on the adoption of existing technologies developed elsewhere, possibly with some adaptation to suit the needs of the local market. They are still considered to be an innovation, though, as long as they are, at the very least, new to the firm itself.

Comparable Enterprise Survey data on innovation are available only for the Eastern Europe and Central Asia (ECA) and MENA ES regions. These data show that in both regions, firms engage in technological and non-technological innovation at similar rates; on average, nearly 40 percent of firms engaged in at least one type of innovation. In neither region are many of the new or improved products truly new to the global market (figure 5.8). The adoption (and adaptation) of existing products and processes is particularly important for emerging markets and developing economies—including those in the MENA ES region—where firms have considerable room for improvement relative to the technological frontier.

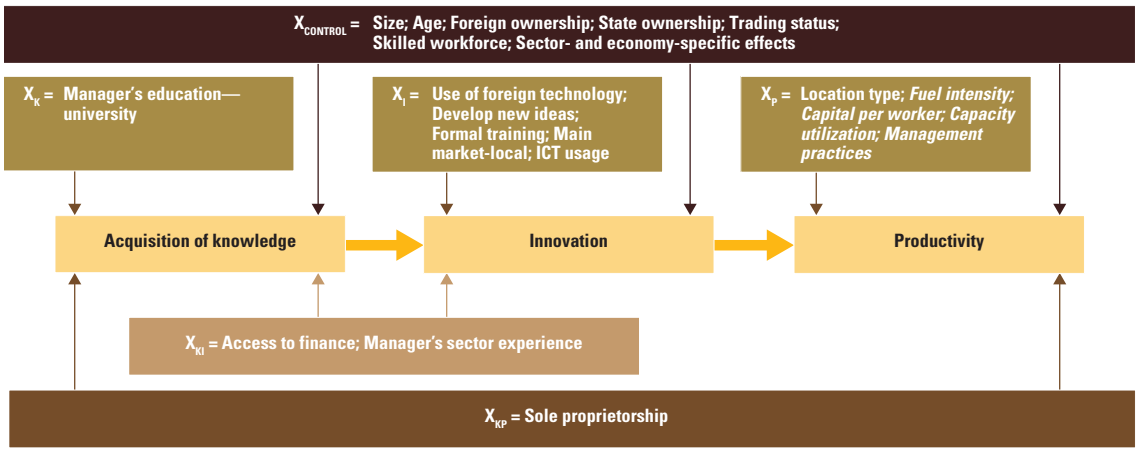
R&D and other forms of knowledge acquisition are dominated by high-tech sectors, but two-way trading seems to favor knowledge acquisition in lower-tech sectors as well

Firms can use a range of different approaches to acquiring knowledge. They can create ("make") it themselves through in-house spending on R&D.[36] Firms can also "buy" this knowledge by contracting R&D with other companies and institutions or by purchasing or licensing patented technologies, non-patented inventions, and know-how. Acquisition of knowledge does not always lead

BOX 5.1: Estimating the impact of innovation on labor productivity

The impact of innovation on productivity is estimated using a modified version of a well-known three stage model by Crépon, Duguet, and Mairesse (the "CDM model").[a] The original model links productivity to firms' innovation activities and, in turn, treats innovation as an outcome of firms' investment in R&D. The model used here treats innovation as an outcome of firms' investment in the acquisition of knowledge, either created by the firm (R&D) or obtained from external sources. That is, it explains the decision to acquire knowledge; the decision to introduce a new product or process; and the firm's labor productivity (figure B5.1).

FIGURE B5.1: Version of the CDM model used in the chapter



Source: Authors' representation of the model.
Note: Based on Crépon and others (1998). ICT = information and communication technology. Variables in italics are available for manufacturing firms only.

All stages are estimated simultaneously using an asymptotic least squares estimator (ALS). The recursive model accounts for the simultaneity and unobserved variable problems arising from estimating the effect of the acquisition of knowledge and innovation activities, which are likely to influence each other, on productivity.[b] The model does not allow establishing causal relationships because the system does not permit the identification of true instruments. Instead, the model imposes exclusion restrictions grounded in economic theory and previous empirical work.

The first stage estimates the innovation input equation:

$$(1)\ Knowledge_i = 1[Knowledge_i^* > 0] \text{ where}$$

$$Knowledge_i^* = X_{i,K}\beta_1 + X_{i,KI}\beta_2 + X_{i,KP}\beta_3 + X_{i,CONTROL}\beta_4 + \varepsilon_{i1}$$

This represents the probability of the spending on the acquisition of knowledge (including R&D) by firm i, where $Knowledge_i$ takes the value of 1 whenever the latent value of spending on the acquisition of knowledge reported by the firm, $Knowledge_i^*$, is larger than zero. $X_{i,K}$, $X_{i,KI}$, $X_{i,KP}$ and $X_{i,CONTROL}$ include variables listed in figure B5.1.

The second stage of the model determines the probability of a firm implementing innovation, taking into account its decision to acquire knowledge. The latent variable $Knowledge_i^*$ derived from the first stage is used to explain the impact that the acquisition of knowledge has on innovative activities:

$$(2)\ Innovation_i = 1[Innovation_i^* > 0] \text{ where}$$

$$Innovation_i^* = \gamma_1 Knowledge_i^* + X_{i,I}\gamma_2 + X_{i,KI}\gamma_3 + X_{i,CONTROL}\gamma_4 + \varepsilon_{i2}$$

In this equation, coefficient γ_1 denotes the impact of the acquisition of knowledge on the probability of a firm introducing an innovation. $Innovation_i$ refers to the occurrence of the various types of innovation. The probability of observing such an innovation is explained by $X_{i,KI}$, $X_{i,CONTROL}$ and $X_{i,I}$, which include variables listed in figure B5.1.

The final stage of the model relates the firm's innovative activities—or more precisely, the latent variable

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that determines whether or not to innovate—to labor productivity (measured as revenue per employee, converted into U.S. dollars, in log terms):

$$(3)\ Productivity_i = \xi Innovation_i^* + X_{i,P}\delta_1 + X_{i,KP}\delta_2 + X_{i,CONTROL}\delta_3 + \varepsilon_{i3}$$

The coefficient ξ reflects the impact of innovation on labor productivity. In addition to $X_{i,CONTROL}$ and $X_{i,KP}$, the augmented production function includes variables in vector $X_{i,P}$ (see figure B.5.1). For manufacturing firms, $X_{i,P}$ also includes their fuel intensity, capital per worker, and capacity utilization.

a See Crépon and others (1998).

b The model also addresses issues relating to measurement errors in innovation surveys.

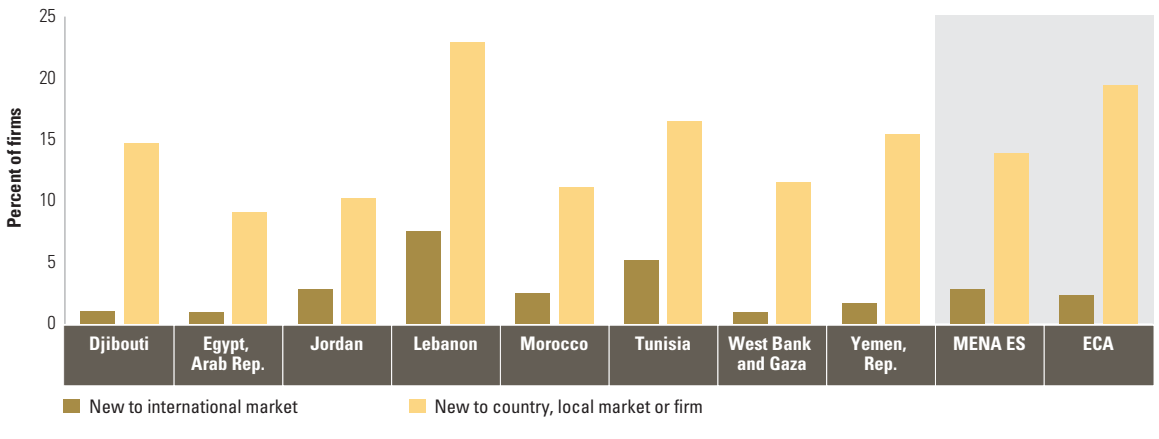
BOX 5.2: Types of firm-level innovation[a]

Productivity-enhancing innovations are not limited to new products. Significant improvements in technical specifications, components and materials, incorporated software, user-friendliness, and other functional characteristics of existing goods and services count too. They can also entail new or significantly improved production or delivery methods, such as the automation of work that used to be done manually or the introduction of new software to manage inventories.

Moreover, innovations do not necessarily need to involve new technologies: they may also be in the form of organizational or marketing improvements. Examples of organizational innovation include introduction of a supply chain management system or decentralization of decision making, giving employees greater autonomy. Marketing innovations could be aimed at better addressing customers' needs, opening up new markets, or repositioning a firm's product in the market. Examples include the introduction of a new flavor for a food product to target a new group of customers or the introduction of variable pricing based on demand.

a Based on OECD, European Commission and Eurostat (2005).

FIGURE 5.8: Product innovation at the global technological frontier and the adoption of existing technologies



Source: Enterprise Surveys.
Note: Self-reported innovation and degree of novelty. Comparable ES data on innovation are available only for ECA and MENA ES.

to successful innovation; conversely, innovation may not always require the acquisition of knowledge.

The percentage of firms that engage in R&D is similar in the MENA ES and ECA economies, but firms in the MENA ES region are less likely to engage in acquiring knowledge more broadly. The MENA ES region compares favorably with the ECA region in higher-tech manufacturing sectors, such as pharmaceuticals, and medium-low-tech sectors, such as basic metals, but lags statistically significantly behind in low-tech sectors, such as food products or textiles (figure 5.9).[37] Differences between different types of sectors are particularly large in Jordan, where almost a quarter of higher-tech firms engage in acquiring knowledge, but less than 5 percent do so in other manufacturing sectors. This could be related to their exposure to the international market: almost a quarter of higher-tech Jordanian firms are exporters, compared with less than 13 percent of firms in other manufacturing sectors.

In contrast, in Morocco and Tunisia, the gap between higher-tech manufacturing and lower-tech manufacturing and services is much lower. Both economies are characterized by greater integration into GVCs than their regional peers. In general, GVCs are considered to be crucial for knowledge transfer to local firms.[38] Tunisia, for example, has opted for an economic model oriented toward exports and industrialization supported by a pro-active policy of public investment in physical and human capital, and of attracting foreign direct investment (FDI). In Morocco, the clothing industry, for example, has become a key supplier for fast fashion supply chains, as have automobile parts manufacturers and the aeronautical industry.[39]

Innovation benefits from firm-specific human capital: access to knowledge through foreign ownership, two-way trading, and ICT as well as access to finance

The analysis shows that there are a number of firm characteristics that are important determinants of firm innovation. First, a suitably skilled workforce (including strong management skills) is a key prerequisite for successful innovation. In the MENA ES region, firms that provide formal training to their employees or give them time to develop new approaches and ideas are more likely to introduce new products, processes, organizational or marketing methods, while the formal level of education of employees does not seem to play an important role in that process (tables A5.4 and A5.5).[40] This may reflect both the general quality of education in the MENA ES region as well as a mismatch between the skills provided by formal education and those demanded by the private sector. Formal training helps workers learn the skills that they need for their particular tasks as well as new production techniques.

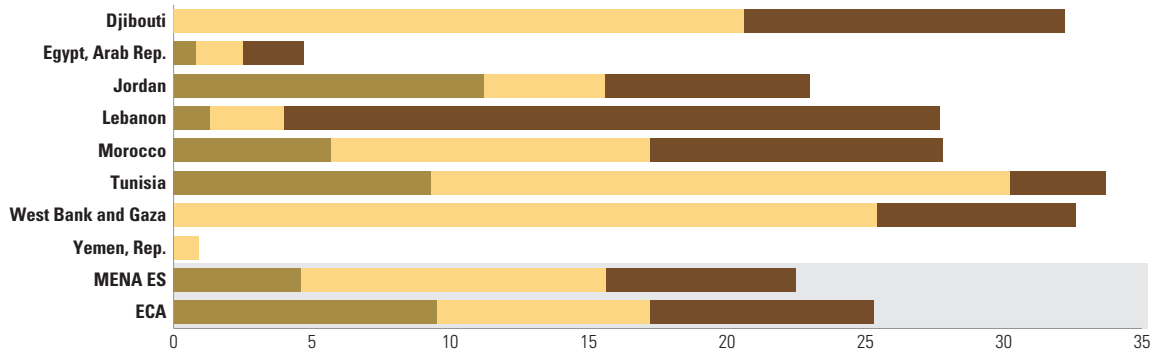
The formal level of education of managers, however, matters for the decision to acquire knowledge: firms in which managers have a university degree are much more likely to do so either through R&D or from external sources. Such managers may be more familiar with the external knowledge already available, more open to investing in R&D, or more supportive of implementing various ways of acquiring knowledge in their workplace (tables A5.4 and A5.5, column 1).

Second, in the MENA ES region, access to knowledge and information plays a crucial role in the ability of firms to innovate (tables A5.4 and A5.5). Most firms do not introduce innovation new to the technological frontier and often rely on existing knowledge of what their peers are doing. The results show that two-way trader status is positively and significantly associated with innovation directly and indirectly, and it is a possible channel for the labor productivity premium shown above. Two-way traders are more likely to license foreign technology as well as introduce technological innovations. Similarly, manufacturers with at least 10 percent foreign ownership are more likely to acquire knowledge, introduce new products, and implement technological innovations.

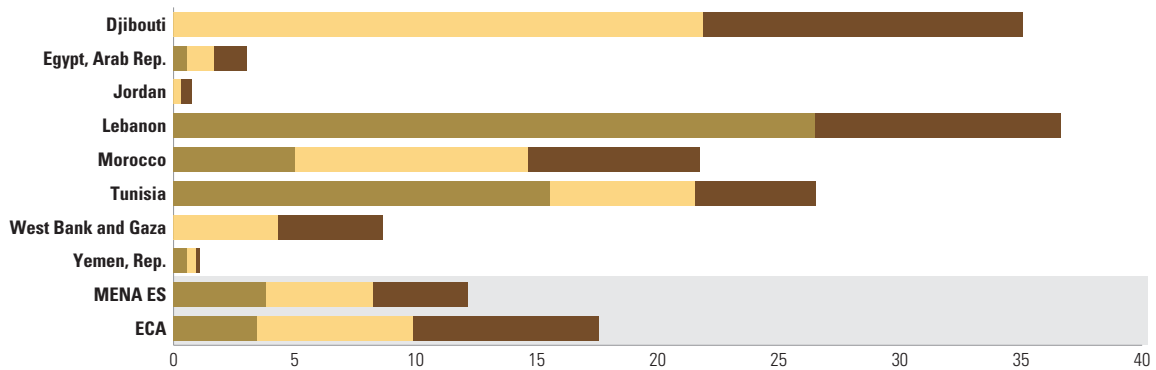
There are several reasons why foreign ownership and two-way trading—where, for example, firms are involved in GVCs—may be particularly important sources of information for innovation. First, to satisfy a GVC's product quality and process efficiency requirements, managers may need to adapt their production methods or acquire technology via licensing arrangements. Second, to ensure smooth delivery to foreign clients, improved delivery methods may be required. Third, by importing intermediate goods, firms may also import state-of-the-art technology that has not previously been available in the domestic market. This may require further training of workers, enhancing their technical skills—which may, in turn, enable firms to introduce their own new products.[41]

FIGURE 5.9 :The proportion of firms that acquire knowledge

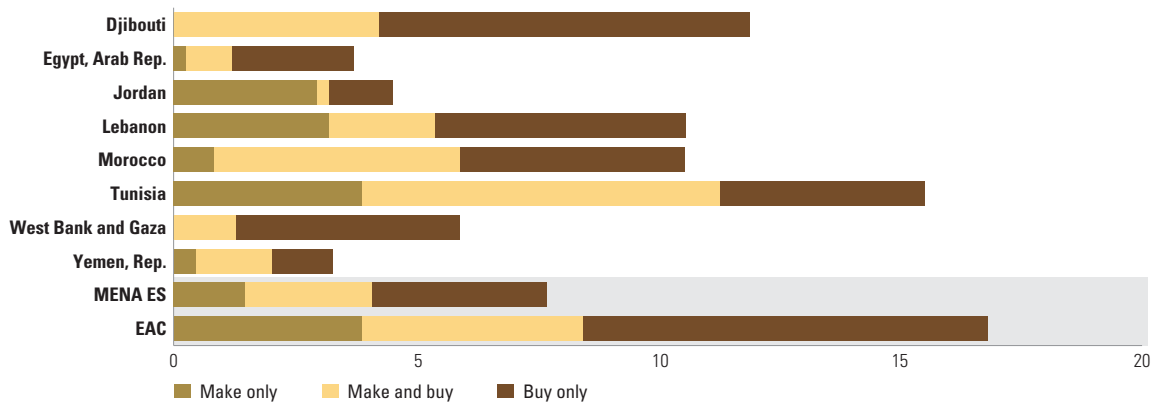
A: Percent of firms, high- and medium-high-tech industries



B: Percent of firms, medium-low-tech industries



C: Percent of firms, low-tech industries



Source: Enterprise Surveys.
Note: Based on International Standard Industrial Classification (ISIC), Rev 3.1. Higher-tech manufacturing sectors include pharmaceuticals (24), machinery and equipment (29), electrical and optical equipment (30–33), and transport equipment (34–35, excluding 35.1). Low-tech manufacturing sectors include food products, beverages and tobacco (15–16), textiles (17–18), leather (19), wood (20), paper, publishing and printing (21–22), and other manufacturing (36–37). Data represent cross-economy averages. Comparable ES data on innovation are available only for ECA and MENA ES.

Furthermore, firms that use email to communicate with their clients or suppliers are also significantly more likely to introduce both technological and non-technological innovations. This may attest to the importance of both modern organizational practices and supporting ICT infrastructure in facilitating innovation.

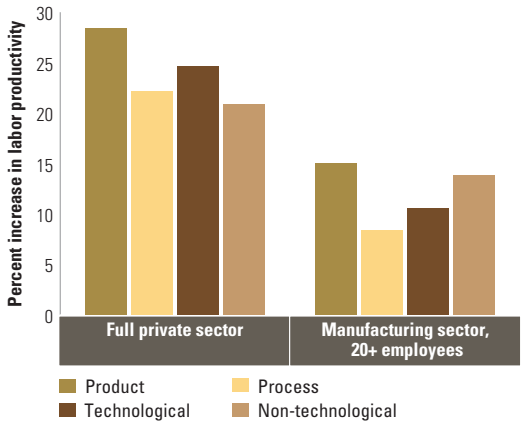
Finally, the results suggest that firms in the MENA ES economies—as in many other economies—are much more likely to introduce new products, processes, or both if they have access to finance in the form of a line of credit or a loan. Introduction of non-technological innovation is less affected by access to finance and foreign technologies (tables A5.4 and A5.5). Adapting external technologies, products, and processes to local circumstances can be costly, and firms may need sufficient financial resources to do so. While banks might not be willing or able to fund innovative firms at the technological frontier, they may fund firms that innovate by imitation, which is arguably less risky. They can also stimulate innovation by providing firms with working capital or short-term loans, which can free up internal resources that the firms can use to finance innovation.[42]

Firm innovation is associated with higher labor productivity, but less than in other developing economies

Figure 5.10 shows that all types of innovation are associated with higher labor productivity in both the full private sector and in particular in manufacturing firms with more than 20 employees (tables A5.6 and A5.7). This correlation is highest for product innovation, which is associated with labor productivity that is 28 percent higher than that of firms that do not introduce new or significantly improved products. It is lower for process innovation, which is associated with labor productivity that is 22 percent higher compared with firms not undertaking this type of innovation. The correlations are up to 62 percent lower for manufacturing firms. The somewhat lower returns to process innovation may be due to the fact that firms in the MENA ES region are more likely to introduce new processes than new products,[43] and hence the benefits of engaging in process innovation are lower.

These returns are in line with those found for developed economies, but lower than those observed in developing economies, especially for the manufacturing sector.[44] This result may be related to limited competition, as well as the presence of politically connected firms in several MENA ES economies and the regulations protecting them,[45] which prevent innovative firms without political connections from obtaining a larger market share and higher labor productivity.

FIGURE 5.10: Association between innovation and labor productivity



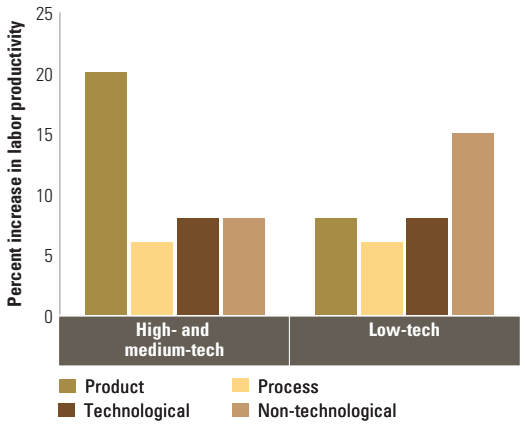
Source: Enterprise Surveys database and authors' calculations.
Note: This figure is based on coefficients from tables A5.6 and A5.7, columns 1–4. For a detailed description, see box 5.1.

Non-technological innovations, which are probably less risky and costly than technological innovations, are also significantly associated with higher labor productivity (21 percent higher than in the private sector overall). Given that this is comparable to or higher than productivity yields associated with technological innovation, it is perhaps surprising that only 29 percent of firms in the MENA ES economies engage in either. This could be due to a lack of information on new organizational and marketing methods, skepticism about their effectiveness, or resistance to change within organizations.[46]

High-tech firms benefit most from product innovation, while low-tech firms benefit most from non-technological innovation

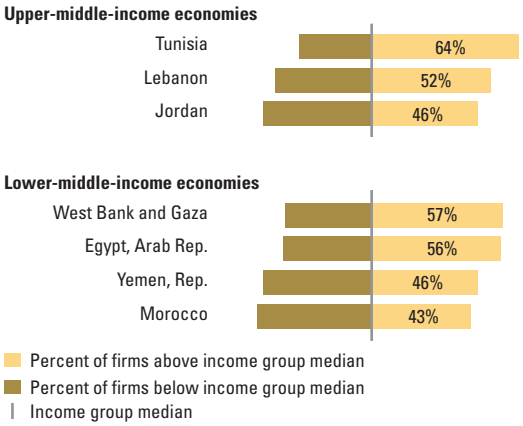
There are also differences in returns to innovation within manufacturing (figure 5.11). In sectors with high- and medium-tech intensity, introducing a new product is associated with labor productivity levels that are almost 20 percent higher compared with firms that did not introduce

FIGURE 5.11: Association between innovation and labor productivity by technological intensity



Source: Enterprise Surveys.
Note: This figure is based on coefficients from table A5.8, columns 1–4. For a detailed description, refer to box 5.1. Bars with patterned fill indicate that coefficients are not significant at the 10 percent level.

FIGURE 5.12: Distribution of the quality of management practices compared with income-group median



Source: Enterprise Surveys.
Note: Djibouti is excluded, as the quality of management practices is available for only 12 firms. Comparable data are available for a comparison income group only in the ECA. For Egypt, Morocco, the West Bank and Gaza, and the Republic of Yemen, the comparison income group is the lower-middle-income group. For Jordan, Lebanon, and Tunisia, the comparison group is the upper-middle-income group.

a new product (table A5.8). In manufacturing sectors with low-tech intensity, firms benefit more from introducing non-technological innovations; the latter are associated with 15 percent higher labor productivity levels.[47]

This variation in estimated returns to innovation can be explained by differences in the probability of different types of innovations and the level of competitive pressures faced. In several MENA ES economies, more than one-fifth of low-tech firms are two-way traders and compete primarily in the international market.[48] They face great pressure to deliver the required products quickly and efficiently. As a group, low-tech firms are less likely to introduce new organizational or marketing methods, but those that do so successfully may manage to capture a larger market share as a result, thereby increasing their revenue per worker. Some innovations by firms in low-tech manufacturing sectors may be due to European firms moving production to Tunisia and Morocco from China in the period up to late 2014, as a result of rising wage costs and the increasing cost of fossil fuels during that period.[49]

Poorly managed firms benefit more from improving their management practices than from innovation

The MENA ES included a subset of questions on management practices.[50] These questions look at core management practices relating to operations, monitoring, targets, and incentives. They range from dealing with machinery breakdowns to factors determining the remuneration of workers. On the basis of firms' answers, the quality of their management practices can be assessed and given a rating (see box 5.3 for details).

There are firms with good and bad management practices in all MENA ES economies (figure 5.12). The share of manufacturing firms with good management practices in Tunisia, Lebanon, the West Bank and Gaza, and Egypt is higher than in their peer economies.[51] Jordan, the Republic of Yemen and Morocco, on the other hand, stand out with a share of firms with bad management practices above their peer economies. With some exceptions, large manufacturing firms are on average better managed than their medium-sized counterparts.

The quality of management practices in the MENA ES economies is positively correlated with economic development (measured as GDP per capita, figure B5.3). It is not significantly associated with firm-level labor productivity, either on its own or in combination with different types of innovation (table A5.7). This is in contrast with results found elsewhere, including in the ECA region.[52] Among

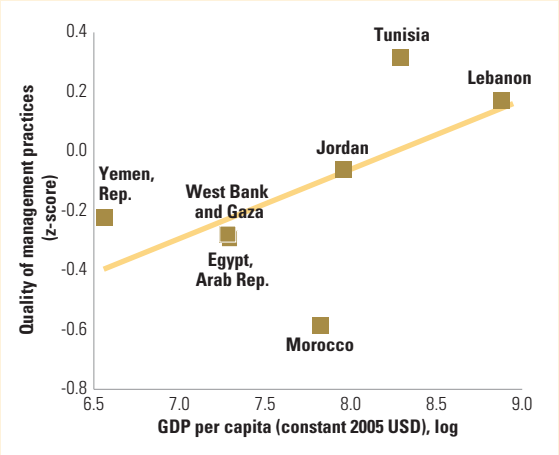
BOX 5.3: Management practices in the MENA region

The MENA ES includes a section on management practices in the areas of operations, monitoring, targets, and incentives. The operations question focuses on how the firm handles a process-related problem, such as machinery breaking down. The monitoring question covers the collection of information on production indicators. The questions on targets focus on the timescale for production targets, as well as their difficulty and employees' awareness of them. Lastly, the incentives questions cover criteria governing promotion, practices for addressing poor performance by employees, and the basis on which the achievement of production targets are rewarded. These questions were answered by all manufacturing firms with at least 20 employees. The median number of completed interviews with sufficiently high response rates was just below 115 per economy, with totals ranging from 12 in Djibouti to 1,130 in Egypt.[a]

The scores for individual management practices (in other words, for individual questions) were converted into z-scores by normalizing each practice so that the mean was 0 and the standard deviation was 1. To avoid putting too much emphasis on targets or incentives, unweighted averages were first calculated using the z-scores of individual areas of the four management practices. An unweighted average was then taken across the z-scores for the four practices. Lastly, a z-score of the measure obtained was calculated. This means that the average management score across all firms in all economies in the sample is equal to zero. The management practices of individual firms deviating either left or right from zero, with those to the left denoting bad practices and those to the right indicating good practices.

There is a positive correlation between the average quality of management practices and log per capita GDP (see figure B5.3).

FIGURE B5.3: There is a positive correlation between the average quality of management practices and log per capita GDP



Source: Enterprise Surveys.
Note: Djibouti is excluded, as the measure of quality of management practices is available for only 12 firms.

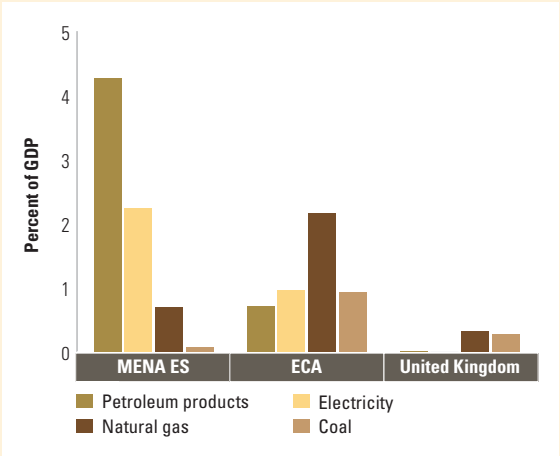
a The questions on management practices came at the end of a long face-to-face interview. This resulted in an unusually large number of people responding "don't know" or refusing to answer.

poorly managed firms, however, those that are somewhat better managed tend to have higher labor productivity, while the association with innovation is not significant. In contrast, for well-managed firms, management practices are not correlated with higher labor productivity, but innovations are (table A5.9). These results suggest that poorly managed firms might achieve higher returns from improving management practices than from being innovative. Well-managed firms, on the other hand, might benefit more from engaging in innovation than from further improving their management practices.

In economies with fewer energy subsidies, better managed firms use energy resources more efficiently

The MENA ES data also show that energy intensity, as measured by fuel intensity, is negatively correlated with labor productivity (tables A5.6 and A5.7). Theoretically, better management practices may either decrease usage of energy through more efficient production techniques or increase it through higher capital utilization. Empirical evidence shows that in the United Kingdom, better-managed firms use energy more efficiently.[53] Similar analysis applied to the MENA ES region does not reveal the same relationship (table A5.10, column 1). This may be due to a remarkable difference in the level of subsidization of energy consumption: the average of energy subsidies (the sum of subsidies for petroleum products, natural gas, and

FIGURE 5.13: Petroleum products, natural gas and electricity subsidies in the MENA ES region are much higher than in the United Kingdom



Source: Clements and others (2013) and authors' calculations.

coal) in seven MENA ES economies[54] in 2011 constituted 5 percent of GDP, compared with 0.6 percent of GDP in the United Kingdom (figure 5.13).

In the less-subsidized group of MENA ES economies—all but Egypt and the Republic of Yemen—higher-quality management practices are associated with a lower level of fuel spending per dollar of total revenue (table A5.10, column 3).[55] The estimate suggests that improving the management quality from the 25th to the 75th percentile is associated with a 32 percent decrease in firm's fuel intensity. More subsidized MENA ES economies do not follow this pattern (table A5.10, column 2) and, therefore, do not benefit in a similar way from improvements in management practices.

These results provide evidence of an indirect relationship between management practices and labor productivity in the MENA ES economies: better management practices are associated with lower energy intensity and lower energy intensity is associated with higher productivity. This is true only in economies with a relatively low level of energy subsidies. If anything, more subsidized economies do not benefit from better management practices and, as a consequence, they lack one of the ways to improve their productivity.

POLICY CONCLUSIONS

MENA ES economies generally perform worse on various competitiveness rankings compared with their middle-income peer economies in other regions, even though the labor productivity of private sector firms is similar in both groups.

Trade is not the issue per se: firms in the MENA ES region are more likely to export, import, or both than their counterparts elsewhere; but those firms are also more likely to be SMEs. The differences lie in the productivity premium: superstar exporters have similar productivity margins as elsewhere, but the bulk of exporters lag behind. In other words, many exporters may find themselves constrained or unwilling to expand, or they have an incentive to continue exporting despite being inefficient. The winners in terms of productivity gains, however, are importers, which is perhaps due to the access they get to foreign technology and supply chains. This is despite the obstacles that importers face in terms of higher tariffs, non-tariff restrictions on trade from abroad, and the time it takes for imports to clear customs.

Trade, access to information, and access to knowledge more broadly—through two-way trading, foreign ownership, firm-specific human capital, and ICT—are also important determinants of innovation in the MENA ES region. The percentage of firms that engage in any type of innovation is comparable with the ECA region, but labor productivity gains from innovation are smaller than those observed in other developing economies. Only well-managed firms see productivity gains from innovation; poorly managed firms would benefit more from improving their management practices.

Taken together, these findings suggest several measures that policy makers in the MENA ES economies should implement to reduce the differences in productivity gains.

First, firms would benefit from greater openness to international trade and in particular more effective customs and trade regulations, both when exporting and importing. The aim should be reducing entry costs for all firms; giving preference to certain groups of firms—including SMEs—may result in less efficient and dynamic firms entering the export market. Moreover, while trade costs in the MENA ES economies seem to be comparable with trade costs

elsewhere, additional factors such as internal transport costs are important for well-functioning export sectors.

Second, importing should not be viewed solely through the lens of trade deficits and foreign exchange reserves. Despite the obstacles that importers face in terms of higher tariffs, non-tariff restrictions on trade from abroad and time to clear customs, firms in the MENA ES region are import-reliant. Imports allow companies to source component parts of a better quality or at a lower cost than those available in the domestic market, as well as to acquire knowledge about new products and processes. Time- and cost-efficient access to high-quality inputs, either domestic or foreign, can thus be a means to encourage more high value-added production.

Third, FDI-specific restrictions that hinder foreign investment should be removed. Manufacturers with at least 10 percent foreign ownership are more likely to acquire knowledge, introduce new products, and implement technological innovations. Yet despite this, the World Bank's *Investing Across Borders* reports that relative to other regions, the MENA economies are fairly restrictive on foreign equity ownership in many sectors, with the exception of Tunisia, and it takes twice as long to start a foreign firm as it does to start a domestic firm.

Fourth, the governments should facilitate improvements in the skills of the workforce. Better communication and cooperation between the private sector and universities would be beneficial and should be encouraged, with adequate funding provided at secondary, vocational, and university levels. Governments could encourage firms to provide training to their employees through dedicated training programs or training centers. Moreover, there is a need for more intensive training programs, particularly aimed at improving the management of SMEs.

Finally, there is an issue that is not discussed directly in the chapter due to data availability, but is related to many of its findings. Restrictions on firm entry and exit as well as restrictions that give undue advantage to incumbent firms, particularly state-owned or politically connected firms (such as privileged access to subsidized energy and state procurement contracts or state-supported non-tariff barriers to trade), should be removed.

There is now a wealth of evidence showing that such restrictions suppress productivity, aggregate growth, and employment growth. There are several reasons for this. Unconnected firms might shrink due to fewer profitable investment opportunities or stop growing to stay small enough to operate under the radar of their connected larger competitors; they might also be forced to exit the market. Furthermore, undue advantages for incumbent firms might discourage new and potentially more productive and innovative firms from entering. Such distortions have further knock-on effects: they may provide incentives for less efficient firms to enter export markets and gain or retain their market share, and prevent some more efficient ones from exporting or growing.

Endnotes

1 See Altomonte and Békés (2016).

2 See Altenburg and others (1998).

3 See Porter (2000) and UNCTAD (2005).

4 See World Economic Forum *Global Competitiveness Report* 2015–2016.

5 The labor productivity results discussed in the chapter disappear when total factor productivity is used instead: while the coefficients mostly keep their signs, the significance disappears. This could be due to the assumptions used in TFP estimation, relatively smaller sample size (not all manufacturing firms reported the capital measures), or higher-than-optimal capital intensity, resulting from energy subsidies. Further, it may take longer for trade and innovation to be reflected in total factor productivity improvements than in labor productivity improvements—it may take more time for firms to adjust capital and other non-labor inputs. Data availability does not allow us to determine the actual cause with certainty.

6 The comparison income group includes either upper-middle-income or lower-middle-income economies (according to the World Bank income classification, as of 2012) for which Enterprise Survey data are available, excluding MENA economies.

7 The firm-level literature on the profile of exporters is expansive, following the path of early works by Bernard and Jensen (1995, 1999); Bernard and others (2003, 2006, 2007). For recent surveys of the literature, see Tybout (2003); Wagner (2007, 2012); and Greenaway and Kneller (2007). It should be noted that productivity is most often based on revenue rather than quantity output. This distinction is important as firms may have higher revenue-based productivity not only based on their productive efficiency but also through commanding higher prices for the goods they sell or lower prices for their inputs. See Foster and others (2008).

8 See Melitz (2003) and Bernard and others (2007).

9 Bernard and others (2007).

10 Ibid.

11 See Behar and Freund (2011).

12 Jaud and Freund (2015, p. 57) find that while there are dominant superstar traders, there are few near-level trading firms. As they succulently characterize this situation, "…in MENA the largest exporter is alone at the top—Zidane without a team."

13 Throughout the chapter, exporters are defined as firms exporting more than 10 percent of their sales directly.

14 "Superstar exporters" here are defined as the top 5 percent of firms by their export sales value. "Big player" exporters are those accounting for between the 50th and 94th percentile. "Small player" exporters are those that fall below the median in terms of export value, by economy. Jaud and Freund (2015) define superstars as the top 1 percent; since that report works from administrative data and not a sample, a more conservative definition is used here to ensure sufficient coverage. Their approach necessarily includes all firms at the frontier and so the observed effect they find is higher than presented here.

15 Jaud and Freund (2015).

16 Even after taking relative capital intensity into account, this pattern remains.

17 Jaud and Freund (2015). Examples include Jordan Enterprise Development Corporation (JEDCO), whose export promotion program has a strong focus on SMEs, and the Investment Development Authority of Lebanon (IDAL) which focuses its export promotion on the agro-industry (agricultural and agro-industrial products) and therefore largely aims at relatively small firms.

18 Ibid, p. 51.

19 International Monetary Fund (2014).

20 World Bank (2009), p. 151.

21 Significant at a 10 percent level.

22 The ES data do not include productivity levels at the time the firm started operating. Moreover, it should be noted that by structure, only incumbent firms are considered, and so entry and exit effects are not considered.

23 See Seker (2012); Amador and di Mauro (2015).

24 See Behar and Freund (2011). Figures from WDI, Imports as a percentage of GDP. For Yemen and Djibouti the most recent year available is used: 2006 and 2007 respectively.

25 Jaud and Freund (2015).

26 See Amiti and Konings (2007); Seker (2012); Amin and Islam (2014).

27 Jaud and Freund (2015) directly attribute unrealized growth to these policies, "Closing MENA markets to competition with high tariffs and restrictive non-tariff measures (NTMs) has not helped domestic exporters grow." (p. XV).

28 World Bank (2014). According to the ES data, 96 percent these so-called offshore firms import inputs, compared with 70 percent of comparators. Offshore firms use an average of 75 percent foreign inputs, compared with 50 percent for other Tunisian firms in the ES.

29 Note that West Bank and Gaza do not control their borders and customs themselves.

30 Jaud and Freund (2015).

31 Ibid. They note: "In addition, even if individual firms are able to source high-quality inputs from abroad, transport costs and the increasing prevalence of "just-in-time" production imply that a lack of high-quality locally available inputs is likely to hinder the ability of even the most talented firms to succeed." p. 35.

32 See Mohnen and Hall (2013) for an overview.

33 In a management field experiment looking at large Indian textile firms, Bloom and others (2013a) find that improved management practices resulted in a 17 percent increase in productivity in the first year through improvements in the quality of products, increased efficiency and reduced inventories. For micro and small enterprises, McKenzie and Woodruff (2015) showed that micro and small firms with better business practices in marketing, stock-keeping, record-keeping and financial planning have higher labor productivity, survival rates and faster sales growth.

34 See Brown and others (2006); Estrin and others (2009); Bloom and Van Reenen (2010); Bloom and others (2012, 2013); McKenzie and Woodruff (2015); and Rijkers and others (2014).

35 See Crépon and others (1998).

36 R&D is the creative work undertaken on a systematic basis to increase a firm's stock of knowledge.

37 The differences are significant at 10 percent level. The shares of higher- and medium-low-tech firms in ECA and MENA ES are similar: 20.1 and 22.7 percent respectively. The definition of manufacturing sectors according to technological intensity can be found at http://www.oecd.org/sti/ind/48350231.pdf

38 See Saliola and Zanfei (2009).

39 See AfD, OECD and UNDP (2014).

40 Stone and Tarek Badawy (2011) find a similar result using a sample of seven MENA economies (Egypt, Lebanon, Libya, Morocco, Saudi Arabia, Syria and the Republic of Yemen).

41 See EBRD (2014), Box 3.2.

42 Ibid, Chapter 4 and Bircan and De Haas (2015).

43 Differences are significant at 10 percent level.

44 See Mohnen and Hall (2013) for an overview. Raffo and others (2008) found that a rise in product innovation increased labor productivity of manufacturing firms by 7.8, 24.6 and 36.8 percent in France, Brazil and Mexico respectively.

45 See, for example, Rijkers and others (2014), Diwan and others (2013).

46 See, for example, Atkin and others (2015).

47 Significant at a 1 percent level.

48 International market is the main market for 37.1 percent of firms in Tunisia, 34.3 percent of firms in West Bank and Gaza, 32 percent of firms in Morocco, and 21.1 percent of firms in Lebanon. In the remaining economies, comparable figures are below 8 percent.

49 Examples include lingerie manufacturer La Perla moving production from China to Tunisia and Turkey and ready-to-wear group Etam moving production to Morocco, Tunisia and Turkey (see Wendlandt, 2012).

50 See Bloom and others (2013b).

51 Comparable ES data on management practices are available only for ECA and MENA ES.

52 See EBRD (2014), Chapter 2, Bloom and Van Reenen (2010), Bloom and others (2012), Bloom and others (2013a), Bartz and others (2016).

53 See Bloom and others (2010).

54 Data on energy subsidies for West Bank and Gaza are not available.

55 The share of energy subsidies in GDP is below the relevant regional average in less subsidized economies and above it in more subsidized economies.

APPENDIX A5

TABLE A5.1: Exporter size and labor productivity premia

	(1)	(2)	(3)	(4)
Dependent variable	Log (PFTE)	Log (LP)	Log (PFTE)	Log (LP)
Direct exporter only (at least 10 percent of sales) (Y/N)	0.54***	0.09		
	(0.105)	(0.139)		
Superstar exporters (top 5th percentile by export value) (Y/N)			2.33***	1.71***
			(0.350)	(0.332)
Big player exporters (50th to 94th percentile by export value) (Y/N)			0.96***	0.71***
			(0.128)	(0.143)
Small player exporters (below 50th percentile by export value) (Y/N)			-0.08	-0.60***
			(0.125)	(0.138)
At least 10 percent foreign ownership (Y/N)	0.43**	0.11	0.35**	0.07
	(0.185)	(0.164)	(0.159)	(0.139)
Log (LP)	0.00		-0.07**	
	(0.033)		(0.032)	
Log (PFTE)		0.00		-0.10**
		(0.048)		(0.049)
Constant	2.87***	9.64***	3.55***	9.95***
	(0.351)	(0.191)	(0.345)	(0.193)
Observations	3,011	3,011	3,011	3,011
R-squared	0.26	0.227	0.329	0.289

Source: Enterprise Surveys.
Note: Simple OLS using survey-weighted observations (using Stata's svy prefix). Linearized Taylor standard errors clustered on strata are indicated in parentheses. PFTE = permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per permanent full-time employee, in 2012 USD. Variables omitted from the table: economy and sector fixed effects. Column 2 corresponds to marginal effects as presented in figure 5.4. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.2: Importer size and labor productivity premia

	(1)	(2)
Dependent variable	Log (PFTE)	Log (LP)
Import inputs (at least 10 percent foreign origin) (Y/N)	0.44***	0.55***
	(0.122)	(0.132)
At least 10 percent foreign ownership (Y/N)	0.50***	0.02
	(0.182)	(0.149)
Log (LP)	-0.01	
	(0.036)	
Log (PFTE)		-0.01
		(0.050)
Constant	2.89***	9.52***
	(0.373)	(0.195)
Observations	2,842	2,842
R-squared	0.262	0.277

Source: Enterprise Surveys.
Note: Simple OLS using survey-weighted observations (using Stata's svy prefix). Linearized Taylor standard errors clustered on strata are indicated in parentheses. PFTE = permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per PFTE, in 2012 USD. Variables omitted from the table: economy and sector fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.3: Size and labor productivity premia by trader type

	(1)	(2)	(3)	(4)
Dependent variable	Log (PFTE)	Log (PFTE)	Log (LP)	Log (LP)
Two-way trading firm (Y/N)	0.86***	0.63***	0.55***	0.33*
	(0.147)	(0.136)	(0.167)	(0.185)
Direct exporter only (at least 10 percent of sales) (Y/N)	0.29	0.52**	0.17	0.37
	(0.229)	(0.249)	(0.266)	(0.249)
Import inputs only (at least 10 percent foreign origin) (Y/N)	0.35**	0.05	0.58***	0.44***
	(0.138)	(0.150)	(0.151)	(0.167)
At least 10 percent foreign ownership (Y/N)	0.40**	0.05	0.02	-0.07
	(0.183)	(0.136)	(0.150)	(0.148)
Log (LP)	-0.01	-0.03		
	(0.036)	(0.045)		
Log (PFTE)			-0.01	-0.07
			(0.052)	(0.093)
Log (Age)		0.05		-0.05
		(0.046)		(0.060)
Log (Number of employees at start-up)		0.57***		0.08
		(0.044)		(0.105)
Log (Capital per employee)		0.00		0.24***
		(0.027)		(0.043)
Constant	2.93***	1.71***	9.50***	7.74***
	(0.369)	(0.425)	(0.232)	(0.475)
Observations	2,842	2,145	2,828	2,145
R-squared	0.286	0.57	0.275	0.372

Source: Enterprise Surveys.
Note: Simple OLS using survey-weighted observations (using Stata's svy prefix). Linearized Taylor standard errors clustered on strata are indicated in parentheses. Two-way trading firm is a firm that exports at least 10 percent of revenue and imports at least 10 percent of inputs. PFTE = permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per PFTE, in 2012 USD. Columns 2 and 4 exclude superstar exporters. Variables omitted from the table: economy and sector fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.4: CDM, 1st and 2nd stages, full private sector

	Stage 1	Stage 2: Innovation			
	(1)	(2)	(3)	(4)	(5)
Dependent variable	Spending on knowledge acquisition (Y/N)	Product (Y/N)	Process (Y/N)	Technological (Y/N)	Non-technological (Y/N)
Spending on knowledge acquisition (Y/N)		0.19*	-0.13	-0.00	0.09
		(0.110)	(0.134)	(0.106)	(0.110)
Log (Age)	-0.18*	0.09*	0.03	0.07	0.06
	(0.100)	(0.052)	(0.064)	(0.050)	(0.050)
Log (PFTE)	0.52***	-0.16**	0.10	-0.03	0.04
	(0.068)	(0.070)	(0.086)	(0.068)	(0.069)
At least 10 percent foreign ownership (Y/N)	0.47**	0.11	0.07	0.16	0.12
	(0.234)	(0.142)	(0.168)	(0.138)	(0.138)
At least 25 percent state ownership (Y/N)	0.76	-0.44	-0.59	-0.54	-0.51
	(0.957)	(0.473)	(0.603)	(0.462)	(0.437)
Direct exporter (at least 10 percent of sales) (Y/N)	0.14	0.05	0.13	0.15	0.07
	(0.178)	(0.100)	(0.116)	(0.096)	(0.097)
Percent PFTE with university degree	0.01***	-0.01**	-0.00	-0.00*	-0.00
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
Percent PFTE with secondary education only	0.00	-0.00***	-0.00	-0.00	-0.00
	(0.003)	(0.001)	(0.002)	(0.001)	(0.001)
Years of manager's experience in the sector	-0.00	0.01**	0.01	0.01	-0.01**
	(0.007)	(0.003)	(0.004)	(0.003)	(0.003)
Line of credit or loan from a financial institution (Y/N)	0.28	0.35***	0.51***	0.53***	0.20**
	(0.183)	(0.094)	(0.114)	(0.093)	(0.093)
Foreign technology license (Y/N)		0.39***	0.60***	0.64***	0.21*
		(0.111)	(0.115)	(0.109)	(0.112)
Employees receive time to develop new ideas (Y/N)		1.15***	1.51***	1.39***	1.60***
		(0.085)	(0.089)	(0.083)	(0.083)
Employees receive formal training (Y/N)		0.67***	0.38***	0.56***	0.71***
		(0.094)	(0.100)	(0.091)	(0.090)
Main market: local (Y/N)		-0.23***	-0.24***	-0.20***	-0.16*
		(0.083)	(0.091)	(0.077)	(0.081)
Email usage (Y/N)		0.60***	0.42***	0.43***	0.67***
		(0.096)	(0.105)	(0.088)	(0.095)
Sole proprietorship (Y/N)	0.03				
	(0.180)				
Manager has a university degree (Y/N)	0.83***				
	(0.185)				

Source: Enterprise Surveys.
Note: This table reports regression coefficients for the first and second stage of the model described in box 5.1. The results are estimated using asymptotic least squares (ALS). Standard errors are reported in parentheses below the coefficient. PFTE = permanent full-time employees. Variables omitted from the table: Percent PFTE with university degree (don't know), percent PFTE with secondary education (don't know), sector and economy fixed effects, and the intercept. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.5: CDM, 1st and 2nd stages, manufacturing firms with 20 or more employees only

	Stage 1	Stage 2: Innovation			
	(1)	(2)	(3)	(4)	(5)
Dependent variable	Spending on knowledge acquisition (Y/N)	Product (Y/N)	Process (Y/N)	Technological (Y/N)	Non-technological (Y/N)
Spending on knowledge acquisition (Y/N)		-0.06	-0.26	-0.30	0.18
		(0.184)	(0.207)	(0.206)	(0.182)
Log (Age)	0.03	0.17*	0.08	0.11	0.05
	(0.163)	(0.086)	(0.100)	(0.098)	(0.083)
Log (PFTE)	0.32***	-0.14	0.05	-0.01	0.06
	(0.119)	(0.092)	(0.105)	(0.106)	(0.089)
At least 10 percent foreign ownership (Y/N)	0.97**	0.49*	0.35	0.72**	0.04
	(0.391)	(0.269)	(0.306)	(0.303)	(0.263)
At least 25 percent state ownership (Y/N)	0.80	-0.02	-1.46	-0.27	-0.77
	(0.995)	(0.625)	(1.119)	(0.712)	(0.644)
Direct exporter only (at least 10 percent of sales) (Y/N)	0.65	0.24	0.33	0.41	-0.15
	(0.694)	(0.338)	(0.398)	(0.399)	(0.322)
Import inputs only (at least 10 percent foreign origin) (Y/N)	1.96***	0.18	0.71	0.67	-0.37
	(0.516)	(0.407)	(0.467)	(0.465)	(0.398)
Two-way trading firm (Y/N)	1.73***	0.51	0.85*	1.07**	-0.08
	(0.579)	(0.392)	(0.454)	(0.456)	(0.380)
Percent PFTE with university degree	0.01	-0.00	-0.01*	-0.00	0.00
	(0.007)	(0.004)	(0.005)	(0.005)	(0.004)
Percent PFTE with secondary education only	-0.00	-0.01***	-0.01***	-0.01**	-0.00
	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)
Years of manager's experience in the sector (Y/N)	0.01	0.01	0.01	0.01*	-0.00
	(0.012)	(0.006)	(0.007)	(0.007)	(0.006)
Line of credit or loan from a financial institution (Y/N)	0.79***	0.43**	0.70***	0.78***	0.13
	(0.300)	(0.213)	(0.236)	(0.238)	(0.208)
Foreign technology license (Y/N)		0.45***	0.76***	0.57***	0.28
		(0.168)	(0.177)	(0.170)	(0.175)
Employees receive time to develop new ideas (Y/N)		0.90***	1.56***	1.30***	1.59***
		(0.138)	(0.144)	(0.140)	(0.141)
Employees receive formal training (Y/N)		0.92***	0.45***	0.80***	0.60***
		(0.148)	(0.157)	(0.148)	(0.149)
Main market: local (Y/N)		0.02	0.15	0.04	-0.07
		(0.152)	(0.168)	(0.147)	(0.159)
Email usage (Y/N)		0.46***	0.28	0.22	0.39**
		(0.161)	(0.183)	(0.150)	(0.166)
Sole proprietorship (Y/N)	0.16				
	(0.336)				
Manager has a university degree	0.93***				
	(0.312)				

Source: Enterprise Surveys.

Note: This table reports regression coefficients for the first and second stage of the model described in box 5.1. The results are estimated using asymptotic least squares (ALS) on a sample of manufacturing firms with at least 20 employees. Standard errors are reported in parentheses below the coefficient. Two-way trading firm is a firm that exports at least 10 percent of revenue and imports at least 10 percent of inputs. PFTE = permanent full-time employees. Variables omitted from the table: Percent PFTE with university degree (don't know), percent PFTE with secondary education (don't know), sector and economy fixed effects, and the intercept. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.6: CDM, 3rd stage, full private sector

	Stage 3			
	(1)	(2)	(3)	(4)
Dependent variable: Log (LP)	Product	Process	Technological	Non-technological
Innovation (Y/N)	0.25***	0.20***	0.22***	0.19***
	(0.030)	(0.026)	(0.026)	(0.024)
Capital or main business city (Y/N)	0.19***	0.20***	0.19***	0.19***
	(0.044)	(0.044)	(0.044)	(0.044)
Log (Age)	-0.04*	-0.03	-0.04*	-0.02
	(0.023)	(0.022)	(0.022)	(0.022)
Log (PFTE)	-0.00	-0.01	0.00	-0.02
	(0.017)	(0.017)	(0.017)	(0.018)
At least 10 percent foreign ownership (Y/N)	0.05	0.09	0.06	0.07
	(0.074)	(0.071)	(0.071)	(0.071)
At least 25 percent state ownership (Y/N)	0.44*	0.50**	0.48**	0.43*
	(0.250)	(0.243)	(0.242)	(0.242)
Direct exporter (at least 10 percent of sales) (Y/N)	0.15***	0.16***	0.14***	0.17***
	(0.055)	(0.053)	(0.054)	(0.054)
Percent PFTE with university degree	0.01***	0.01***	0.01***	0.01***
	(0.001)	(0.001)	(0.001)	(0.001)
Percent PFTE with secondary education only	0.00***	0.00***	0.00***	0.00***
	(0.001)	(0.001)	(0.001)	(0.001)
Sole proprietorship (Y/N)	-0.33***	-0.37***	-0.34***	-0.35***
	(0.041)	(0.042)	(0.041)	(0.041)

Source: Enterprise Surveys.
Note: This table reports regression coefficients for the third stage of the model described in box 5.1. The results are estimated using asymptotic least squares (ALS). Standard errors are reported in parentheses below the coefficient. PFTE = permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per PFTE, in 2012 USD. Variables omitted from the table: percent PFTE with university degree (don't know), percent PFTE with secondary education (don't know), sector and economy fixed effects, and the intercept. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.7: CDM, 3rd stage, manufacturing firms with 20 or more employees only

	Stage 3			
	(1)	(2)	(3)	(4)
Dependent variable: Log (LP)	Product	Process	Technological	Non-technological
Innovation (Y/N)	0.14***	0.08**	0.10**	0.13***
	(0.048)	(0.039)	(0.041)	(0.041)
Management practices	-0.04	-0.04	-0.04	-0.04
	(0.035)	(0.035)	(0.035)	(0.035)
Log (Capital per employee)	0.27***	0.27***	0.27***	0.27***
	(0.019)	(0.019)	(0.019)	(0.019)
Capacity utilization	0.00*	0.00*	0.00*	0.00*
	(0.001)	(0.001)	(0.001)	(0.001)
Capital or main business city (Y/N)	0.03	0.03	0.03	0.03
	(0.088)	(0.088)	(0.088)	(0.088)
Log (Age)	-0.04	-0.02	-0.02	-0.01
	(0.041)	(0.039)	(0.039)	(0.039)
Log (PFTE)	0.01	-0.00	0.00	-0.03
	(0.033)	(0.033)	(0.032)	(0.035)
At least 10 percent foreign ownership (Y/N)	-0.01	0.04	0.00	0.01
	(0.100)	(0.097)	(0.099)	(0.098)
At least 25 percent state ownership (Y/N)	0.15	0.28	0.19	0.24
	(0.413)	(0.421)	(0.412)	(0.415)
Direct exporter only (at least 10 percent of sales) (Y/N)	0.11	0.14	0.13	0.15
	(0.160)	(0.157)	(0.158)	(0.158)
Import inputs only (at least 10 percent foreign origin) (Y/N)	0.14	0.14	0.15*	0.15*
	(0.088)	(0.087)	(0.086)	(0.087)
Two-way trading firm (Y/N)	0.23**	0.27**	0.25**	0.26**
	(0.113)	(0.109)	(0.112)	(0.109)
Percent PFTE with university degree	0.01***	0.01***	0.01***	0.01***
	(0.002)	(0.002)	(0.002)	(0.002)
Percent PFTE with secondary education only	0.00***	0.00**	0.00**	0.00**
	(0.001)	(0.001)	(0.001)	(0.001)
Fuel intensity (fuel cost as a fraction of sales)	-0.47***	-0.47***	-0.47***	-0.47***
	(0.087)	(0.087)	(0.087)	(0.087)
Sole proprietorship (Y/N)	-0.09	-0.11	-0.10	-0.11
	(0.078)	(0.079)	(0.078)	(0.079)

Source: Enterprise Surveys.
Note: This table reports regression coefficients for the third stage of the model described in box 5.1 for the sample of manufacturing firms with at least 20 employees. The results are estimated using asymptotic least squares (ALS). Standard errors are reported in parentheses below the coefficient. PFTE = permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per PFTE, in 2012 USD. Two-way trading firm is a firm that exports at least 10 percent of revenue and imports at least 10 percent of inputs. Variables omitted from the table: percent PFTE with university degree (don't know), percent PFTE with secondary education (don't know), sector and economy fixed effects, and the intercept. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.8: CDM, 3rd stage, manufacturing firms with 20 or more employees only, by technology intensity

	Stage 3			
	(1)	(2)	(3)	(4)
Dependent variable: Log (LP)	Product	Process	Technological	Non-technological
High- and medium-technology intensity				
Innovation (Y/N)	0.18**	0.06	0.08	0.08
	(0.076)	(0.062)	(0.064)	(0.054)
Low-technology intensity				
Innovation (Y/N)	0.08	0.06	0.08	0.14***
	(0.060)	(0.046)	(0.052)	(0.055)

Source: Enterprise Surveys.
Note: This table reports regression coefficients for the third stage of the model described in box 5.1 for the sample of manufacturing firms with at least 20 employees by technology intensity. The results are estimated using asymptotic least squares (ALS). Standard errors are reported in parentheses below the coefficient. PFTE—permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per PFTE, in 2012 USD. Variables omitted from the table in addition to those shown in table A5.7: percent PFTE with university degree (don't know), percent PFTE with secondary education (don't know), sector and economy fixed effects, and the intercept. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.9: CDM, 3rd stage, manufacturing firms with 20 or more employees only, by management quality above or below median

	Stage 3			
	(1)	(2)	(3)	(4)
Dependent variable: Log (LP)	Product	Process	Technological	Non-technological
Firms with management quality above median				
Innovation (Y/N)	0.12*	0.11**	0.09*	0.13**
	(0.063)	(0.052)	(0.052)	(0.051)
Management practices	-0.01	-0.01	-0.01	-0.02
	(0.081)	(0.081)	(0.081)	(0.081)
Firms with management quality below median				
Innovation (Y/N)	0.13**	0.06	0.09	0.08
	(0.065)	(0.052)	(0.060)	(0.060)
Management practices	0.14*	0.16**	0.15**	0.15**
	(0.074)	(0.073)	(0.073)	(0.073)

Source: Enterprise Surveys.
Note: This table reports regression coefficients for the third stage of the model described in box 5.1 for the sample of manufacturing firms with at least 20 employees where the quality of management practice is above or below the MENA ES weighted median. The results are estimated using asymptotic least squares (ALS). Standard errors are reported in parentheses below the coefficient. PFTE = permanent full-time employees. LP = labor productivity. Labor productivity is measured as total revenue per PFTE, in 2012 USD. Variables omitted from the table in addition to those shown in table A5.7: percent PFTE with university degree (don't know), percent PFTE with secondary education (don't know), sector and economy fixed effects, and the intercept. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

TABLE A5.10: Management practices and fuel intensity

Dependent variable: Fuel intensity (fuel cost as a percent of revenue)	(1)	(2)	(3)
	All economies	More subsidized	Less subsidized
Management practices	-0.41	0.39	-0.87**
	(0.304)	(0.439)	(0.373)
Log (Age)	-0.13	-0.15	-0.53*
	(0.241)	(0.432)	(0.316)
Log (Sales)	-0.86***	-1.33***	-0.57
	(0.313)	(0.473)	(0.402)
Log (PFTE)	0.45	1.40*	0.11
	(0.331)	(0.725)	(0.393)
Log (Capital stock)	0.61***	0.34	0.72***
	(0.192)	(0.273)	(0.215)
Percent PFTE with university degree	-0.01	-0.02	0.00
	(0.014)	(0.018)	(0.020)
Constant	4.68	10.34**	2.82
	(2.942)	(4.302)	(4.105)
Observations	2,498	1,542	956
R-squared	0.217	0.204	0.276

Source: Enterprise Surveys.
Note: This table reports regression coefficients for the sample of manufacturing firms with at least 20 employees using OLS regression on survey-weighted observations (using Stata's svy prefix). Standard errors are reported in parentheses below the coefficient. PFTE = permanent full-time employees. Variables omitted from the table: percent PFTE with university degree (don't know), sector and economy fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

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