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Under-provision of private training by MENA firms: what to Do about It?

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Abstract

This paper shows that firms in the Middle East and North Africa (MENA) provide training to their workers less frequently than firms in other regions and yet seem to be more in need of it. Utilizing firm level data from the Enterprise Surveys for over 100 countries, it attempts to explain that paradox and also identify alternative policy actions that MENA countries might use to substantially increase firm-supplied training by MENA firms. In particular, it points to the potential usefulness of reforms of labor regulations in MENA countries to be less rigid, but also coupling this with stronger enforcement so as to encourage existing firms to be more formal and new firms to enter, grow in size and adopt characteristics more favorable to training over time.

JEL classification: Codes; J41; J58; O15; O53

Keywords: Training; Labor regulations; Enforcement; Middle east; Education-skills mismatch

1 Introduction

This paper shows that countries of the Middle East and North Africa (MENA) stand out from other regions of the world in several unfortunate, important and interrelated ways. In general, there is a larger gap between the skills that firms want and those which young school and university graduates possess in the MENA region than elsewhere. At the same time MENA countries are experiencing unusually high youth unemployment rates and unusually long periods of time for school-to-work transitions. Worker training would seem like a useful solution. But as we show, on the one hand, the literature on government funded and coordinated training seems to be ineffective in the region and low in benefits relative to costs, and on the other hand, the incidence of firm-supplied training is extremely low both in absolute terms and relative to firms in other regions. This suggests the need for policy reforms to overcome these shortcomings. For this reason, this paper draws on empirical findings on the determinants of firm-supplied training to workers in both MENA and Non-MENA countries to identify some possible reforms that might ameliorate these shortcomings in MENA countries. We consider programs both to improve the quality of public sector supplied training programs in MENA countries and to induce both firms to undertake more training and workers to participate in it.

The remainder of the paper is organized as follows: Section 2 draws largely on existing literature to identify these shortcomings in the MENA region with respect to existing public-sector training programs. It also draws on firm level surveys that show the incidence of firm-supplied training in the MENA region to be lower than in any other region despite the demonstrated greater need for such training. It then identifies the primary objective of this paper, namely, to identify factors that seem to inhibit the provision of such training by MENA firms relative to that by firms in Non-MENA countries. Section 3 develops a method for empirically identifying such factors lying behind the extremely low incidence of firm-supplied training in MENA countries that overcomes some methodological challenges faced in attempts to do so. Section 4 identifies the empirical model and data, Section 5 presents the empirical results and Section 6 derives the implications for policy and future research from the findings of both this and complementary studies.

2 Documentation of the relatively greater need for, but lesser supply of, firm-supplied training in the MENA region relative to other regions

Three of the most well-documented demographic characteristics of the MENA region are the relative importance of its youth bulge, the relatively high rate of unemployment among that youth and its extremely low female labor force participation rate. On the other hand, it is generally true that both the female labor force participation rate and population as a whole are growing in MENA over time. This means that in the years ahead, the challenge of finding employment for MENA youth is only going to be growing even further over time. Comparative data on each of these three characteristics are presented in the first three columns of Table 1. In particular, column (1) shows that MENA countries have a slightly higher share of youths (15–24) than in any other region except Sub Sahara Africa (SSA); column (2) shows that it has the highest unemployment rate in this youth group,[1] and column (3) that it has the lowest female labor force participation rate.

Column (4) of Table 1 uses data from the World Bank's Enterprise Surveys (that will be used extensively in the present analysis) to show that more than 38% of MENA firms rate the lack of education and skills among their workers to be a "serious or very serious obstacle to their business", a rate that is higher than those in the other (mostly developing) countries included in the Enterprise Surveys.[2] Angel-Urdinola and Leon-Solano (2013, p. 2) define the school-to-work transition as the time it takes between the age at which 50% of the population has left education and that at which 50% has found employment and show that it takes more than five years to make that transition in MENA but less than two years to do so in other regions. Collectively, therefore, columns (1)-(4) of Table 1 point to the greater seriousness of the skill gap in the MENA region and its possible link to the region's high youth unemployment rate. It is this youth bulge and high youth unemployment rate that have frequently been pointed to as major contributors to "the Arab Spring" and the revolutions that have already toppled several governments in the region (Tunisia, Egypt, Libya and Yemen) and threatened several others.

Columns (5), (6) and (7) of this same table, however, show that, according to these same surveys, the percentages of both firms which offer such training, and the percentages of

Table 1 Worker, firm and gender characteristics across regions of developing countries

Region	% of Population Aged 15-24	% of Youth (15–24) who are Unemployed	FLFP	% of Firms saying Education And Skill of Workers is a Serious Obstacle to their Business	% of Firms Offering Training to Workers	% of Workers Offered Training	Average Number of Permanent Workers Offered Training	% of Firms Owned by Largest Owner	% of Firms Publicly Listed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MENA	20	21	20	38.6	17.7	28.1	15.5	86.9	0.7
EAP	15.5	8	63	25.1	44.61	60	24.9	85.3	3.1
EECA	15	18	46	29.0	32.8	45	30.7	84.6	5.1
LAC	18	17	54	35.9	44.3	58.6	44.8	75.8	4.4
SA	19.6	10	32	15.2	27.9	45.5	55.5	87.8	1.2
SSA	20.9	18	63	24.5	30.1	45.4	28.2	86	3.5
Non-MENA	16.5	14.6	54	23.9	39.3	52.0	37.9	81.0	4.2
All	17.5	12.5	51	26.9	37.7	49.4	35.2	82.7	3.9

Identification of regional designations

MENA Middle East and North Africa; *EAP* East Asia and the Pacific; *EECA* Eastern Europe and Central Asia; *LAC* Latin America and the Caribbean; *SA* South Asia; *SSA* Sub-Saharan Africa; *Non-MENA* All Developing Countries outside of MENA

Sources of Data (by column)

(1) United Nations Department of Economic and Social Affairs, Population Division, World Population Prospects

(2) International Labor Office Global Employment Trends

(3) Female Labor Force Participation Rate, FLFP, (Females Age 15+), International Labor Office Global Employment Trends

(4) Angel-Urdinola and Leon-Solano 2013, p.3

(5) - (9) World Bank, Enterprise Surveys, using latest year available for each country

their workers who receive that training are well below those of firms and workers in other regions. Hence, not only does training seem to be in greater need in this region but also it seems to be less frequently supplied. What makes this training shortfall even more pervasive and serious is that, because of the relative importance of oil (a depletable natural resource), and relatively high wage rates (induced by extremely high wage rates in the public sector funded by oil revenues), training is also needed to facilitate the kind of structural change needed to maintain competitiveness and employment growth in the face of globalization and Dutch disease effects of oil.

Two other findings from the literature on MENA that highlight the seriousness of the skill gap in this region are: (1) the well-recognized growing gap in virtually every MENA country between the skills possessed by those completing their education (at increasingly high levels) and those desired by firms (World Bank, 2006), and (2) the much lower productivity growth between 1991 and 2010 in MENA than elsewhere (Tzannatos, 2013).

If government-supplied training were both widely available and efficient, it could at least partially compensate for the shortfall in firm-supplied training. However, the literature on training in the MENA region makes it clear that, despite considerable efforts within the region, government-led training has not been successful. Among the more important and comprehensive surveys of MENA government efforts in training are World Bank (2004), World Bank (2008), Abrahart et al. (2002), and Angel-Urdinola et al. (2013). These studies have generally concluded that the government initiated training programs have imposed significant fiscal costs on governments without yielding positive economic effects, often giving rise to discriminatory selection, and failing to identify and then deliver the type and quality of training that firms need. Many of these studies point to the especially poor quality of public sector-provided on-the-job training (OJT), insufficient involvement of privately run OJT, and excessive concentration on males. The provision of these public sector training programs is often characterized as being excessively fragmented across different supplying agencies, leading to duplication, inefficiency, and lack of coordination. Many of these individual agencies are said to be woefully under-staffed relative to the number of clients to be served and to use outdated curricula that are unable to meet the needs of the private sector. Almost universally, they are said to be poorly designed and to lack accountability with respect to results and program evaluation (Angel-Urdinola and Semlali 2010, Angel-Urdinaola, Semlali and Brodmann 2010, and Angel-Urdinola and Leon-Solano 2013).

UNESCO (www.unevoc.unesco.org/go.php?q=world+TVE+Database) provides a useful database covering the technical and vocational education training programs in a number of MENA countries in recent years (Egypt 2012, Iraq 2014, Lebanon 2012, Oman 2013, Yemen 2013). These reports identify common problems in these largely government supplied programs but also some substantial differences in the main constraints across countries. For example, in Egypt these are said to be the low quality and deficient remuneration of the teachers; in Iraq, the unstable external environment and the lack of an adequate strategy framework; in Lebanon, the lack of both close contact with businesses and their needs, the poor quality of facilities and excessive centralization of management; in Oman, excessive reliance on non-national trainers; and, in Yemen, the dearth of qualified teachers.

On the other hand, evaluations of firm-supplied training on productivity are generally much more positive, especially when the workers are reasonably well educated (Tan and Batra, 1995), as they increasingly are in MENA. We make no claim that the trainers in firms are better qualified and the programs offered necessarily better presented than those of publicly provided ones. They do, however, have two important advantages. They know the needs of firms better and may also be better able to design them in a way as to be more incentive compatible for both firms and their workers. For this reason, the paper puts more emphasis on the functioning of labor markets and on labor regulations and their enforcement than the aforementioned studies that focus on the quality of training programs. It will, however, place needful emphasis on the quality of education in each country and on the firm-specific assessments of the skill deficiencies in their work force.

Given the firm-specific information on the incidence of firm-supplied training and on various factors that may explain variations in it across firms and countries in the MENA region (and for comparison purposes also other developing regions) available in the World Bank's Enterprise Surveys, it is these surveys which we utilize in this study to identify factors that may explain why firm-supplied training, despite being seemingly so badly needed in MENA (column (4) of Table 1), is in fact so seldom offered (column (5) of Table 1). Our approach allows us to improve on existing studies in dealing with common methodological problems confronting studies of this sort.

Our findings show that the comparatively low incidence of training in MENA firms can be attributed to: (1) a combination of relatively rigid labor regulations and low enforcement (making for large numbers of informal firms and widespread complaints by formal firms of unfair competition from informal firms), (2) a host of adverse firm characteristics such as insufficient access to external finance, small size, dearth of new firms, their lack of technical expertise, and foreign and other corporate ownership, and (3) lower response rates in the form of training to normal triggers (such as for example, the firms' perception of low worker skills). The results also point to differences in the effects on training between labor regulations on hiring and those on firing. In our conclusion, we draw on these results to suggest ways in which the existing MENA shortfall in firm-supplied training may be reduced.

3 Method for identifying factors lying behind the lack of firm-supplied training

Labor markets and the effects of regulations on them have long been recognized as difficult to analyze. The relationships between employers and workers are subject to numerous uncertainties and complexities. Since monitoring is costly, informational asymmetries arise and, as a result, also the possibilities for adverse selection, moral hazard and market failures. Any such market failures may give rise to the use of labor regulations to reduce these inefficiencies. But, by no means does it necessarily follow that the regulations chosen will be optimal and enforced.

A natural starting point is to realize that for privately supplied training to be sustainable, it has to be profitable to both firms and their workers. In practice, these both may be buffeted in different directions by different influences, including

sudden shocks and insufficiently competitive labor markets, which can limit the time both parties will remain together and thereby mutually benefit from training.

One important insight into a successful approach was provided by Acemoglu and Pischke (1998). They pointed to Germany, where firing costs of regular workers were comparatively high (which, as we show below, they also are in MENA countries outside of the Gulf). German workers found it profitable to engage in apprenticeships with relatively low wage rates, which made firms able to pay for the training. While their jobs were not protected at entry or during training (reflecting flexibility in hiring rules), these apprentices were willing to accept the risks of not being retained because of the anticipated higher wages after the training. At the same time, firms were willing to pay for the training because the wages during training were low, and those apprentices who demonstrated poor abilities during training could easily be dismissed. A problem could arise for the firms if workers could hold up their employers for higher wages via strikes (Ahsan and Pages, 2009), but Posusney (1997) and Cammett and Posusney (2010) have shown that MENA workers have virtually never enjoyed such power.

Even more fundamental analyses of the skill-gap in MENA firms and of their labor markets are those of Bardak et al. (2006), the World Bank (2010) and Angel-Urdinola and Leon-Solano (2013, p.3) which traced these problems back to inadequacies in labor regulations and their enforcement and firm informality. Outside of the Gulf at least, de jure labor regulations in the region have generally been characterized as excessively rigid, and as a result are seldom enforced. As elsewhere, this results in the informality of most private firms, implying that most firms do not abide by existing regulations on taxation, labor, safety and other matters. But, by being informal, they are usually deficient in finance, technology and competitiveness, making training rather useless (Elbadawi and Loayza, 2008). Emigration of better educated workers to Europe and elsewhere is another contributor to the skills gap in some of the MENA countries with the best education (World Bank, 2010; Tzannatos, 2013).

The complexities that make it difficult to derive solid conclusions on the impacts of labor regulations on labor training apply not only to theoretical models but also to empirical analyses. Problems that challenge empirical investigations include: (1) the infrequency of changes of labor regulations in any particular country over time, (2) the possible simultaneity of other accompanying changes, the effects of which may be difficult to separate out, (3) the fact that almost all such regulations are national in scope, thereby ruling out the ability to learn from within-country differences, and (4) the absence of satisfactory measures of regulatory enforcement. Problems (1) and (2) are a result of the fact that changes in labor regulations typically give rise to distinct winners and losers, making them politically controversial and therefore very hard to accomplish (Campos, Hsiao, and Nugent, 2010; Campos and Nugent, 2012).

Until recently at least, data on labor regulations over time, and firm surveys linking labor regulations to the incidence of training were both rather rare in developing countries, limiting most existing studies to developed countries. An especially relevant study on OECD countries is that of Bassanini et al. (2005), which found a substantial difference in the correlations between the incidence of job training and the rigidity of regulations on hiring and those on firing across households over time in 13 European countries.

Yet, because the characteristics of firms, workers, institutional conditions and enforcement in developing countries (where markets are more segmented and regulations less well-enforced) vary considerably from those in developed countries, generalizations from the research on developed countries cannot be assumed to apply to developing countries, to either MENA or other regions.

0.1 Some empirical studies on such training in developing countries

Relevant studies on the incidence of training in developing countries include Tan and Batra (1995), Zeufack (1999), Noor and Ismail (2008), Kahyarara and Teal (2008) and Almeida and Faria (2014). As to the effects of such training, Betcherman et al. (2004) report rather traditional evaluations of the effectiveness of various types of training programs on employment outcomes subject to various kinds of selection bias and endogeneity. Card et al. (2011) report an evaluation of a program in Dominican Republic based on randomized experimental design and cite several others using that methodology. Many of the programs evaluated in this superior way, however, were for special groups, such as disadvantaged youth, and received rather mixed evaluations. Closer to the present study is Almeida and Faria (2014), which first estimates the determinants of training across both firms and their workers in both Malaysia and Thailand and then applies propensity score matching methods to show that the returns to workers of that training are positive but vary by worker and industry characteristics.

None of these studies, however, dealt with a MENA country and none related training to labor regulations in any way. One study that did touch on training in a MENA country (Tunisia) is Muller and Nordman (2011). These authors identified cases where such training did take place and showed that this was where wage rates were generally low during training but higher afterwards, thereby supporting the explanation of Acemoglu and Pischke (1998). Since workers and firms were matched in the Tunisian study for only a very few firms, however, their evidence is largely anecdotal.

While in most countries labor regulations are determined at the national level (making it difficult to measure the effects of different regulations), they are not always equally well enforced throughout the country. For the Dominican Republic, Schrank (2006) took advantage of a situation where those charged with enforcement also provided guidance to firms on the objectives of labor regulations, including training. He showed that the percentages of workers trained were higher in those parts of the country with more regulators per capita.

0.2 Strategies for relating national level labor rigidity indexes to firm level training

To analyze the effects of labor regulations on firm behavior, therefore, one needs access to detailed internationally comparable indexes of the rigidity of labor regulations, preferably disaggregated by type of regulation and accompanied by detailed firm surveys on enforcement of the regulations, firm-supplied training and other firm and institutional characteristics.

Thanks to the Enterprise Surveys undertaken by the World Bank from 2002 to present, firm level data on training and the many firm, industry and location-level characteristics have been collected with almost identical questionnaires, sampling

procedures and coding methods from a growing number of developing and transition countries.

Two rather distinct approaches have been followed in linking labor and other regulations to firm outcomes including training with this data. The first (the obstacles approach) is by way of firm-level perceptions of the relative importance of different regulations and lack of access to certain services as obstacles to doing business. The second (the enforcement approach) makes use of various proxies for enforcement of such regulations which may vary within countries (as in the small sample survey of Schrank, 2006).

Pierre and Scarpetta (2004, 2006) demonstrated the relevance of the obstacles approach by showing that the rigidity of existing de jure labor regulations was positively and rather strongly related to the perceptions reported by firms concerning the severity of labor regulations as an obstacle to their business. Kaplan (2009), Bhaumik et al. (2012) and Seker (2010) linked these measures to other types of firm performance, though not to firm-supplied training. Bhaumik and Dimova (2013) found a positive effect of both training and education on TFP among some firms in textiles in non-MENA countries but did not examine the determinants of training. One study that used the obstacles approach with six MENA countries included is Kinda et al. (2009). That study showed the effects of various "obstacles to business" on productivity but not on training.

Of particular relevance to the use of the enforcement approach is Almeida and Aterido (2008) which developed a proxy for locally varying enforcement, again based on the Enterprise Surveys. The main enforcement measures used were the numbers of visits by labor or tax inspectors. In their empirical model, they include both their enforcement measure (visits by inspectors) and in one specification also its interaction with the country-level rigidity of labor regulations. Their results show that enforcement by itself has a negative effect on the probability of formal training but that its interaction with labor law rigidity has a positive and significant effect. Two possible shortcomings, however, would seem to be (1) that no allowance is given to a direct effect of labor law rigidity on training (or the firm's perceived severity of these regulations as in the "obstacles approach) and (2) the possible endogeneity or selection bias in their enforcement measure.

These rather mixed results on the relationship between labor regulations and training from earlier studies based on Enterprise Surveys would seem to leave the door open for further analysis, and especially so given an earlier finding of very high returns to training by Almeida and Carneiro (2008). Although the countries in their sample included a couple of MENA countries, no attempt was made to compare these or to explain why, as shown in Table 1, training is on average much lower in MENA countries than in other developing countries.

The enforcement approach in Almeida and Carneiro (2008) was motivated by a study for Brazil initiated earlier (Almeida and Carneiro, 2009), which was facilitated by rich administrative information on the allocation of inspectors by municipality. Their focus on Brazil and on enforcement was motivated in part by that country's combination (akin to MENA) of very rigid labor (and other) regulations but overall very limited (but varying) enforcement and, as a result, a very large informal sector. The Brazilian study showed that greater enforcement led to lesser reliance on informal workers within a

given firm but also to lower levels of productivity, especially when suitable instruments for enforcement and a 2SLS estimating procedure were used. That study, however, did not deal with training.

4 The model, data and its estimation

As stated above, in this study we take advantage of the same Enterprise Surveys used by a few studies reviewed above, though thus far hardly at all for MENA countries, where (as noted above) firm-supplied training seems most needed but least available. The Enterprise Surveys provide comparable data for a large number of developing countries, not only on the characteristics of all firms included in each different country and year sample, but also on whether or not they provide training to their workers, the perceived seriousness of the various possible labor regulations and other obstacles to their business and three different enforcement proxies. These are: the number of visits by inspectors (the proxy used by Almeida and Carneiro (2008)) specifically for Brazil, the time spent by management on regulations, and (our preferred measure) a dummy variable representing consensus by firms in the same location and industry as the firm that competition from informal firms is either no obstacle or only a minor obstacle. The surveys employed in this study all utilize a common questionnaire, identical measures and coding systems and very similar sampling schemes. The surveyed firms are largely private and formal in the sense of following some regulations, though not necessarily labor regulations.

An important point of departure taken in this paper from some earlier applications of both the obstacles and enforcement approaches is to use not the firm's own subjective evaluations of the various obstacles or enforcement proxies which could be subject to selection bias, but rather the average evaluations of all firms in the same industry, location, and country as the firm under consideration but excluding the firm's own evaluation.

Given that firm-supplied training ($Training_{ijc}$) is measured by whether or not firm i in industry j and country c has offered training in the period under study, and assuming that a profit-maximizing firm will choose to offer training to its workforce only if doing so is expected to raise its profits (π_{ijc}), that firm will offer training only if:

$$Training_{ijc} = \begin{cases} 1 \; if \; \pi_{ijc} > 0 \\ 0 \; otherwise, \end{cases} \tag{1}$$

where π_{ij} should be regarded as accruing jointly to both employers and workers and is assumed to be a linear function of a number of observable firm, industry, and country characteristics including labor regulations and their enforcement:

$$\pi_{ijc} = \beta_1 X_{cj} + \beta_2 Y_{ijc} + \beta_3 \left(X_{cj} * Y_{ijc}\right) + \beta_4 Z_{ijc} + \mu_c + \mu_j + \varepsilon_{ijc}, \tag{2}$$

where X_{cj} is a measure of the rigidity of labor regulations at the level of the neighborhood or industry of firm j, Y_{ijc} is a vector of enforcement measures of labor regulations (again measured as an average of other firms in the same neighborhood), $(X_{cj} * Y_{ijc})$ captures relevant interactions between the two sets of variables, and Z_{ijc} represents the various relevant firm-level characteristics. The parameters μ_j and μ_c represent time-invariant unobserved characteristics of industry and country, respectively,

and ε_{ijc} captures unobserved firm characteristics that may be correlated with training incidence. The probability that firm i offers training is now:

$$\Pr\left(Training_{ijc}=1\right)=\Pr\left(\varepsilon_{ijc}>-\beta_1 X_{cj}-\beta_2 Y_{ijc}-\beta_3\left(X_{cj}*Y_{ijc}\right)-\beta_4 Z_{ijc}-\mu_c-\mu_j\right) \quad (3)$$

If the residuals, ε_{ijc}, are normally distributed, equation (3) can be estimated by maximum likelihood (probit).

Unfortunately, Enterprise Surveys are not yet available for all countries in the MENA region. Those used in this study are those for Algeria 2007, Egypt 2004, 2007 and 2008, Iraq 2011, Lebanon 2006 and 2009, Morocco 2004, Oman 2003, Syria 2003 and 2009, and Yemen 2010.[3]

Descriptive statistics on all variables used in the analysis for the samples of firms in MENA countries are presented in Table 2 (and for use in subsequent comparison with Non-MENA countries also for the Non-MENA sample). The definitions of all these variables are given in Table 3. As indicated in Table 2, about 15% of the sample MENA firms provided training to their workers in the year preceding the survey, compared to 24% in the Non-MENA sample. Actually, this comparison is more favorable to MENA than was depicted in column (5) of Table 1. This is because the two MENA countries with the highest probabilities of training, namely Lebanon and Syria, are heavily weighted in the current MENA sample (with two surveys each), while those countries with low training rates, such as Jordan and the West Bank and Gaza, are excluded (because of missing data on key variables in their respective surveys).

Note from the last column that the means of these variables are almost invariably significantly different from those in the Non-MENA sample. As in earlier studies with the Enterprise Surveys, in general, the labor obstacle is not ranked as very serious, but this varies quite significantly both within and between countries. Yet, the average for firms in the MENA region (1.30) is considerably higher than that for Non-MENA firms (1.09). Notice also that there is remarkably wide variation across MENA countries (reflected by much larger ratios of standard deviations to the means) than in the Non-MENA sample for each of the three labor rigidity indexes. These are: an overall index (IndexO, an index on hiring rules alone (IndexH) and one on firing rules (IndexF)), each taken from the Doing Business Database. While the averages of IndexO are similar (just under 30) in MENA and Non-MENA, those for the two major components, IndexH and IndexF, are very different (MENA's average being much lower for IndexH but much higher for IndexF). MENA firms face lower tax rates, are older and larger, more likely to be solely owned or a partnership, less likely to have experienced sales growth of over 50% in the last couple of years, to own a quality certificate, a website and to do business through email than Non-MENA firms. While there is little difference between MENA and Non-MENA samples for one of our enforcement proxies (the mean number of visits by tax officials), for the other two enforcement measures (the time of the top manager(s) spent on regulations (Management Time) and the percent of firms indicating that competition from informal firms is not even a moderate obstacle to the firm's business (Obstacle Informal Low), the means are considerably lower among MENA firms than among Non-MENA firms. These differences reflect lower levels of enforcement in MENA. In addition, offering gifts to officers is more frequent in MENA, implying that, even when there is some enforcement, such "gifts" offer a way around the regulations.

Table 2 Descriptive statistics for MENA and Non-MENA countries

Variable	Obs.	Mean	SD	Obs.	Mean	SD	Min	Max	Difference
		MENA		Non-MENA					
Year	3778	2008.4	1.55	41854	2008.2	2.06	2006	2012	−0.2***
GDP per capita	3778	4791.8	1424.3	37043	7351.03	4829.9	284.2	23167.8	2559.2***
Total tax rate	3778	47.4	14.03	41854	54.55	37.42	16.5	287.1	7.2***
Rule of Law	3778	4.3	1.8	40871	4.92	1.08	1	8.39	0.63***
IndexH	3778	17.2	20.1	41854	44.23	26.07	0	100	27.04***
IndexF	3778	46.2	16.4	41854	29.46	23.64	0	70	−16.70***
IndexO	3778	28.9	5.16	41854	29.97	14.95	4	66	1.07***
Education spending	3778	4.9	2.11	41697	4.07	1.41	1.1	10.7	−0.82***
Capital city	3778	0.26	0.44	41854	0.38	0.49	0	1	0.12***
Textiles	3778	0.09	0.29	41524	0.05	0.22	0	1	−0.04***
Garments	3778	0.10	0.30	41854	0.09	0.28	0	1	−0.02***
Textiles and garments	3778	0.196	0.397	41854	0.14	0.35	0	1	−0.06***
Food	3778	0.096	0.29	41854	0.13	0.34	0	1	0.03***
Other manufacture	3778	0.54	0.50	41854	0.35	0.48	0	1	−0.19***
Multi-plant	3778	0.20	0.40	41854	0.15	0.39	0	1	−0.05***
Sole owner	3778	0.43	0.50	41854	0.27	0.45	0	1	−0.16***
Partner	3778	0.14	0.35	41854	0.06	0.24	0	1	−0.08***
Percent private	3774	93.80	23.16	41144	90.11	28.14	0	100	−3.7***
Percent foreign	3778	1.88	12.05	41854	8.88	26.82	0	100	6.9***
Percent government	3778	2.39	14.41	41854	0.31	4.65	0	100	−2.08***
Age	3778	19.82	16.35	41854	19.69	18.61	0	340	−0.13

Table 2 Descriptive statistics for MENA and Non-MENA countries *(Continued)*

Quality certificate	3778	0.16	0.36	41854	0.20	0.40	0	1	0.05***
Sales export	3778	7.50	20.81	41854	8.42	22.74	0	100	0.9*
Website	3778	0.30	0.46	41854	0.43	0.50	0	1	0.1***
Email	3778	0.42	0.49	41854	0.72	0.45	0	1	0.3***
Gift officer	3778	1.88	6.67	41854	0.98	4.19	0	100	−0.9***
Manager experience	3778	14.96	11.18	41854	17.76	11.74	0	75	2.8***
Crime	3778	0.98	7.98	41854	0.58	3.28	0	100	−0.40***
Management time	3778	9.49	18.22	41854	11.96	17.95	0	100	2.5***
Inspections tax	3019	3.89	7.12	24192	3.58	5.56	0	100	−0.31**
Total tax ratex mean log (Inspect. tax)	3778	63.95	25.08	41854	68.27	62.96	0	924.14	4.3***
Size	3778	193.04	802.97	41854	111.58	517.48	0	27802	−81.5***
Average labor change	3568	15.17	58.77	38503	45.37	175.94	−96.0	11064.3	30.2***
Female owner	3778	0.18	0.38	41854	0.32	0.47	0	1	0.15***
Relative labor productivity	3711	2.05	20.70	41816	1.01	6.77	0	803.0	−1.04***
Finance WC internal	3778	83.57	28.91	41854	65.43	36.29	0	100	−18.1***
Water out	3778	0.77	0.42	41854	0.92	0.28	0	1	0.15***
Power out	3778	0.739	0.44	41854	0.59	0.49	0	1	−0.15***
Sales Growth > 50	3778	0.048	0.21	41854	0.24	0.43	0	1	0.19***
Sales growth < −20	3778	0.24	0.43	41854	0.09	0.29	0	1	−0.15***
Training	3778	0.15	0.36	41854	0.24	0.42	0	1	0.08***
Obstacle labor	3732	1.30	1.4	41693	1.09	1.22	0	4	−0.21***
Obstacle education	3778	1.79	1.6	41854	1.43	1.32	0	4	−0.36***
Obstacle informal	3606	2.35	1.57	40540	1.68	1.42	0	5	−0.68***

Table 2 Descriptive statistics for MENA and Non-MENA countries *(Continued)*

Obstacle informal low	3778	0.31	0.46	41854	0.46	0.50	0	1	0.16***
Obstacle education2	3778	0.38	0.49	41854	0.25	0.43	0	1	−0.14***
Obstacle Labor2	3732	0.23	0.42	41693	0.15	0.36	0	1	−0.081***

Source: Author's calculations based on the Enterprise Surveys (World Bank). The enforcement measure Obstacle Informal Low was generated using firm's response to the question about perceived severity of anti-competitive or informal practices coded as Obstacle Informal. Obstacle Informal Low is, therefore, a dummy variable equal to one if Obstacle Informal is either 0 or 1 on a four-point scale from 0 to 4 (i.e., no or minor obstacle), and zero otherwise. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 Definition of variables

Variable	Definition
GDP per capita	GDP per capita, PPP (constant 2005 international $)
IndexH	Index of labor law rigidity to hiring
IndexF	Index of labor law rigidity to firing
IndexO	Overall index of labor law rigidity
Total tax rate	Total tax rates (Doing Business Database)
Rule of law	Index for the quality of Legal System and Property Rights (Economic Freedom of the World)
Education spending	Public expenditure on education as a percentage of GDP
Capital city (Dummy)	Location in capital city
Industry (Dummy)	Type of industry
Textiles (Dummy)	Textile industry
Garments (Dummy)	Garment industry
Textiles and Garments (Dummy)	Textile and/or garment industry
Food (Dummy)	Food industry
Other manufacture (Dummy)	Other manufacturing industry
Multi-Plant (Dummy)	Multi-plant firm
Sole owner (Dummy)	Sole proprietorship
Partner (Dummy)	Partnership
Percent private	Percentage of the firm owned by private domestic individuals, companies or organizations
Percent foreign	Percentage of the firm owned by private foreign individuals, companies or organizations
Percent government	Percentage of the firm owned by government/state
Age	Number of years since the establishment began operations in the country
Quality certificate (Dummy)	Possession of internationally-recognized quality certification
Sales export	Percentage of total sales exported
Email (Dummy)	Firm uses email in communications with clients or suppliers
Gift officer	Percent of annual sales paid as a gift or an informal payment
Manager experience	Manager's experience in sector
Crime	Losses due to theft, robbery, vandalism or arson
Management time	Percentage of senior management's time spent in dealing with regulations
Inspections tax	Number of times inspected by or met with tax officials
Size	Total number of full-time permanent and seasonal/temporary workers
Average labor change	Average annual percentage change in the total number of full-time employees
Female owner (Dummy)	Female owner
Relative labor productivity	Sales per worker relative to the country and industry average
Finance working capital internal	Percent of working capital financed using internal funds or retained earnings
Water out (Dummy)	Incidence of water outages
Power out (Dummy)	Incidence of power outages
Sales growth > 50 (Dummy)	Sales growth rate greater than fifty percent
Sales growth < −20 (Dummy)	Sales growth rate less than negative twenty percent
Training (Dummy)	Incidence of training
Obstacles:	Severity of the obstacle: No Obstacle (0), Minor Obstacle (1), Moderate obstacle (2), Major Obstacle (3), or Very Severe Obstacle (4)

Table 3 Definition of variables *(Continued)*

Obstacle labor	Labor regulations
Obstacle education	Inadequately educated workforce
Obstacle informal	Practices of competitors in the informal sector
Obstacle education2 (Dummy)	Skills and education of available workers
Obstacle labor2 (Dummy)	Labor regulations

5 Empirical results and their robustness

After testing for the influence of outliers, variables with many missing observations and multicollinearity, we arrived at the relatively full specification that yielded results presented in column (1) of Table 4. While the variables included in the benchmark specification allow us to control for many firm characteristics, to deal with the dearth of industry and country controls, we control for unobservable factors at the industry and country levels by including fixed effects for industry and country.

Each separate column of Table 4 provides a set of estimates of the marginal effects derived from the estimates from probit equation (3) with the unchanging set of explanatory variables listed in the lower portion of the table but with one-at-a-time changes in the term interacted with Mean Obstacle Labor in the top portion of the table. Column (2) presents the corresponding result when our preferred enforcement measure Obstacle Informal Low is added. Our use of interaction terms in columns (3)-(5) is prompted by the aforementioned studies of Almeida and Carneiro (2008), and the many other studies cited above suggesting that labor regulations may have very different effects on firm performance depending on their enforcement.

Obstacle Informal Low is our preferred measure of enforcement for the MENA region because it more completely captures the essence of enforcement for firms in a particular location and industry.[4] To be included in the survey, each firm is at least somewhat formal, implying that it may face competition from firms which do not adhere to the labor and other regulations and thus would be free of any cost-increasing effects of complying with these regulations. If enforcement were weak, there could be many such low cost informal firms constituting an important obstacle to the formal firm's business. For this reason we deem responses indicating that competition from informal firms is a serious obstacle to the firm's business to be a solid indication of weak enforcement of regulations in the MENA region, and the absence of such complaints (Obstacle Informal Low) one of strong enforcement. As with Mean Obstacle Labor, eliminating the assessment of the individual firm itself from its construction serves to limit self-selection bias.

In the top row of the table are the estimates of the direct effects of our key micro-level (neighborhood) measure of the seriousness of labor regulations as an obstacle to the firm's business operations (Mean Obstacle Labor) obtained from the different specifications. In the rows immediately below this one are the estimated coefficients of the enforcement and alternative interaction terms. These estimates are all important to this study as they reflect how the effects of existing labor regulations, as perceived by firms in the immediate (industry and location) neighborhood of the firm, vary with the level of the variable with which it is interacted (Obstacle Informal Low, Textiles or Finance Working Capital Internal).

Table 4 Determinants of training incidence (MENA and Non-MENA samples – marginal effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			MENA				Non-MENA	
Mean obstacle labor	−0.00453	−0.00554	−0.0272**	−0.0102	−0.0838***	0.0116	0.00873	0.00179
	(0.0138)	(0.0137)	(0.0113)	(0.0145)	(0.0109)	(0.00995)	(0.0101)	(0.0108)
Obstacle informal low			0.0512***					
x Mean obstacle labor			(0.00780)					
Textiles				0.0535**			0.0234***	
x Mean obstacle labor				(0.0250)			(0.00873)	
Finance working capital internal					0.000986***			0.000161***
x Mean Obstacle labor					(0.000251)			(4.95e-05)
Obstacle informal low		0.0302***	−0.0345**					
		(0.00647)	(0.0144)					
Mean management time	0.00428	0.00423	0.00413	0.00436	0.00433	−0.000371	−0.000324	−0.000366
	(0.00317)	(0.00324)	(0.00321)	(0.00312)	(0.00316)	(0.000511)	(0.000514)	(0.000511)
Mean log (Inspections tax)	0.0894	0.0908	0.0818	0.114	0.0837	0.0398	0.0549**	0.0393
	(0.129)	(0.131)	(0.129)	(0.123)	(0.130)	(0.0260)	(0.0274)	(0.0260)
Total tax rate	−0.00105	−0.00110	−0.000846	−0.00147	−0.000959	−0.000484	−0.00078**	−0.000476
x Mean log (Inspections tax)	(0.00219)	(0.00224)	(0.00221)	(0.00209)	(0.00219)	(0.000361)	(0.000374)	(0.000359)
Sales growth > 50	0.0327*	0.0361*	0.0381**	0.0332*	0.0353*	0.0138**	0.0144**	0.0137**
	(0.0188)	(0.0189)	(0.0179)	(0.0190)	(0.0186)	(0.00604)	(0.00604)	(0.00603)
Sales Growth < −20	0.0333**	0.0271	0.0283	0.0332**	0.0327*	−0.0125*	−0.0129*	−0.0125*
	(0.0166)	(0.0173)	(0.0177)	(0.0164)	(0.0167)	(0.00670)	(0.00680)	(0.00668)
Finance working capital internal	−0.00039***	−0.00040***	−0.00040***	−0.00039***	−0.0016***	−0.00012**	−0.00011*	−0.00033***
	(0.000117)	(0.000125)	(0.000120)	(0.000117)	(0.000301)	(5.82e-05)	(5.84e-05)	(0.000108)
Water out	−0.0456*	−0.0425	−0.0439*	−0.0461*	−0.0442*	−0.0336***	−0.0340***	−0.0338***

Table 4 Determinants of training incidence (MENA and Non-MENA samples – marginal effects) *(Continued)*

	(0.0242)	(0.0264)	(0.0260)	(0.0241)	(0.0239)	(0.0126)	(0.0126)	(0.0126)
Power out	0.0101	0.00953	0.0101	0.0105	0.0114	0.0305***	0.0307***	0.0304***
	(0.0375)	(0.0397)	(0.0393)	(0.0376)	(0.0370)	(0.00749)	(0.00759)	(0.00748)
Log (Size)	0.0336***	0.0334***	0.0331***	0.0332***	0.0340***	0.0413***	0.0418***	0.0413***
	(0.0100)	(0.0107)	(0.0108)	(0.00988)	(0.00999)	(0.00263)	(0.00263)	(0.00262)
Capital city	0.0224**	0.0285***	0.0291***	0.0242**	0.0200*	−0.00456	−0.00437	−0.00435
	(0.0114)	(0.0109)	(0.0103)	(0.0110)	(0.0104)	(0.00815)	(0.00806)	(0.00817)
Multi-plant	0.0651***	0.0676***	0.0669***	0.0647***	0.0653***	0.0165**	0.0167**	0.0164**
	(0.0123)	(0.0130)	(0.0130)	(0.0121)	(0.0121)	(0.00731)	(0.00737)	(0.00729)
Percent foreign	0.000962***	0.000867***	0.000864***	0.000970***	0.000972***	9.01e-05	8.03e-05	8.92e-05
	(0.000188)	(0.000156)	(0.000162)	(0.000192)	(0.000188)	(7.29e-05)	(7.37e-05)	(7.32e-05)
Percent government	−0.000271	−0.000251	−0.000234	−0.000277	−0.000296	0.000436	0.000444	0.000423
	(0.000473)	(0.000484)	(0.000483)	(0.000475)	(0.000449)	(0.000301)	(0.000302)	(0.000303)
Quality certificate	0.0871***	0.0810***	0.0813***	0.0867***	0.0880***	0.0753***	0.0763***	0.0754***
	(0.00895)	(0.00844)	(0.00888)	(0.00897)	(0.00862)	(0.00699)	(0.00710)	(0.00698)
Crime	−0.00120**	−0.00122**	−0.00123**	−0.00120**	−0.00131**	0.000159	0.000180	0.000137
	(0.000556)	(0.000579)	(0.000566)	(0.000548)	(0.000578)	(0.000733)	(0.000742)	(0.000735)
Sole Owner	−0.0112	−0.0100	−0.00860	−0.0130	−0.0108	−0.0177***	−0.0168**	−0.0175***
	(0.0202)	(0.0211)	(0.0210)	(0.0196)	(0.0196)	(0.00671)	(0.00675)	(0.00668)
Partner	−0.00132	0.00159	0.00331	−0.00354	−0.000173	−0.0258**	−0.0271**	−0.0257**
	(0.0210)	(0.0218)	(0.0216)	(0.0195)	(0.0208)	(0.0129)	(0.0131)	(0.0129)
Log (Age)	−0.0281***	−0.0286***	−0.0274***	−0.0288***	−0.0270***	0.00183	0.00156	0.00185
	(0.00563)	(0.00544)	(0.00531)	(0.00557)	(0.00521)	(0.00349)	(0.00351)	(0.00346)
Email	0.0370**	0.0374**	0.0378**	0.0371**	0.0376**	0.0565***	0.0562***	0.0560***
	(0.0161)	(0.0165)	(0.0159)	(0.0157)	(0.0156)	(0.00797)	(0.00807)	(0.00801)

Table 4 Determinants of training incidence (MENA and Non-MENA samples – marginal effects) *(Continued)*

Website	0.0332*	0.0342	0.0347	0.0332	0.0327	0.0327***	0.0327***	0.0328***
	(0.0202)	(0.0217)	(0.0217)	(0.0205)	(0.0204)	(0.00690)	(0.00696)	(0.00691)
Log (Manager Experience)	0.0277***	0.0282***	0.0278***	0.0278***	0.0277***	0.0123**	0.0121**	0.0122**
	(0.00928)	(0.00946)	(0.00970)	(0.00939)	(0.00944)	(0.00484)	(0.00487)	(0.00483)
Log (Sales Export)	0.00133	0.00126	0.00101	0.00108	0.00121	0.0131***	0.0129***	0.0131***
	(0.00447)	(0.00477)	(0.00467)	(0.00439)	(0.00438)	(0.00222)	(0.00218)	(0.00221)
Female Owner	0.00477	0.00427	0.00409	0.00354	0.00546	0.0131**	0.0131**	0.0129**
	(0.0268)	(0.0276)	(0.0273)	(0.0263)	(0.0269)	(0.00542)	(0.00543)	(0.00543)
Gift Officer	0.00311	0.00313	0.00308	0.00313	0.00311	0.000767*	0.000804*	0.000747*
	(0.00228)	(0.00238)	(0.00232)	(0.00227)	(0.00230)	(0.000438)	(0.000446)	(0.000441)
Obstacle Education2	0.0180	0.0211	0.0213	0.0174	0.0171	0.0283***	0.0283***	0.0282***
	(0.0243)	(0.0257)	(0.0254)	(0.0235)	(0.0240)	(0.00361)	(0.00364)	(0.00359)
Log (Education Spending)	1.221*	1.177	1.251*	1.231*	1.254*	−0.187***	−0.193***	−0.186***
	(0.705)	(0.734)	(0.711)	(0.715)	(0.673)	(0.0409)	(0.0420)	(0.0409)
Country & industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.206	0.210	0.211	0.207	0.208	0.342	0.342	0.342
Observations	3,325	3,270	3,270	3,325	3,325	40,590	40,260	40,590

Note: Dependent variable is a dummy variable that assumes the value 1 if the firm offers formal on-the-job training to its employees. Robust standard errors are given in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

The coefficients in the top row show the direct effect on training of Mean Obstacle Labor for the MENA sample to be negative but not always statistically significant, consistent with the widely reported low level of enforcement. In columns (3) and (5) in which interaction terms were added, these coefficients take on somewhat larger negative values and are statistically significant. In column (2), which includes our preferred measure of enforcement, Mean Obstacle Informal Low, the marginal effect exercised by that enforcement measure 0.0302, is sufficiently large as to more than offset the negative effect of even a large value of the Mean Obstacle Labor (of say 3) multiplied by its coefficient of −0.005 so that the combination of the two would be positive (and about 1.5 %). In column (3), where the interaction between these two measures is also included, the effect of enforcement by itself becomes negative and significant, as is also the effect of Mean Obstacle Labor. Yet, both of these negative effects would be more than offset by the positive interaction effect (0.0512) for reasonably high values of Mean Obstacle Labor. The column (3) result, therefore, supports our main hypothesis for MENA firms that, when the regulations are well-enforced, firms perceiving the labor regulations to be at least moderately serious obstacles to business are actually more likely to provide training to their workers than firms which do not view the regulations to be a serious obstacle.

Clearly, from the positive and significant interaction terms in columns (4) and (5), firms in textiles and those lacking access to external finance have positive interaction effects that offset the direct negative effects of the perceived seriousness of the labor regulations on training. In the former case, we attribute this to the labor intensity and competitiveness of textiles and in the latter case to the fact that they are complements to one another in their influence on training.

Turn next to the results in columns (6)-(8), which are those based on firms from the Non-MENA sample corresponding to the specifications for MENA firms in columns (1), (4) and (5). As can easily be seen, there are substantial differences from the corresponding results in the MENA sample. Indeed, for the Non-MENA sample, none of the direct effects of Mean Obstacle Labor are negative and statistically significant. Yet, the effects of the interactions involving textiles and lack of access to external finance in columns (7) and (8) are positive and significant (just as they were in columns (4) and (5) for MENA firms), presumably for similar reasons.

Next, we turn to the simpler direct effects of the other enforcement proxies, Mean Management Time and Mean Log (Inspections Tax), in the next two rows of Table 4. For the MENA sample in columns (1)-(5), the estimated marginal effects of these variables are all positive but not statistically significant, in contrast to those with our preferred enforcement proxy, Obstacle Informal Low. For the Non-MENA sample, where the Obstacle Informal Low measure of enforcement is not available, neither the direct effect of labor regulations (Mean Obstacle Labor) nor that of the Mean Management Time measure of enforcement exerts a statistically significant effect, but in column (7) the effect of the third enforcement proxy (Mean Log Inspection Tax) becomes positive and significant.

From the next row in the table, it can be seen that, for the MENA sample, the interaction term between Mean Log (Inspections Tax) and the Total Tax Rate does have the significant negative effect on Training that one might expect. That effect is negative and significant, however, in column (8) for the non-MENA sample.

Note that the effects of positive shocks in the form of recent sales increases of 50% or more are positive and significant in each column, though larger in the MENA sample than in the Non-MENA sample. Among the presumably negative external shocks, only the effect of Water Out is negative in both regions, more significantly so in the Non-MENA sample. Counterintuitively, the negative sales growth shock has a positive and sometimes significant effect in the MENA sample. Notably, Power Out has a positive and significant effect in the Non-MENA region. As expected, the apparent lack of access to external finance for working capital (measured by Finance Working Capital Internal) has a highly significant negative effect on the probability of training in both samples, but is somewhat larger in absolute terms in the MENA sample. As expected, because of economies of scale and scope in training, in both samples, firms which are larger or have more than one plant are more likely to train than others.

Another interesting difference is that the effect of location in the Capital City is positive and significant in MENA but not in Non-MENA. Once again, this could be attributed to enforcement since in most countries enforcement of regulations tends to be stricter in capital cities than elsewhere. Several other significant differences in the estimated effects on training between the two samples are for: (1) foreign ownership (having a positive effect in MENA but not elsewhere), (2) Crime (having a negative effect in MENA but not elsewhere), (3) Age (having a significant negative effect on training in MENA but not elsewhere), (4) share of exports in total sales, female ownership, and lack of skills of the labor force as a serious obstacle to business (Obstacle Education2) all having positive and statistically significant effects on training in Non-MENA firms but not MENA firms, and (5) the share of educational spending in GDP, the effect being positive and significant in the results for the MENA sample but negative and significant in the Non-MENA sample. This latter difference could be interpreted as implying that educational quality is lower in MENA than Non-MENA (reflected in the higher mean for this variable in Table 2 for MENA), thereby suggesting that further increases in educational quality and quantity would do more to increase the incidence of training in MENA than elsewhere.

The results presented in Table 4, therefore, amply demonstrate (1) the complementarity between enforcement (proxied by Obstacle Informal Low) and the rigidity of labor regulations (measured by Mean Obstacle Labor) in the MENA sample, and (2) the many important differences in effects on training between the MENA and Non-MENA samples. The table did not, however, show the effects of interactions between Mean Obstacle Labor and the other enforcement proxies or of any differences in the rigidities of different types of labor regulations (which could be quite relevant given the large differences in the means of the rigidities in hiring and firing between MENA and Non-MENA) shown in Table 2.

To that end, in Table 5 we narrow our focus to the MENA sample alone but examine the effects of different enforcement proxies, on the one hand, and of the different labor regulation rigidity indexes (hiring (IndexH) and firing (IndexF)) on the other. In each of the six different columns of Table 5, we include a slightly different interaction term in the top rows of the table but the same set of additional controls as in Table 4. Yet, since the effects of the latter controls differed only slightly across the columns in Table 4 and are almost identical to those obtained from the specifications for MENA firms in Table 5, in the interest of space these are not presented in Table 5.

Table 5 Determinants of training incidence (marginal effects)

	(1)	(2)	(3)	(4)	(5)	(6)
Mean Obstacle Labor			0.00357	0.00496	−0.00334	−0.00363
			(0.0168)	(0.0156)	(0.0204)	(0.0204)
IndexH	−0.000575					
x Mean Obstacle Labor	(0.000518)					
IndexH	−0.000298					
x Mean Obstacle Labor	(0.000300)					
x Obstacle Informal Low						
IndexF		−0.000267				
x Mean Obstacle Labor		(0.000241)				
IndexF		0.000639**				
x Mean Obstacle Labor		(0.000289)				
x Obstacle Informal Low						
IndexH			−0.00028***			
x Mean Management Time			(2.58e-05)			
IndexF				0.000438***		
x Mean Management Time				(0.000121)		
IndexH					0.000296	
x Log (Inspections Tax)					(0.000504)	
IndexF						0.000212***
x Log (Inspections Tax)						(2.59e-05)
Obstacle Informal Low	0.0335***	−0.0119				
	(0.00476)	(0.0269)				
Mean Management Time	0.00431	0.00414	0.0113***	−0.0153**	0.00495	0.00491
	(0.00317)	(0.00315)	(0.00127)	(0.00632)	(0.00358)	(0.00355)
Mean Log (Inspections Tax)	0.0669	0.0907	0.104	0.136	−0.0117	−0.0220
	(0.110)	(0.126)	(0.120)	(0.115)	(0.116)	(0.117)
Total Tax Rate	−0.000564	−0.00105	−0.00108	−0.00171	0.00127	0.00144
x Mean Log (Inspections Tax)	(0.00183)	(0.00211)	(0.00192)	(0.00184)	(0.00193)	(0.00192)
Country & Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.209	0.209	0.221	0.219	0.201	0.202
Observations	3,325	3,325	3,325	3,325	2,770	2,770

Note: Dependent variable is a dummy variable that assumes the value 1 if the firm offers formal on-the-job training to its employees. Robust standard errors are given in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

In columns (1) and (2) we make use of the same enforcement proxy Obstacle Informal Low (which was used in column (2) of Table 4) but in this case, weighting both Mean Obstacle Labor and its interaction with Obstacle Informal Low, first with either IndexH in column (1) or IndexF in column (2). While weighting both terms by IndexH renders the effects of both terms statistically insignificant in column (1), weighting with IndexF makes the effect of the direct term negative but insignificant but that of the interaction term positive and significant as it was in Table 4. Once again, this result underscores the complementarity between the rigidity of the labor regulations (in this case limited only to firing) and our preferred enforcement proxy in the MENA sample in their effects on Training.

To facilitate comparability with Table 4 in which in every column we included Mean Obstacle Labor by itself, in the remaining columns of the table we include Mean Obstacle Labor by itself but apply the IndexH or IndexF weights to each of the two other enforcement proxies. The results of column (3) show that, when the IndexH weight is applied to Mean Management Time, its effect on Training is negative and significant and that of the un-weighted term Mean Management Time by itself is positive and significant. This implies that at low levels of IndexH, the direct effect of Mean Management Time will dominate over the interaction term so that the overall effect of enforcement on training will be positive, whereas when IndexH is 50 or more, the overall effect will be negative. On the other hand, when IndexF is used in the interaction terms as in column (4), the opposite occurs: the direct effect of Mean Management Time is negative, but the interaction term is positive and significant such that at values of IndexF above 35, the overall net effect on training would be positive, but below that it would be negative.

Finally, in the last two columns of the table we present estimates similar to those in columns (3) and (4) but with the third enforcement proxy, Mean Log (Inspections Tax). Once again, the direct effects of this enforcement proxy are positive but not significant but, while its interaction with IndexH has no significant effect on training, the one with IndexF has once again a positive and significant effect. Hence, from the three sets of columns in Table 5, it should be clear that, when enforcement is directed to firms facing highly rigid regulations on firing, the effect on training is likely to be considerably more positive than when it is directed to firms facing more rigid regulations on hiring. Although not shown here, the results for the control variables (available on request) are almost identical to those for the MENA sample in Table 4. Hence, all the aforementioned results for these variables from Table 4 hold also for Table 5.

Various measures and procedures in the analysis could have been done differently, and many of these alternative estimates have been obtained for robustness purposes but usually only for the standard specification. One alternative procedure which was applied to all the results is estimation by a linear probability model instead of Probit. These alternative estimates of Tables 4 and 5 are available as Tables A1 and A2 in Section A of an Additional file 1, showing that, with a few minor exceptions, the results are quite robust.[5]

One might also like to know how different the results of Table 4 for MENA would be if a more quantitative measure of training, for example the percentage of skilled workers trained, were used in place of the Training dummy used in Tables 4 and 5. To this end, we present in Table A3 of Section B of the Additional file 1 OLS and censored regression model (Tobit) estimates from a much smaller sample of MENA firms for whom answers to the more quantitative training measure were available. For robustness purposes, in the third column of this same table A3, we also present results obtained from a generalized linear model (GLM) in which the dependent variable is a fraction ranging between zero and one. The three models produce very similar results, though with Tobit estimates providing the best fit.

Although some of the coefficients obtained using this alternative measure of Training are much larger in magnitude, a majority of the results are qualitatively almost identical to those obtained from using the Training dummy. There is a strong negative and statistically significant effect of Mean Obstacle Labor on the percentage of skilled

workers trained. Yet, the positive and significant coefficient of the interaction between Mean Obstacle Labor and our preferred measure of enforcement, Mean Obstacle Informal Low, is not large enough to more than offset the negative effect of Mean Obstacle Labor at least when we use the censored regression model which yields the most significant results. Although not discussed here, the results for the control variables are also almost identical to those for the Training dummy used in Tables 4 and 5.

A few exceptions in which there are some significant differences in these estimated effects on training between these two measures are for: (1) foreign ownership (having a positive effect under Training dummy but not when percentage of skilled workers trained is used), (2) a significant negative impact of Mean Management Time on training when the dependent variable is a fraction of skilled workers trained, (3) positive effect of finance working capital internal on the percentage of skilled workers trained but negative on the probability of training, (4) effects for the MENA region of ownership variables, such as Sole, Partner, and Female Owner, that are statistically significant only when we use the quantitative measure of Training, and (5) a significant negative impact of percentage of sales exported on training when the dependent variable is a fraction of skilled workers trained.

In short, the use of percentage of skilled workers trained as an alternative measure of training validates our main results derived from our proposed dummy variable Training. This is especially true because of a strong positive correlation between these two measures across MENA countries as a group as well as for many individual MENA countries (available on request).

Finally, since our measure of the Rigidity of Labor Regulations is based on the reported perceptions of these as an obstacle to business by the individual firms, readers might well be suspicious about the ability of such perceptions to reflect realities in the field. Therefore, in Table A4 in Section C of our Additional file 1, we present results obtained by relating the perceived values of Obstacle Labor back on the objectively measured Rigidity Indexes of Labor Regulations (Indexo, Indexf and Indexf), the enforcement measures and other controls including Average Obstacle, the average of some ten or more obstacles identified in the Enterprise Surveys, designed to capture the idiosyncrasies of individual managers to rate all obstacles as serious and thereby the influence of personality biases. As can be seen, the objective labor rigidity indexes, the enforcement measures and interactions thereof are all statistically significant, thereby serving to increase confidence in the relevance of the measures we have used.

6 Conclusions

Let us return to the primary objective of this study, namely to identify possible reasons why MENA firms are less likely to offer training to their workers than firms in other developing countries despite the fact that MENA firms rate their workers' lack of skills a more serious obstacle to their businesses than firms in other developing countries. By identifying these factors, we hope to present policy makers with some policy options that would encourage private firms to offer training (without subsidies or government participation).

The factors we identify are obtained in three different exercises: (1) comparing the means of the different firm and other characteristics between the MENA and Non-MENA samples in Table 2, (2) identifying differences in the estimated effects of the rigidity of labor regulations, their enforcement and other firm and industry characteristics between the MENA and Non-MENA samples of Table 4, and (3) by comparing the results in Tables 4 and 5 of different specifications of the interactions between different types of labor regulations and enforcement mechanisms within the MENA sample itself.

With respect to the enforcement measures in the first exercise, while we found little difference in Table 2 between the MENA and Non-MENA means for the number of visits by tax inspectors (which in any case is not directly related to labor inspectors), the means of Management Time spent on regulations and Obstacle Informal Low are both significantly lower for MENA than for Non-MENA firms.[6] That the mean for Gift Officer is also higher in MENA than Non-MENA implies that, even when enforcement efforts are present, their effectiveness could be undermined through bribery. Since enforcement can be expected to be higher among firms located in the capital city and foreign owned, the fact that the means of these characteristics are significantly lower in MENA firms would also seem to contribute to the observed lower incidence of firm-supplied training in MENA firms. Similarly, since firms owned by a single owner or a partnership could be expected to be more difficult to find and monitor for violations of regulations, the higher means on these two variables may also contribute to weaker enforcement and its significantly lower incidence of training in MENA.

Then, with respect to other firm characteristics, quite obviously, the lower averages among MENA firms for favorable firm characteristics like higher sales growth, managerial experience, technological sophistication (reflected in the possession of a Quality Certificate, a Website and the use of Email) would also seem to contribute to the low incidence of Training in MENA. By the same token, MENA firms' higher means for the absence of external credit (Finance Working Capital Internal), Mean Obstacle Labor, Sole Owner, and Crime, all considered characteristics unfavorable to Training, could also contribute to MENA's low incidence of training.

But, how much difference would such changes make? Table 6 presents estimates of the magnitudes of these effects obtained by multiplying the differences in means for each of the aforementioned characteristics (from Table 2) by its corresponding estimated marginal impact on training from column (1) of Table 4. These represent the estimated magnitudes by which training would increase as a result of each such change in mean characteristics. While most of these are individually rather small, when added together, the probability of training could be increased by more than 0.1168, i.e., 11.68%. If all these changes could be accomplished, such an increase would represent an increase of well over 70% in the existing propensity to train (of about 0.15) by surveyed firms in MENA countries. If we add to this the effects of lowering the unfavorable characteristics of the several variables listed on the right hand columns of Part A of the table as in the second exercise mentioned above, it would appear that training by firms could be increased by an additional 1.6%.

Then in Table 7 we turn to the third exercise, that is, relating differences in the coefficients of the corresponding favorable and unfavorable characteristics. Among

Table 6 Simulated potential gains in the probability of training

Variable	Raising MENA Mean of Favorable Characteristic	Variable	Lowering MENA Mean of Unfavorable Characteristic
Capital city	0.002676	Sole Owner	0.00174
Percent foreign	0.006832	Age	0.00616
Quality certificate	0.003536	Crime	0.000425
Sales export	0.001296	Finance WC Internal	0.006783
Website	0.00429	Obstacle Labor	0.000874
Email	0.010585		
Manager experience	0.06912		
Management time	0.011025		
Female owner	0.001061		
Sales growth > 50	0.006384		
Total	0.116804	Total	0.015982

Gains from Raising Means of Favorable MENA Characteristics and Lowering Those of Unfavorable Characteristics to Those of Non-MENA

the favorable characteristics are Sales Export, Email, Female Owner and Obstacle Education2 and among the unfavorable characteristics, Sole Owner. The largest of these is Sales Export, a favorable characteristic for training which was shown to have a much larger positive effect in Non-MENA than in MENA. Once again, if all these individual behavioral effects were changed, the results suggest that training could be increased by another 10% or more.

Naturally, not all of these firm characteristics can immediately be changed by decree. For example, raising the incidence of websites and quality certificates, the share of exports in total sales or their effects on training among MENA firms all require time to change either firm behavior or allow appropriate policy changes to become effective. What MENA governments can control directly, however, are labor regulations, their enforcement and educational expenditures. Raising enforcement for given rigidity of the labor regulations and switching from greater enforcement of hiring rules to that of firing rules by themselves could, according to the results presented here, contribute quite substantially to increased training by firms.[7] In the case of labor regulations, looking across the sample of results for the MENA sample in Tables 4 and 5 and comparing these with the corresponding results for the Non-MENA sample in Table 4, one can see that the effect of perceived obstacles in the form of labor regulations is more likely to be negative and statistically significant for MENA firms than for Non-MENA firms. Hence, reducing this by way of the actual rigidity of

Table 7 Gains from raising estimated coefficients of favorable variables and lowering those of unfavorable variables to those of Non-MENA

Variable	Raising MENA Estimated Coefficient of Favorable Characteristic	Variable	Lowering MENA Estimated Coefficient of Unfavorable Characteristic
Sales export	0.09015	Sole Owner	0.00304
Email	0.00756		
Female owner	0.001246		
Obstacle education2	0.0032		
Total	0.102156	Total	0.00304

the de jure labor regulations, especially that related to hiring regulations (as shown in Table 5), would also seem to be a direct way to increase the likelihood of training. From the results of Table 4, for the MENA countries at least, an increase in educational spending would also be expected to have a significant positive effect on Training.

Recall that when interactions between Mean Obstacle Labor and our preferred measure of enforcement Obstacle Informal Low are allowed for as in columns (3) of Table 4 and (2) of Table 5, the interaction terms become positive and significant, but primarily only when rigidity of regulations on firing is concerned as in columns (2), (4) and (6) of Table 5. This complicates the determination of the net effects of changes in these measures on Training. From the relevant parameter estimates of Table 5, however, it can be seen that, when enforcement of the firing regulations is quite high and the firing regulations scored as being fairly high (i.e., at least moderately rigid), the positive impact of these interaction terms will more than counterbalance the direct negative effect of Mean Obstacle Labor.[8] Hence, from the point of view of firm-supplied training at least, it should be clear that priority in enforcement of labor regulations should be given to the regulations on firing.

Hence, the three most important actions that policy makers in MENA countries can do to raise the incidence of training on the part of firms in any particular country in the short run are (1) to reduce the rigidity in the hiring index, (2) to increase enforcement of regulations on firing and (3) to increase the quality and quantity of education (in the latter case to increase the trainability of workers). All three of these actions are consistent with the simple model of Acemoglu and Pischke (1998), explaining the success of Germany's apprentice program. Targeting enforcement efforts to both industries like Textiles, which are labor intensive and for which the enforcement interaction effect (column (3) of Table 4) is especially large and positive, and to the various types of firms which have thus far managed to escape enforcement efforts could yield still larger effects.

In the longer run, the calculations shown in Table 6 suggest that increasing managerial experience, access to external finance, foreign ownership, and sales growth, and inducing export-oriented firms to undertake training might increase the incidence of firm-supplied training in MENA countries even more.

Clearly what should also be evident is that the actions taken by several MENA governments to head off feared Arab uprisings resulting from the youth unemployment problems by raising public sector wage rates and creating relatively unproductive government jobs can only be counterproductive to training and private sector development (Tzannatos, 2013).

Needless to say, the issues under investigation in this study are sufficiently important and the apparent training gap between MENA and Non-MENA countries sufficiently large as to demand further research. Among the needs are (1) Enterprise Surveys of additional MENA countries with all the relevant questions included, (2) larger within-country samples to facilitate separate investigations by industry, (3) adding a question asking the respondent firms to distinguish between hiring and firing rules as obstacles to business, and (4) constructing panels of firms from successive surveys, especially in those cases in which either labor regulations or their enforcement may have changed over time.

Endnotes

[1]In MENA countries, the youth unemployment rate is typically several times as high as the overall unemployment rate (Bardak et al. 2006, Fig. 1.9).

[2]This characteristic is perhaps somewhat less known than the first three but has been widely acknowledged among those familiar with the skill gap between that which firms want and what job entrants possess. Part of the reason that it is less well known is that because firms often identify a number of obstacles as serious barriers to their business, according to the summarized data by region on the Enterprise Survey website, only 5.1% of MENA firms currently rate this lack of skills to be the most serious barrier to their business.

[3]While such surveys have also been conducted for Algeria 2002, Jordan 2006, Morocco 2007 and West Bank and Gaza 2006, unfortunately they did not include the relevant questions on training.

[4]Unfortunately, however, the question about competition from the informal sector was asked very differently outside of the MENA region and is deemed unsuitable as a proxy for regulatory enforcement.

[5]Although tests for the normality of the residuals may not be as meaningful for Probit models as for linear models, the application of the Shapiro-Francia Test for normality suggests that, in general, the hypothesis of normality should not be rejected for the MENA sample in Tables 4 and 5 (Shapiro and Francia, 1972).

[6]This finding is quite consistent with the more qualitative assertions of the policy studies undertaken in the MENA region cited in Section 2 above.

[7]For example, this is easiest to see in column (2) of Table 4 where raising this from 0 to 1 would increase the likelihood of training by over 3%.

[8]For example, making use of the results in column (2) of Table 4, raising the value of Obstacle Informal Low from 0 to 1 would have the effect of raising the probability of training in that firm's group by 0.0163. If this were also a country with an average level of IndexF, i.e., 46, from the relevant coefficients of column (2) of Table 5, the probability of training would be increased by 0.0236. Since Obstacle Informal Low is, for reasons given above, our preferred enforcement proxy, this is our preferred estimate of the effect that could be expected of an increase in enforcement. Yet, if either of alternative measures (Mean Management Time or Log (Inspections Tax) were used, as in columns (4) and (6) of the same table, the results show that the probabilities of training would be increased by even more.

Additional file

Additional file 1: Online appendix.

Abbreviations

IndexF: Index of rigidity of regulations on dismissal or Firing of workers; IndexH: Index of rigidity of regulations on hiring workers; IndexO: Overall index of rigidity of labor regulations; MENA: Middle east and north africa; TFP: Total factor productivity.

Competing interests

The IZA Journal of Labor & Development is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

Authors' information
In much of our other work concerning labor regulations we have found rigid labor regulations to be detrimental to smooth functioning of the labor market and efficiency, but in this study on training we see some positive effects of the regulations, at least when they are not too rigid and focused on firing rules instead of hiring ones.

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