Determinants and Performance of The Formal Sector

Evidence from Data of Small and Medium Enterprises in North Africa

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"(The concept informal sector) is invoked to refer to street vendors in Bogota, shoe-shine workers in Calcutta, specialized knitwear in Modena and producers of fashion garments in New York City (...) These activities are also likely to be unregulated by the state and excluded from standard economic accounts of national accounts"

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Abstract

This paper analyses what the determinants of firm formality are and the impact of that formality on firm productivity and paid wages. Using a matched firm-entrepreneur dataset for two North African countries, we conclude that firm size and age as well as the age and education of the entrepreneur have a significant and positive impact on the likelihood of firm formality. In opposite direction, firms with a seasonal activity or with a single plant are more likely to be informal. We also provide empirical evidence supporting the view that, *ceteris paribus*, formal firms have a better performance. We use the OLS estimate to show that formal firms have a higher productivity in Egypt and in Morocco, 10% and 34% respectively. These results are robust to instrument possible endogenous variables, such as the firm registration and the number of workers. Lastly, the evidence dealt with is not conclusive enough to support the idea that formal firms pay a premium to their workers in comparison to the wages paid by their counterparts in the informal sector.

Sumário Executivo

Este *paper* analisa quais são os determinantes de formalidade entre empresas, bem como o impacto da formalidade na produtividade e salários pagos pela empresa. Usando uma base de dados empresa-empreendedor para dois países Norte-Africanos concluímos que o tamanho e a idade da empresa, bem como a idade e o nível de escolaridade do empreendedor têm um impacto positivo significante na probabilidade da empresa ser formal. Em sentido oposto, empresas cuja actividade é apenas sazonal, ou que possuem apenas uma fábrica, são mais prováveis de serem informais. Encontramos, ainda, evidência empírica que suporta a teoria de que as empresas formais, *ceteris paribus*, têm uma melhor performance. Estimamos por OLS que as empresas formais têm uma produtividade maior no Egipto e em Marrocos: 10% e 34%, respectivamente. Estes resultados são robustos à instrumentalização das variáveis potencialmente endógenas, tais como o registo das empresas e o número de trabalhadores. Por fim, não encontramos evidência estrita ou contundente que suporte a ideia de que as empresas formais paguem, *ceteris paribus*, salários superiores às empresas do sector informal.

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1. Introduction

Within this paper we analyze the profile and performance of Small and Medium Enterprises (SMEs) in Egypt and Morocco. The study of this topic is particularly important and relevant since a large share of the working population of developing countries is employed in these small size firms. Therefore, the SMEs play a very important role in the overall economy and in its functioning.

Tightly connected with the SMEs is the informality issue, which is the main focus of our study[1]. Throughout this paper we will try to pinpoint the main determinants of the formalization and economic success of firms, contributing simultaneously to better understand and clarify the relation between these two concepts.

Moreover, the analysis of the informal sector[2] is very significant and interesting as it is positively viewed due to some of its aspects, namely, it employs a large share of workers (in Egypt about 55% and in Morocco about 45% of all non-agricultural employment in the period 1994-2000, according to the ILO (2002)[3]), and it can play a greater flexibility role in society. But it is also true that the informal sector is often associated with some negative stylized facts such as the characterization of the sector as a low-paid, low-productivity and low-skilled one, which raises several growth and equity concerns.

Furthermore, according to the World Bank (2010) both Egyptian and Moroccan firms had been seeing the informal sector and the illegal competition as major barriers and constraints to their development and to the possibility of showing better performances. This fact increases the importance of analyzing this sector.

Geographically, both Egypt and Morocco are part of the Middle East and North Africa region (MENA). This region is a vital source of global economic stability and of crucial importance to enable worldwide economic growth due to their reserves of natural resources.

Nowadays the MENA region faces major population and employment challenges since the forecast points out to an increasing number of informal firms and workers - the predictable population growth is much higher than the best forecasts for formal job creation. Moreover, the prevalence of a very young and often low-skilled population tends to worsen this scenario thus raising important efficiency concerns.

[1] Despite the existence of a broad literature studying the informal sector in developed countries, this paper only focus and covers the informality phenomenon in developing ones, as it is the case of MENA countries.

[2] It is important to highlight that this paper only focus on micro-determinants. There is already a considerable amount of literature referring to the macro-determinants of informality, such as the type and enforcement of regulation, taxation or legal quality. For a good study on this topic see, for instance, Dabla-Norris et al (2005) or Loyaza et al (2009).

[3] Schneider and Enste (2000) also identified a shadow or underground economy accounting for 68% and 39% of the Egyptian and Moroccan respective GDP.

This region also shows some disappointing labor market outcomes, which can be, at least partially, explained by poor labor market policies (e.g. poor contract enforcement) and by the poor quality of the public services associated with the private sector, which suffers from low dynamism and low private investment.

Indeed, both Egypt and Morocco experience these generic problems and face these challenges. However, it is important to stress that in Egypt the over-regulation granting too much job protection to insiders in the job market and the existence of too much legal bureaucracy[4] are some of the major challenges and concerns, while in Morocco the concern is mostly with the considerable deficit of population education and skills.

Therefore, getting important insights on the determinants and performance of the SMEs by paying special attention to the informal sector may allow to design better policies and to establish objectives targeting an improvement in the productivity of the micro-entrepreneurial sector and in the workers welfare.

The remainder of the paper is structured as follows. Section 2 presents a broad literature review on the informal vs formal sector topics. Section 3 describes the survey and data used. Section 4 describes the measure of formality we choose to focus on and the empirical determinants of formality according to the definition presented. Section 5 presents a model to evaluate the impact of firm formality on firm productivity and provides empirical results about it. Section 6 provides empirical results about the impact of firm formality on the wages paid by the firm. Section 7 concludes.

2. Literature Review

The literature on the formal and informal sectors is not as extensive and deep as on other economic topics, despite the importance of the topic and of the fact that these issues are being on debate for several years. There are, although, some important and remarkable works that pinpoint some of the micro determinants of the informal sector as well as its characteristics. In Liimatainen (2002) and Dabla-Norris et al. (2005) we find empirical support for the stylized characterization of the informal sector as employing low-skilled and low-educated workers, as well as being closely linked with firms of small dimension and with poor access to financial markets. The authors also highlight that these characteristics, together with the great difficulty in providing the development of skills and its adequacy to their workers, contribute to the existence of a sector with low productivity and innovation.

Amaral and Quintin (2005) suggest a workers self-selection model which not only supports these stylized facts, but it also helps to explain why this can happen. They present a model where informal managers, whose firms have less access to financial markets, decide to replace

[4] According to the World Bank data, it took 193 days to register a new business in 2004.

physical capital by non-skilled labor, assuming that this type of labor is the best substitute for capital. So, informal firms end up with more unskilled and unqualified workers than formal firms and are, therefore, less productive.

In order to empirically identify the determinants of firm informality, Perry et al. (2007) uses data from Brazil and Mexico to conclude that informality among firms decreases along with the entrepreneurs' education and has an u-shaped relation with their age ─ first increases and then decreases. Moreover, bigger and older firms are less likely to be informal[5]. Paula and Scheinkman (2007), using firm tax registration as the definition for formality and a different dataset, find the same results for the Brazilian case, which reinforces the validity of these results.

Also Levenson and Maloney (1998) report that "young and small firms are disproportionally informal" alluding to his conclusion that firms which start operations informally tend to grow in size and in operations, which leads them to transform into formal ones.

Making an international comparison Elbadwi and Loyaza (2008) use small firms pooling data from Morocco, Egypt, Lebanon and Turkey and conclude that the likelihood of firm formality is higher in Turkey than in any of the other African countries. But the most remarkable result is that informal firms are on average less productive than formal ones.

We can find similar results in other empirical studies. For instance, Perry et al. (2007) use pooled data from Argentina, Bolivia, Mexico, Panama and Peru and find that informal firms are on average 30% less productive than formal firms, even after controlling for several firm and industry-specific characteristics. Taymaz (2009) also finds significant differences in the productivity of Turkish formal and informal firms.

There is another old but always hot and relevant discussion on the possible segmentation or not of the sectors, as well as a possible wage gap. It brings back to the discussion of the dual market hypothesis ─ a traditional view defended by Fields (1975) or Dickens and Lang (1985), which states that workers rationed out of the modern/formal sector, often due to job shortages, escape unemployment by entering into the more flexible informal sector. This is an exclusionary view since it assumes that workers would prefer the benefits of formal and regular jobs, although they cannot get them, so they have to opt for the second choice of entering the disadvantageous informal market. Then, the informal sector just appears as a queuing and second-best opportunity, with authors defending the existence of (noneconomic) barriers to mobility between sectors, which results in a secondary/informal market characterized by a flat and low wage profile.

[5] The author uses alternately the firms absence of license, non-payment of taxes or absence of social security as the criteria for being informal. However, the results presented are common to all the possible definitions of informality.

More recently, some authors, as Maloney (1999; 2004[6]) and Loyaza and Rigolini (2006) have begun to question this conventional paradigm, offering alternative explanations and descriptions for reality. They argue that an important share of informal jobs simply reflects inherent differences in job requirements, as well as the workers' rational and voluntary choices depending on their individual preferences and their skills endowments. It is also based on a personal cost-benefit analysis of entering the formal sector. This new view also assumes that the movements and the openness between sectors are considerably more, as both the economic activity and the workers tend to freely shift between the informal and the formal sector, and vice-versa.

Boeri and Garibaldi (2006) and Albretch et al. (2006) present theoretical models with the sorting of workers between sectors according to their endowments and skills. Galiani and Weinschelbaum (2007) and Dimova et al. (2008) go further in their analysis and empirically conclude that there is a self-selection of more educated workers and with more human capital in the formal sector[7].

Despite all these arguments and as Perry et al. (2007) highlight "there is no clear *a priori* presumption that informal employment should carry lower, equal or higher earnings than formal jobs". On the one hand, informal jobs should command higher earnings to compensate workers for the value of lost fringe benefits (such as social protection) and their greater risk of unemployment. On the other hand, earnings may be lower to adjust for the value of non pecuniary benefits, such as more general flexibility or tax savings.

Even empirically the results on this supposed wage gap (and its direction) are quite disperse and divergent. Using a matched worker-firm level dataset, specifically working with the workers' individual wages as the dependant variable Fox and Gaal (2008) get, for Uganda, a 30% lower wage in the case of men working in the informal sector and a 45% lower wage in the case of women when comparing with their counterparts in the formal sector. Almeida (forthcoming) finds similar results for Mauritania. However, very different results were found by Marcouiller et al. (1997) for Mexico, where he documents a wage premium for the workers in the informal sector. Bargain and Kwenda (2009) show that the magnitude and even the direction of the wage gap between sectors depend on the level of the wage distribution. The authors conclude that the positive wage differential between the formal and the informal sector tends to decrease as we consider the top of the wage distribution. The gap can even become negative turning into an informal sector wage premium.

[6] In Maloney (2004) we find several empirical results that help to support his idea. For instance, 60% of Mexican self-employed workers left their previous job to enter voluntarily in the informal sector; while in Brazil 62% of self-employed male workers referred that they do not want to move to the formal sector because they feel happy with their current informal sector job.

[7] In these models workers are heterogeneous and endogenously decide in which sector they want to work according to their preferences. Galiani and Weinschelbaum (2007) focus on Latin American countries, while Dimova et al. (2008) focus on West African countries.

We have already referred that workers tend to chose whether to enter the formal sector or to remain in the informal one. The same choice needs to be done at the firm level, as firms also have costs and benefits related to being formal. Perry et al. (2007) summarize very well both the advantages and the drawbacks of formality for firms. On the one hand, they can have access to formal capital and financing markets as well as to further business information and advisory councilling. Moreover, they can protect their property rights and have access to courts in order to better enforce any signed contract. On the other hand, they lose some autonomy and flexibility, since they need to cope with regulation and bureaucracies. Another drawback has to do with the high costs of the registration process, and also with the fact that a formal firm needs to comply with fiscal obligations and pay taxes. Following these arguments, McKenzie and Sakho (2007) conclude that firms decide to become formal or not according to a rational profit maximization choice, where they take into consideration both costs and the benefits of doing so.

Returning back to the origins of the concept of the informal sector, it was primarily used in a report on Kenya prepared by the ILO in the beginnings of 70s[8]. One of the first well-known definitions is from De Soto (1989), who defines it as "the collection of firms, workers and activities that operate outside the legal and regulatory frameworks". However, the existence of multiple concept definitions, which appeared meanwhile, and in order to create smoothness in data collection processes as well as to allow the comparability of results across countries, a new standard worldwide definition was established during the Fifteenth International Conference of Labor Statisticians (in 1993): *the group of household enterprises (or unincorporated enterprises owned by households) that includes both the informal-own account enterprises and enterprises of informal employers (with a continues base). The firms should also fulfill one or both of the criteria: size of unit below a specific level of employment and non-registration of the enterprise or its employees*[9].

More recently, and according to Hussmanns (2004) researchers updated this 1993 definition in order to absorb and reflect the changes and expansion of this sector in developing countries. In the new expanded framework the informal sector is described as the sum of the total informal employment, which is comprised not only by workers employed in informal firms, but also by wage workers that even working in formal firms do not have social security protection[10].

Hanley et al. (2006) precisely highlight the small attention that literature still gives to the conceptual differences of the formal sector used in empirical studies, and refer that those differences can result in biased and wrong conclusions when trying to compare different studies.

[8] According to the ILO (1972), the study appeared as a response to the increasing growth of large cities and mass unemployment in African developing countries. Moreover, the concept was firstly used as a means to distinguish formal and informal income opportunities on the basis of whether the activity entailed wage or self-employment.

[9] Adapted from *ILO Report of the Fifteenth International Conference of Labor Statisticians,* Geneva 1993.

[10] Summing up, the major differences are that it goes deeper in counting precarious employment for formal firms as well as new types of informality.

Jütting et al. (2007) also refer the inaccuracy that may arise from comparing international studies on different countries based on unlike definitions, concepts and contexts.

3. Data

Our study explores a matched workers-entrepreneur-firm [11] dataset collected by the Economic Research Forum as part of its project on "Promoting Competitiveness in Micro and Small Enterprises in the MENA region"[12] for Egypt (2003) and Morocco (2002).

This collection of data used a national, stratified and multi-staged systematic sampling method to identify firms. Then, a total of 4958 interviews were carried out in Egypt over the three major administrative regions[13]. In Morocco, 5210 interviews were carried out in nine different administrative regions[14]. All of these interviews were done with firms ranging between 1 and 50 workers, that is, with SMEs.

Moreover, as described in Hussmanns (2004) and in order to cope with the regular definitions of informality, which are often based on non-agricultural firms, we opted to drop the observations for those firms in Egypt. For Morocco, the sample already did not include any agricultural firm.

A very detailed questionnaire with 322 questions was applied in this survey, which contains three specific questions about the different types of formality: i) if the firm is registered with the industrial or commerce register; ii) if the firm is registered with the tax department (it acquired a tax card or card number); and iii) if the firm keeps regular accounts[15].

This is, indeed, a very rich dataset to study the topics of this paper since it contains diversified and vast information on workers and firm characteristics.

At the firm level it contains not only the already specified points on the firms' registration and legal fulfillment, but also information on their geographical location, industry activity sector, number of workers per firm, firm's economic performance during the last year and linkages with other firms or associations.

[11] The survey asks directly if the entrepreneur of the firm, who answered the survey, is a manager or an owner.

[12] These surveys were conducted in four Arabic countries: Egypt, Morocco, Lebanon and Turkey from 2002 to 2004. They were designed to collect information from the responses of the firm owner or manager about his own past and present status and skills, as well as other about the workers' and firm's characteristics, operations and performance. This dataset was already used by El-Mahdi (2005), Elbadawi and Loyaza (2008) and Taymaz (2009) to study similar issues about informality.

[13] The Egyptian regions are: Metropolitan Area, Lower Egypt and Upper Egypt.

[14] The Moroccan regions are: Sous Massa Drâa, Gharb Chrarda Ben Hssen, Marrakech Tensift Al Haouz, Oriental, Grand Casablanca, Rabat Salé Zemmour Zaer, Doukkala Abda, Méknès Tafilalet, Fès Boulmène, Taza Al Hoceima Taounate and Tanger Tétouan.

[15] The specific questions are: Q84 *"Enterprise registered (industrially or commercially)?"*, Q90 *"Registered with tax department (acquired a tax card or card number)?*" and Q98 *"Enterprise keeps regular accounts?"*.

It also adds to the regular variables about the entrepreneur - such as gender, age, marital status, etc - information on his/her experience, tenure in the present job and educational achievements, in terms of formal as well as informal education.

It still presents data on the composition by gender, skills, training, social security coverage and existence or not of written contracts of the firm's workforce.

This dataset also has the richness of holding information about similar features for both countries, once the questionnaire used was the same, which allows international comparisons between the results of different countries.

Therefore, this dataset is really good both to study and assess the micro and small enterprise sector, which is largely composed by informal and unregistered firms, and to identify the impact of the firm registration on their performance.

Table 1 provides summary statistics for the main variables and for all the firms used in the paper, both for Egypt and Morocco.

We can observe that the degree of formality both in Egypt and in Morocco varies considerably depending on the considered formality variable (from the three we specified before). Indeed, considering the registration criteria we find 75% of formal firms in Egypt and 49% in Morocco. In terms of tax registration, the formal sector increases to 81% in Egypt and to 93% in Morocco. Lastly, when taking into consideration the number of SMEs that keep regular (financial) accounts, the size of the formal sector decreases substantially to 38% in Egypt and 14% in Morocco.

To deeper illustrate these differences we draw Figure 1 and 2 for Egypt and Morocco, respectively, where we can observe the pattern of firm formality according to the different criteria and its interaction.

The main conclusion that directly comes up from the figure is that, indeed, the degree of formality is very different depending on which criteria we consider. For instance, if we consider the intersection of the three variables, we just observe 33% of formal firms in Egypt and 10% in Morocco, which is a really small number. However, if we would consider that a formal firm is one that respects at least one of the criteria, we get a substantially higher percentage of formal firms in both Egypt and Morocco, 85% and 78% respectively.

This point reinforces the idea expressed by Henley et al. (2006) that the degree of formality in an economy can vary substantially depending on the used definition for formality and, consequently, someone trying to compare different studies about this topic needs to be very careful when inferring conclusions and/or results.

Therefore, despite the existence of data for using other possible criteria, we decide to consider, from now on, a formal firm as the one that is commercially registered, because it is one definition widely used in literature (e.g. Perry et al. (2007) or Taymaz (2009)) and in our

opinion, it is the one that more accurately and more directly represents the spirit present in the ILO definition of formality from the firm perspective.

In table 1 we can also observe that the average firm in Egypt employs 2.16 workers and has been operating for 12 years, while the average firm in Morocco employs 3.59 workers and is 10 years old.

In both countries, the proportion of total firms that are engaged in exporting is really reduced. On the other hand, the overwhelming majority of firms has a continuous activity during the year and just holds a single plant.

The major difference in terms of surveyed firms in both countries is related to the proportion of firms that can have access to credit. In fact, this value is really low in the Egyptian case, where just 5% of the firms had access to credit in the last year (in relation to the survey year), while this value is much higher in Morocco ─ 20%.

In terms of activity the majority of the firms (65% in Egypt and 49% in Morocco) is concentrated in the trading sector.

Regarding table 2 we can observe that the majority of the entrepreneurs are owners, with just 38% in Egypt and 29% in Morocco being managers. Moreover, there are considerable more men in this leading position, with just 10% and 16% of total entrepreneurs being women in Egypt and Morocco, respectively.

In terms of educational achievements, more than 50% of Egyptian entrepreneurs have a secondary or post-secondary degree, with a remaining share of 23% that did not attend any year of schooling. In Morocco, the scenario looks worse, with 22% having no schooling at all and a higher share of 30% having just primary schooling. Then, less than 50% of total entrepreneurs hold secondary or post-secondary degrees[16].

At the workforce level, we can observe that Egyptian workers are more skilled than Moroccan ones. This result is in line with our characterization of Morocco as a country falling short of more educated and skilled workers.

Another relevant difference between both countries is related to the share of workers having both contract and social security. While these figures are really low for Morocco, with 10% or less for both cases, in Egypt these numbers raise for more than 50%, namely 58% of Egyptian workers have contracts and 54% of all the workers are also covered by social security.

Because it is an important and relevant point on the used data, we will make a switchers analysis, that is, we will discuss why some firms had decided not to register themselves when

[16] These results are aligned with the stated problem of skills deficit in the Moroccan population, which helps to validate the dataset.

they began operations and what the main motives are that lead some of them to register afterwards[17].

First we describe the differences in the main characteristics of firms considering the ones that decide not to register in the beginning of their operations, and distinguishing between the ones which formalize themselves in the meanwhile and the ones that still remain informal[18].

For both countries, the firms that decide to register in the meanwhile are both bigger and older. The entrepreneurs of these firms are also, on average, more educated.

On the other hand, a result that we only observe in the Moroccan case is that firms which registered have more access to credit than the ones which remained unregistered. This outcome is in line with the literature about the advantages of firm formality, namely the better access to credit and financial markets.

After having illustrated the differences between firms that decided not to register in the beginning of their operations focusing on their behavior afterwards, i.e., switchers into formal and non-switchers, we will pinpoint what the motives to their initial non-registration behavior were and what the reasons that led some to switch afterwards were.

Both in Egypt and in Morocco the majority of firms appointed the uselessness of the status itself as the main reason not to register in the beginning.

However, switcher firms in both countries had different motives to do it. Indeed, while in Egypt an overwhelming majority (about 75% of all the switcher firms) did it only because it became mandatory, in Morocco this value is not only much smaller, but also more than half of the switcher firms decided to register because they felt it would bring them some advantages.

The results for Morocco support the existing literature not only in terms of the rational behavior of firms, which decide to formalize or not according to the maximization of their cost-benefit analysis, but they also seem to sustain Perry et al.'s (2007) arguments that as firms survive in time they potentially grow and feel the increasing need of becoming formal while they gradually better realize its benefits.

4. Determinants of Firm Formality

We had briefly analyzed the dynamic behavior of the firms between the start of operations and the time in which the data was collected. Just by looking at the firms' behavior at the time of the data collection, Tables 3 and 4 present the average differences in the main variables between formal and informal firms in Egypt and Morocco, respectively.

[17] In this analysis we disregard the Moroccan firms that had formalized themselves when their operations began and that, afterwards, decided to continue operating in an unregistered way, since it is not only a really small number of firms in this situation, but also because the questionnaire unfortunately does not provide any information on why these firms decided to do it.

[18] In the appendix we present a table with more detailed summary statistics about these differences.

In both countries, formal firms employ more people, are older and have more access to credit [19]. This last point is particularly significant in the case of Morocco. Moreover, entrepreneurs of formal firms are on average more trained and more educated than their counterparts in informal firms, while there is a higher proportion of women entrepreneurs in the informal sector than in the formal one. Lastly, there is a higher proportion of women workers in the informal sector than in the formal one, while not surprisingly the workforce in the formal sector is on average more protected, that is, there is a higher proportion of workers with contract and social security provision when compared with the informal sector. This difference is really substantial in the Egyptian case, where 66% of workers in the formal sector are covered by social security, while only 17% of workers in the informal sector benefit from the same coverage.

Profit-maximizing firms will decide to formalize if the expected present value of the benefits of doing it is higher than its costs, that is, the net value (π_j^*) must be positive.

$$Formal_j = \begin{cases} 1 \; if \; \pi_j^* > 0 \\ 0 \; otherwise \end{cases} \quad \text{Equation (1)}$$

However, since π_j^* is unobservable, Equation (1) cannot be estimated directly. So, we assume that π_j^*, the net value for firm j is a linear function of several observable characteristics: $\pi_j^* = \alpha + X_j'\beta + Z_j'\theta + u_i$, where X_j is a vector of entrepreneur characteristics, Z_j is a vector of firm characteristics and u_j is the unobservable error term[20].

Therefore, and following our model specification, the probability of firm j to be formal is given by:

$$Prob(Formal_j = 1) = Prob(u_j > -\alpha - X_j'\beta - Z_j'\theta) \quad \text{Equation (2)}$$

Assuming that the residuals ,u_j, are normally distributed, we can estimate Equation (2) by maximum likelihood (probit). Tables 5 and 6 report the marginal effect at mean values of the values of interest for different specifications of Equation (2) in Egypt and Morocco, respectively[21].

[19] As in our discussion about the switchers, the results seem to support the theoretical literature on the advantages of formalization as well as the fact that older firms tend to formalize more.
[20] J is the firm subscript.
[21] In the spirit of Henley (2006), which presents econometric analysis revealing that the conditional impact of different demographic and educational factors on the likelihood of firm formality can vary considerably depending on the considered definition, we decide to do a robustness analysis in the appendix. We consider, then, two alternative definitions for a formal firm: to be tax registered or keep

Our preferred specification for both countries is number (4) where we control for firm effects as well as for the entrepreneur characteristics[22].

Our findings for Egypt and Morocco suggest that formality likelihood increases with the firm size. In fact, all coefficients for dummy variables correspondent to different sizes of firms are significant and positive in relation to single-worker firms, which means that firms of self-employed workers tend to be more informal than all other multi-worker firms. This result is the expected one since informality is extensively associated in literature with small-sized firms.

Also, both the age of the firm and its access to credit have a positive impact on the firm formality. This last result looks, again, consistent with the argument of favorable access to financial markets for formal firms.

We would like to highlight that in the Moroccan case seasonality of firm operations and formality appear as strongly negatively correlated, since seasonal firms are 38% less likely to be formal than permanent ones.

Regarding the entrepreneur characteristics, we find some standard and expected results on the probability of firm formality. This probability increases with age, it reaches a pick and then declines, and it also increases with education and training. For instance, in Egypt an entrepreneur with a post-secondary degree has 21% more chances to work in a formal firm than an individual with no education. This number raises to 38% in the Moroccan case. On the other hand, the positive marginal effect of the dummy for past training is much more modest, being 5% in Egypt and 3% in Morocco.

Lastly, firms owned or run by female entrepreneurs are, *ceteris paribus*, 12% less likely to be formal in the Moroccan case, while in Egypt and after controlling for entrepreneurs levels of education we did not find any significant difference regarding the entrepreneur's gender.

5.1 Impact of Formality on Firm Productivity

One of the main questions regarding the formal and informal sectors is concerned with the productivity of the firms in those sectors. As suggested by Silva et al. (2009), it is not possible, *a priori*, to know what the effect of formality is on firm productivity. Indeed, this effect can be either positive or negative, since there are theoretically potential effects and arguments supporting a higher productivity for both sectors. On the one hand, formalization can lead to the

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regular accounts. Despite these considerations, our analysis show similar qualitative results regardless of the considered definition of formality.
The only remarkable difference is in the coefficient signal of the entrepreneur being a woman. Indeed, while not significant, or even with a negative impact on the firm likelihood of formality for the other definitions of formality, when we consider a formal firm as the one that keeps regular accounts, a firm with a female entrepreneur is more likely to be formal than one run by a male.

[22] Aside from the results presented, we also tested a model including job tenure and a firm's foreign ownership. However, we disregarded these variables because their coefficients were always non significant.

increase of the firm's customer base, to an easy access to financial markets or even to an access improvement of production factors, which may result in a higher productivity for formal firms. On the other hand, Almeida and Carneiro (2005) argue that due to the need of compliance with labor regulations and legal restrictions, formal firms can lose some flexibility and, therefore, become less profitable and productive than the informal ones.

Therefore, whether formal firms are more or less productive than the informal ones turns into an empirical question.

Before getting into the main question, we present some descriptive statistics for the logarithms of productivity, wage and capital variables in table 7. We can observe that capital has not only the higher mean value, but it is also the one with the highest standard deviation among Egyptian and Moroccan firms. That is, capital is the variable that presents more volatility within both countries. On the other hand, comparing both countries we can state that Moroccan firms are on average more productive and have more capital. Moroccan workers are also, on average, better paid than the Egyptian ones.

In order to empirically test the impact of formality on productivity, we assume a model already used in literature in studies on similar contents. Almeida and Carneiro (2006) and Saliola and Seker (2011) consider cobb-douglas production functions of the type: $Y_j = AK_j^{\alpha}N_j^{\beta}$. Therefore, we assume that firm value added (productivity) can be expressed by the following log-log function:

$$\ln(y_j) = \rho.\text{Registered}_j + \beta ln\,(k_j) + \lambda \ln(L_j) + Z_j'\gamma + u_j \quad \text{Equation (5.1)}$$

Where ln y_j is the logarithm of productivity for firm j, Registered_j is a dummy variable equal to 1 if the firm j is commercially or industrially registered, ln k_j is the logarithm of the capital stock, ln L_j is the logarithm of the total number of workers employed, Z_j includes a set of workforce, firm and entrepreneur characteristics and u_j captures the firm-specific productivity shocks. The main coefficient of interest is ρ which, all else constant, captures the productivity premium of formal firms relative to the informal ones.

Tables 8 and 9 present the main results of the paper. Each column shows the least square estimates of equation (5.1) and the impact of formality on productivity for different sets of controlling variables.

In column (1), where we just control for the firm capital stock and used labor, we can observe that formal firms are 19% and 44% more productive than the informal ones in Egypt and Morocco, respectively. However, there are other variables of interest (such as the education

of the entrepreneur or the skills of the workforce) which are likely to be not only correlated with the firm formality, but also have a statistically significant impact on productivity. Therefore, our preferred specification is number (6) where we control for several relevant factors apart from the capital and labor of the production function. Doing so, we believe that we can get a better estimate of the real impact of formality on firm productivity.

In column (6) the impact of formality on productivity is weaker, but remains significant and positive. The results show that registered firms are on average more productive than unregistered ones ─ 10% in Egypt and 34% in Morocco. However, for several reasons, it can happen that $registered_j$ is correlated with the error term, which biases the estimate for ρ. For instance, the positive correlation between the decision for firm formality and the firm productivity is likely to result in an upward biased OLS coefficient for the impact of registration on productivity.

Productivity is also positively correlated with the level of capital in both countries. The values for the elasticity of capital (9% in Egypt and 11% in Morocco) are also not too far from the 29% found by Saliola and Seker (2011) for a pool of 81 countries worldwide.

Quite interestingly in Egypt the labor elasticity is not statistically significant different from zero regarding almost all specifications but one, which is negative, whereas in Morocco there is a significant and positive labor elasticity of 6%. In literature we also find distinct results. For instance, Saliola and Seker (2011) find an average labor elasticity of 21% for the 81 countries studied, while Elbadwi and Loyaza (2008) do not find any statistical significant impact of the logarithm of the number of workers in the logarithm of the firm productivity.

The level of education of the entrepreneur is also highly positive correlated with the firm productivity. For instance, *ceteris paribus*, a firm run by an entrepreneur holding a post-secondary degree is 31% and 18% more productive in Egypt and Morocco, respectively, than a firm run by an entrepreneur with no educational degree. This outcome is qualitatively the same as presented by Silva et al. (2009) for the Moroccan case.

5.2 Endogeneity and Robustness

Equation (5.1) raises some endogeneity concerns. First, in a production function the firm tends to decide how much to produce at the same time that it decides how much of each production factors will be used. In our specification we consider that in line with the most used macroeconomic models there is no simultaneity problem between productivity and capital once we assume that the value of capital to be used in the production function was a decision made in a previous period. On the other hand, to face the potential simultaneity of labor we follow the approach suggested by Wooldridge (2005) of using lagged variables to instrument for the endogenous ones. Therefore, we will use as an instrument the number of workers employed by the firm when it started operations.

Secondly, someone could suspect of endogeneity of the registration dummy, because there may be some non-observable but existing factors affecting simultaneously the firm decision of registration as well as its productivity. Therefore, in order to strengthen our results we decide to run 2SLS regressions following the same specification of equation (5.1), but recurring to predetermined instruments ─ a dummy variable equals to 1 for firms who started operations as registered ones and a variable accounting for the age of the firm. We choose the first variable in the same spirit of Wooldridge (2005) and the second one is chosen because it is an important determinant of the firm's formality decision as we observe in section 4, and also because the correlation of the age of the firm correlation with the firm productivity is weak. We believe that not only are these instruments good because they are highly correlated with the endogenous variables and have a small correlation with the dependent variable or the error term, but they also make sense and are valid from an economic point of view.

Instrumental variables estimates are presented in tables 10 and 11 for Egypt and Morocco, respectively. In column (1) we only use two instruments, which turns the regression in a just-identified one. In order to perform a Sargan test and evaluate the goodness of the model and the instruments we use in column (2) the age of the firm as an additional instrument.

As we have already stated we should expect the 2SLS coefficient for registration to be smaller than the previous OLS estimate. However, quite surprisingly we get an even higher impact of registration on productivity than before[23].

Therefore, we are confident that the OLS estimates are, if not a precise measure, at least a good low-boundary for the differences in productivity between sectors. Moreover, our results are in line with previous literature for Morocco, where Silva et al. (2009) using data from 2007 for micro-firms found that in Morocco formal firms are more productive than informal firms with values the following values: 21%, using a propensity-matching estimator to avoid endogeneity, and 52%, using standard OLS procedures,.

6.1 Impact of Formality on Firm Paid Wage

Another hot topic in the literature on the informal and formal sectors relates to the existence and the direction of a wage differential between sectors. That is first it is important to understand if controlling for several specific workers characteristics, there is a significant difference between the average wages paid in the formal and in the informal sectors and, assuming that there is this difference, in which sector the workers are better paid.

[23] It happens for both 2SLS regressions (with 2 and with 3 instruments) on both countries. Moreover, as we can observe the p-value in column (2) allows to accept the model specification as well as the instruments used in Egypt. In Morocco, at a 5% level of confidence we reject either the model specification or the instruments used. However, the lack of potential instruments in the dataset does not allow us to try other specification for Morocco. We are still confident that the results we find are overall robust.

In order to get some insights, Figures 3 and 4 graphically represent the wage distributions in Egypt and Morocco, respectively. We can observe that in Morocco there is not only a higher mean wage value when comparing it with Egypt, but its wage distribution is also more concentrated around the mean value and less volatile across firms.

As we have seen in section 2, and because there are plausible and acceptable theoretical arguments in favor of both possible results, the question of whether firm formality has a positive or negative impact on paid wages turns into an empirical question. Indeed, if on the one hand we can expect higher wages in the formal sector because the informal firms tend to hire mostly unskilled or low-skilled workers and, therefore, they do not reward significantly past education or training. On the other hand, formal firms need to comply with labor regulations and pay taxes on employed labor, which can result in lower net wages for their workers.

However, our analysis presents some limitations in terms of the dependent variable accuracy. Indeed, in the dataset there is no information on the individual wage received by all workers within each firm. Therefore we use the total firm wage bill divided by the number of workers in the firm as the best and more accurate proxy for the average wage in each firm. We are confident that controlling for several workers characteristics we can dilute this limitation and get, if not a precise result about its magnitude, then a good estimate of what the direction of the gap is (if it exists) between the average wages paid by registered and non registered firms.

Then, to evaluate the impact of several observable characteristics on wages, we follow Mincer (1974) and consider a reduced form equation of the type:

$$\ln(w_j) = \rho.\text{Registered}_j + \lambda \ln(L_j) + \delta' X_j + Z_j'\gamma + u_j \quad \text{Equation (6.1)}$$

Where ln w_j is the logarithm of the average wage bill paid by firm j, Registered_j is a dummy variable equal to 1 if the firm j is commercially or industrially registered, ln L_j is the logarithm of the total number of workers employed, Z_j includes a set of workforce, firm and entrepreneur characteristics and u_j captures the firm-specific labor earning shocks. The main coefficient of interest is ρ that, all else constant, captures the wage premium paid by formal firms relatively to informal ones.

Tables 12 and 13 report the ordinary least square estimates of equation (6.1). In column (1) we just control for firm registration and size. Then, from columns (2) to (6) we add different controlling variables of interest in order to isolate the effect of registration on the average wage paid by the firm. Therefore, column (6) is our preferred specification.

We find cross country results very interesting but also different. In Egypt we observe a negative formal sector premium when controlling only for firm registration and size, but this

effect disappears as we control for additional variables and we get a non-significant difference in the average wages paid by formal and informal firms. On the other hand, in Morocco we find a positive and significant formal sector wage premium. Indeed, on average formal firms pay wages to their workers 24% higher than informal firms.

For the control variables we find an interesting result, although not so surprising because it is in line with the statistically null impact of a higher share of skilled workers in the firm productivity. In fact, in Egypt the regressions do not show firms reward their workers' skills or training by paying higher wages. Indeed, both coefficients on the share of skilled workers and on the share of trained workers are non-significant and, therefore, we do not find any statistical evidence to infer that these two main worker characteristics influence the average wage paid by Egyptian firms. In Morocco, our findings are in line with the empirical results showing the positive effects on wages of education and human capital as documented, for instance, by Dimova et al. (2008).

6.2 Endogeneity and Robustness

Equation (6.1) raises endogeneity concerns similar to the ones we already discussed in section 5.2. Indeed, these results can be biased by a certain "reverse causality" caused by the natural sorting of workers between sectors. Despite our believing that some of these effects are already mitigated by the use of average wages at the firm level, and not by individual wages, we decide to tackle this issue in a similar way to the previous section. Therefore, tables 14 and 15 show 2SLS estimates for equation (6.1) using the same variables as before as instruments ─ the size of the firm when it started operations, if it had decided to register or not at that moment, and the age of the firm at the time of the survey.

Although the magnitudes we get for the wage gaps between sectors are different from the ones in the OLS estimates, our results qualitatively support the same conclusions as before. Indeed, while in Egypt we do not find any evidence of wage differentials between the formal and the informal sector, in Morocco we get even more confident about the fact that formal firms pay on average a premium to their workers when comparing with informal firms[24].

In our opinion, and supported by an increasing stream of literature advocating the idea that workers tend to freely choose the sector according to their skills and preferences, the net wages paid by similar firms, differing only on being formal or informal, should tend to equalize. In this sense, we are not surprised with the empirical result we find in Egypt. This result turns even less strange if we simple look at the average wage paid by formal firms which is inferior to the one paid by informal firms. On the other hand, this observation does not fit the Moroccan case,

[24] It is important to highlight that, for both countries, the specification with three instruments presented in column (2) of tables 14 and 15 passes the Sargan test for validity of the instruments and for model specification.

where on average formal firms pay more. One possible explanation for this wage premium paid by formal firms in Morocco is, as already pointed out in sections 1 and 3, the short-fall of more educated and skilled workers and entrepreneurs. Then, formal firms, which are often bigger and need more qualified workers, decide to pay an extra premium to their workers in order to be able to attract the more qualified and skilled ones.

7. Conclusion

In this paper we intended to focus on three main topics of the discussion on the formal vs informal sectors. First, we study what the main determinants of the firm decision of being or not formal are. Secondly, we analyze what the impact of firm formality is on its productivity. And, thirdly, we investigate if formal firms tend to pay significantly more than informal firms.

Using a matched firm-entrepreneur data we find strong evidence supporting the theory that formal firms are more productive than the informal ones. We estimate by OLS that formal firms are 10% and 34% more productive in Egypt and Morocco, respectively. Moreover, these results are robust to several specifications and to possible endogeneity concerns of firm registration and number of workers.

On the other hand, we do not find clear evidence to support the idea that formal firms pay, *ceteris paribus*, more to their workers. Indeed, we find mixed evidence in this field. While in Egypt, after controlling for several firm, entrepreneur and workers characteristics, we find no statistical difference in the wages paid by formal and informal firms, in Morocco formal firms appear to pay indeed more. However, it is important to refer that, due to the lack of individual data about all wages of all the workers, our specification to evaluate this issue is quite limited because it only considers the average wage paid by each firm, instead of the wage received by each worker in the firm, which is the standard and more used approach to this type of analysis. Therefore, we should look carefully and with some reservations to these results, but we are confident that our analysis is a good approximation to what actually happens within the Egyptian and Moroccan firms regarding the formal and informal sector and the workers in those countries.

Our results show clearly that formal firms tend to be more productive than informal firms. But in this study we do not consider any potential benefit or advantage of informal firms that are not captured by the financial statements. Policymakers, which tackle the informal sector issue, should act carefully and evaluate each country's specific case in order to decide what kind of policies to follow and what kind of goals to pursue, e.g. more restrictive in order to reduce the informal sector size or milder. Therefore, they should try to broadly specify and quantify not only the disadvantages of the informal sector, e.g. being less productive, but also its advantages, e.g. the number of firms or workers that are only in the market due to the greater flexibility they can have in the informal sector.

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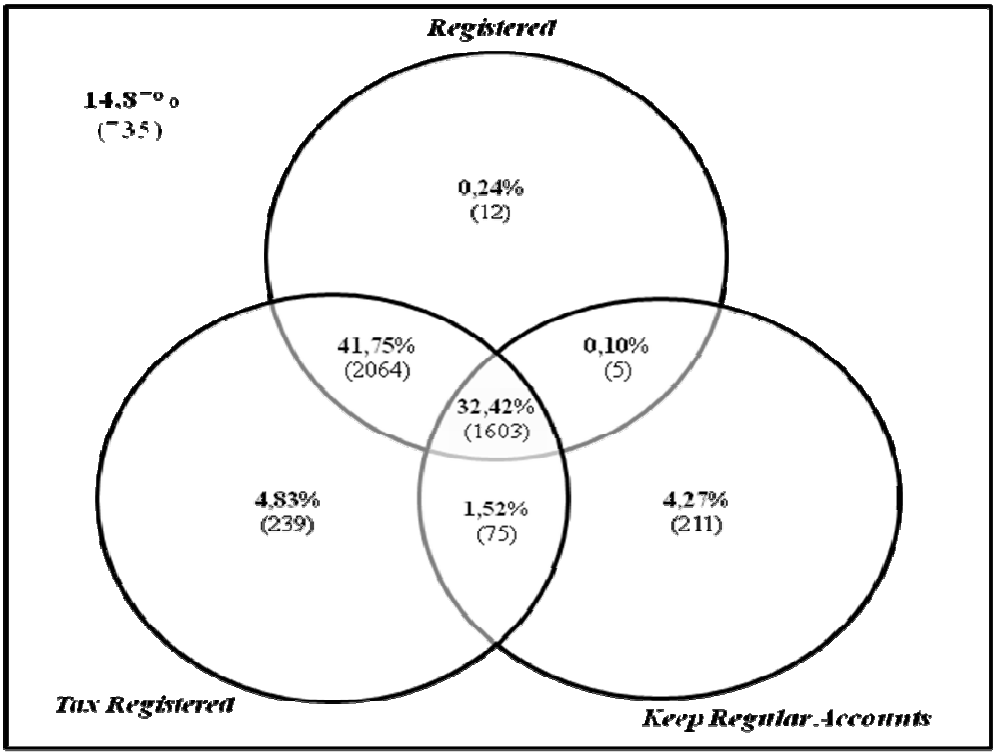
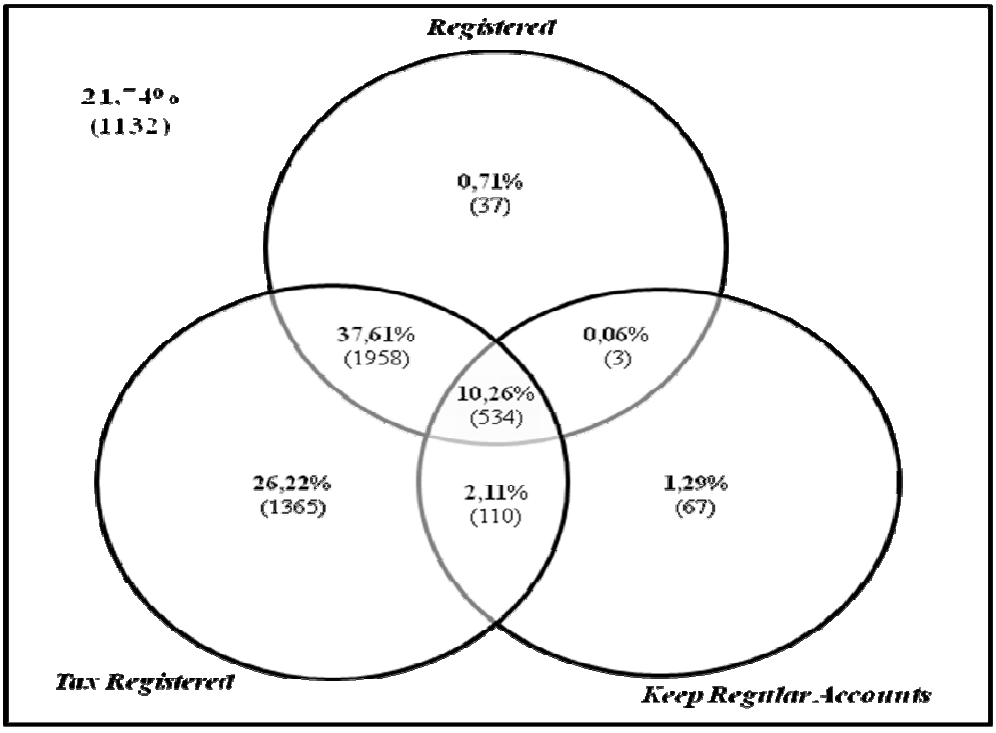
Figure 1. Formal Firms in Egypt



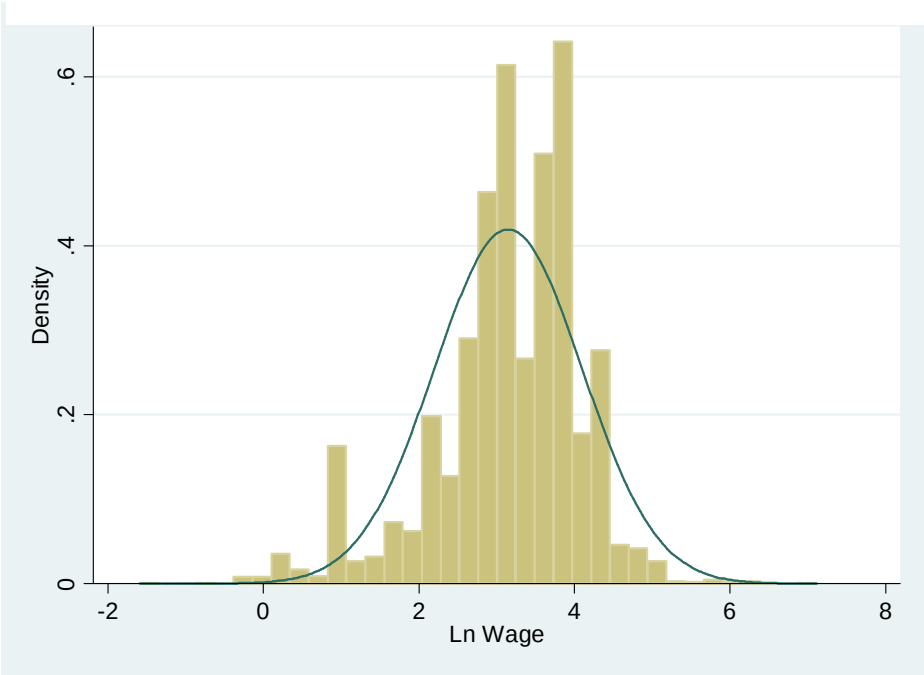
Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Figure 2. Formal Firms in Morocco



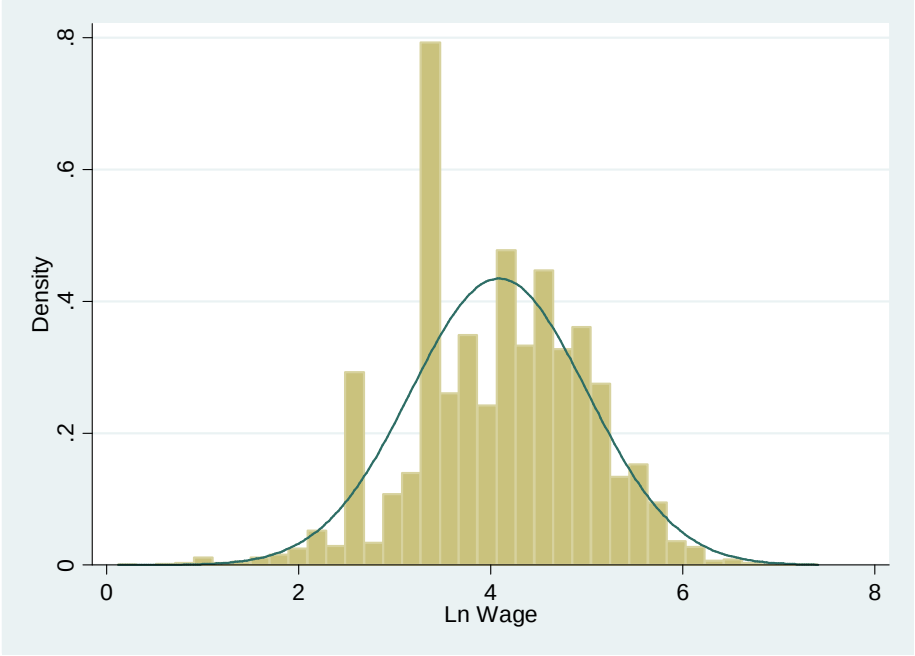
Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Figure 3. Distribution Function of the Egyptian Firm Ln Wage



Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Figure 4. Distribution Function of the Morrocan Firm Ln Wage



Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Table 1. Summary Statistics of the Main Firm Level Variables

Variable	Egypt		Morocco	
	Obs.	Mean	Obs.	Mean
Registered	4,944	0.75	5,206	0.49
Tax Registered	4,943	0.81	5,197	0.93
Regular Accounting	4,926	0.38	5,191	0.14
Size				
Number of Workers	4,944	2.16	5,210	3.59
Single Worker	4,944	0.38	5,210	0.24
Micro (2-4)	4,944	0.57	5,210	0.62
Very Small (5-10)	4,944	0.04	5,210	0.08
Small (10-49)	4,944	0.01	5,210	0.06
Age of Firm	4,895	12	5,205	10
Exporter	4,933	0.002	5,181	0.018
Seasonal Activity	4,935	0.02	5,193	0.02
Single Plant	4,937	0.96	5,210	0.98
Access to Credit	4,944	0.05	5,181	0.20
Sector of Activity				
Manufacturing	4,944	0.15	5,210	0.24
Trade	4,944	0.65	5,210	0.49
Other Services	4,944	0.06	5,210	0.12
Geographical Region				
Metropolitan Area	4,944	0.48	-	-
Lower Egypt	4,944	0.18	-	-
Upper Egypt	4,944	0.34	-	-
Grand Casablanca	-	-	5,210	0.23
Rabat-Salé-Zemmour-Zaer	-	-	5,210	0.16
Marrakech-Tensift-El Haouz	-	-	5,210	0.08

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Table 2. Summary Statistics of the Main Entrepreneur and Workforce Level Variables

Variable	Egypt		Morocco	
	Obs.	Mean	Obs.	Mean
Entrepreneur Characteristics				
Manager	4,939	0.38	5,209	0.29
Woman	4,944	0.10	5,210	0.16
Age	4,942	40	5,208	38
Education Level				
No Education	4,942	0.23	5,096	0.22
Primary Education	4,942	0.16	5,096	0.30
Secondary Education	4,942	0.42	5,096	0.37
Post-secondary Education	4,942	0.19	5,096	0.11
Technical Training	4,944	0.31	5,210	0.66
Of which Informal Training	1,554	0.95	3,450	0.90
Entrepreneur Sole Activity	4,938	0.93	5,168	0.95
Workforce Characteristics				
Share with Social Security	4,943	0.54	5,205	0.10
Share with Contract	4,943	0.58	5,193	0.08
Share of Women	4,943	0.12	5,036	0.18
Share of Skilled Workers	4,943	0.90	5,109	0.70
Share of Semi-skilled Workers	4,943	0.07	5,109	0.18
Share of Unskilled Workers	4,943	0.01	5,109	0.07
Share of Apprentices	4,943	0.02	5,109	0.05
Share of Trained Workers	4,943	0.06	5,201	0.56
Share of Workers related Entrepreneur	4,943	0.76	5,191	0.60

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Table 3. Differences in Summary Statistics between Formal and Informal Firms in Egypt

Variable	Registered		Not Registered	
	Obs.	Mean	Obs.	Mean
Firm Characteristics				
Size				
Number of Workers	3,684	2.31	1,260	1.72
Single Worker	3,684	0.327	1,260	0.522
Micro (2-4)	3,684	0.615	1,260	0.457
Very Small (5-10)	3,684	0.048	1,260	0.019
Small (10-49)	3,684	0.010	1,260	0.002
Age of Firm	3,649	13	1,246	7
Exporter	3,677	0.003	1,256	0.0008
Seasonal Activity	3,677	0.02	1,258	0.04
Single Plant	3,679	0.95	1,258	0.98
Access to Credit	3,684	0.05	1,260	0.04
Entrepreneur Characteristics				
Manager	3,681	0.36	1,258	0.26
Woman	3,684	0.09	1,260	0.15
Age	3,683	41	1,259	40
Education Level				
No Education	3,683	0.19	1,259	0.33
Primary Education	3,683	0.15	1,259	0.19
Secondary Education	3,683	0.44	1,259	0.37
Post-secondary Education	3,683	0.22	1,259	0.11
Technical Training	3,684	0.33	1,260	0.27
Of which Informal Training	1,214	0.94	340	0.98
Entrepreneur Sole Activity	3,678	0.93	1,260	0.91
Workforce Characteristics				
Share with Social Security	3,683	0.66	1,260	0.17
Share with Contract	3,683	0.59	1,260	0.54
Share of Women	3,683	0.11	1,260	0.16
Share of Skilled Workers	3,683	0.89	1,260	0.92
Share of Semi-skilled Workers	3,683	0.08	1,260	0.05
Share of Unskilled Workers	3,683	0.02	1,260	0.01
Share of Apprentices	3,683	0.02	1,260	0.02
Share of Trained Workers	3,683	0.06	1,260	0.05
Share of Workers related Entrepreneur	3,683	0.74	1,260	0.83

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Table 4. Differences in Summary Statistics between Formal and Informal Firms in Morocco

Variable	Registered		Not Registered	
	Obs.	Mean	Obs.	Mean
Firm Characteristics				
Size				
Number of Workers	2,532	5.18	2,674	2.08
Single Worker	2,532	0.112	2,674	0.365
Micro (2-4)	2,532	0.658	2,674	0.593
Very Small (5-10)	2,532	0.120	2,674	0.039
Small (10-49)	2,532	0.110	2,674	0.003
Age of Firm	2,531	11.47	2,671	8.45
Exporter	2,516	0.03	2,662	0.02
Seasonal Activity	2,522	0.004	2,667	0.03
Single Plant	2,532	0.97	2,674	0.99
Access to Credit	2,520	0.27	2,658	0.14
Entrepreneur Characteristics				
Manager	2,531	0.38	2,674	0.20
Woman	2,532	0.12	2,674	0.20
Age	2,530	39.17	2,674	37.04
Education Level				
No Education	2,488	0.15	2,604	0.28
Primary Education	2,488	0.26	2,604	0.34
Secondary Education	2,488	0.42	2,604	0.33
Post-secondary Education	2,488	0.18	2,604	0.05
Technical Training	2,532	0.67	2,674	0.65
Of which Informal Training	1,696	0.89	1,750	0.91
Entrepreneur Sole Activity	2,515	0.95	2,649	0.96
Workforce Characteristics				
Share with Social Security	2,531	0.18	2,670	0.03
Share with Contract	2,532	0.12	2,667	0.04
Share of Women	2,474	0.17	2,558	0.19
Share of Skilled Workers	2,509	0.68	2,603	0.71
Share of Semi-skilled Workers	2,509	0.21	2,603	0.16
Share of Unskilled Workers	2,509	0.07	2,603	0.06
Share of Apprentices	2,509	0.04	2,603	0.07
Share of Trained Workers	2,529	0.58	2,668	0.54
Share of Workers related Entrepreneur	2,530	0.54	2,657	0.66

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Table 5. Determinants of Firm Formality in Egypt

	(1)	(2)	(3)	(4)
Micro [2-4]	0.145***	0.178***	0.157***	0.127***
	[0.013]	[0.014]	[0.014]	[0.014]
Very Small [5-9]	0.159***	0.183***	0.172***	0.140***
	[0.019]	[0.014]	[0.016]	[0.020]
Small [10-49]	0.207***	0.210***	0.204***	0.184***
	[0.021]	[0.010]	[0.012]	[0.019]
Age of Firm	0.0233***	0.023***	0.024***	0.025***
	[0.001]	[0.001]	[0.002]	[0.001]
Seasonal Activity	-0.090**	-0.098**	-0.090**	-0.113**
	[0.045]	[0.046]	[0.045]	[0.046]
Single Plant	-0.103***	-0.099***	-0.091***	-0.074**
	[0.029]	[0.028]	[0.029]	[0.030]
Access to Credit	0.079***	0.053**	0.058**	0.045*
	[0.023]	[0.025]	[0.024]	[0.025]
Manager			0.053***	0.048***
			[0.015]	[0.015]
Woman			-0.087***	-0.028
			[0.022]	[0.020]
Age			0.008***	0.009***
			[0.003]	[0.003]
Entrepreneur Sole Activity			0.083***	0.119***
			[0.028]	[0.030]
Primary Education				0.045***
				[0.017]
Secondary Education				0.164***
				[0.015]
Post-secondary Education				0.208***
				[0.012]
Technical Training				0.051***
				[0.014]
Industry Fixed Effects Included?	No	Yes	Yes	Yes
Region Fixed Effects Included?	No	Yes	Yes	Yes
Observations	4,880	4,876	4,865	4,863

Source: Author's calculations based on *MSE Survey*s (Economic Research Forum).

Dependent variable is a dummy variable that assumes the value 1 if the firm is commercially or industrially registered. Table reports the marginal effect on the firm's propensity to be registered from probit regressions. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Single Worker and No Education are the omitted size and entrepreneur's education groups, respectively. Age of Firm squared and Age squared are also included in the regressions (not reported). Industry fixed effects refer to the 2-digit industry or service.

Table 6. Determinants of Firm Formality in Morocco

	(1)	(2)	(3)	(4)
Micro (2-4)	0.289***	0.283***	0.252***	0.227***
	[0.017]	[0.017]	[0.019]	[0.019]
Very Small (5-9)	0.429***	0.449***	0.421***	0.382***
	[0.017]	[0.017]	[0.019]	[0.022]
Small (10-49)	0.549***	0.557***	0.550***	0.528***
	[0.009]	[0.008]	[0.009]	[0.012]
Age of Firm	0.013***	0.016***	0.013***	0.015***
	[0.002]	[0.002]	[0.002]	[0.002]
Seasonal Activity	-0.413***	-0.412***	-0.401***	-0.381***
	[0.039]	[0.045]	[0.049]	[0.058]
Single Plant	-0.189***	-0.154**	-0.164***	-0.180***
	[0.057]	[0.060]	[0.060]	[0.059]
Access to Credit	0.143***	0.124***	0.124***	0.109***
	[0.019]	[0.019]	[0.0120]	[0.020]
Manager			0.113***	0.117***
			[0.019]	[0.020]
Woman			-0.084***	-0.112***
			[0.023]	[0.023]
Age			0.019***	0.022***
			[0.004]	[0.004]
Entrepreneur Sole Activity			0.026	0.011
			[0.036]	[0.037]
Primary Education				0.108***
				[0.023]
Secondary Education				0.287***
				[0.022]
Post-secondary Education				0.383***
				[0.024]
Technical Training				0.031*
				[0.019]
Industry Fixed Effects Included?	No	Yes	Yes	Yes
Region Fixed Effects Included?	No	Yes	Yes	Yes
Observations	5,157	5,152	5,111	4,999

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Dependent variable is a dummy variable that assumes the value 1 if the firm is commercially or industrially registered. Table reports the marginal effect on the firm's propensity to be registered from probit regressions. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Single Worker and No Education are the omitted size and entrepreneur's education groups, respectively. Age of Firm squared and Age squared are also included in the regressions (not reported). Industry fixed effects refer to the 2-digit industry or service.

Table 7. Summary Statistics of the Main Performance Variables

Egypt					
Variable	Obs.	Mean	Std. Dev.	Min	Max
Ln Productivity	4,074	3.89	1.11	- 0.67	10.84
Ln Wage	4,228	3.15	0.95	- 1.59	7.12
Ln Capital	4,761	5.00	1.64	- 1.08	13.34
Morocco					
Variable	Obs.	Mean	Std. Dev.	Min	Max
Ln Productivity	5,152	5.33	0.99	0.44	9.52
Ln Wage	5,210	4.09	0.92	0.12	7.41
Ln Capital	4,354	6.63	1.74	-2.37	13.78

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).
Note: The logarithmic values are based in absolute variables quoted in USD at current prices at the time of the Survey (1USD/5.89Egyptian Pounds and 1USD/10.6466 Moroccan Dirhams).

Table 8. The Impact of Formality in the Egyptian Firm Productivity (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)
Method:	OLS	OLS	OLS	OLS	OLS	OLS
Registered	0.188***	0.265***	0.251***	0.127***	0.130***	0.097**
	[0.038]	[0.040]	[0.040]	[0.049]	[0.048]	[0.048]
Ln Capital	0.111***	0.109***	0.106***	0.104***	0.101***	0.093***
	[0.011]	[0.011]	[0.011]	[0.011]	[0.011]	[0.011]
Ln Number of Workers	-0.050	-0.050	-0.059	0.016	-0.036	-0.090*
	[0.039]	[0.040]	[0.046]	[0.053]	[0.051]	[0.050]
Share of Woman			-0.210***	-0.180***	-0.187***	-0.143**
			[0.063]	[0.064]	[0.063]	[0.063]
Share of Skilled Workers			0.246	0.228	0.245	0.186
			[0.217]	[0.216]	[0.224]	[0.220]
Share of Semi-skilled Workers			0.448**	0.463**	0.491**	0.418*
			[0.225]	[0.225]	[0.233]	[0.228]
Share of Apprentices			0.0800	0.131	0.160	0.177
			[0.293]	[0.293]	[0.299]	[0.294]
Share of Trained Workers			0.268***	0.230**	0.195**	0.112
			[0.091]	[0.091]	[0.089]	[0.091]
Share with Social Security				0.208***	0.176***	0.175***
				[0.054]	[0.054]	[0.054]
Share with Contract				0.144**	0.138**	0.146***
				[0.056]	[0.055]	[0.055]
Exporter					0.673**	0.591**
					[0.278]	[0.278]
Seasonal Activity					-0.445***	-0.476***
					[0.120]	[0.118]
Single Plant					-0.697***	-0.671***
					[0.129]	[0.128]
Access to Credit					0.166**	0.153*
					[0.081]	[0.080]
Primary Education						-0.007
						[0.053]
Secondary Education						0.133***
						[0.041]
Post-secondary Education						0.305***
						[0.057]
Technical Training						0.128***
						[0.041]
Industry Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Observations	3,916	3,916	3,916	3,916	3,900	3,898
R Squared	0.03	0.08	0.09	0.09	0.11	0.12

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).
The coefficients reported are the least square regression of the ln Productivity on different explanatory variables at the firm level. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Share of Unskilled Workers and No Education are the omitted schooling variables for the workforce and the entrepreneur, respectively. Industry fixed effects refer to the 2-digit industry or service.

Table 9. The Impact of Formality in the Moroccan Firm Productivity (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)
Method:	OLS	OLS	OLS	OLS	OLS	OLS
Registered	0.436***	0.377***	0.378***	0.363***	0.353***	0.343***
	[0.030]	[0.030]	[0.030]	[0.030]	[0.030]	[0.030]
Ln Capital	0.144***	0.133***	0.128***	0.115***	0.110***	0.107***
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
Ln Number of Workers	0.158***	0.181***	0.188***	0.115***	0.075***	0.056**
	[0.021]	[0.022]	[0.023]	[0.025]	[0.025]	[0.025]
Share of Woman			-0.016	-0.023	-0.019	-0.021
			[0.046]	[0.046]	[0.046]	[0.046]
Share of Skilled Workers			0.072	0.060	0.054	0.054
			[0.066]	[0.067]	[0.067]	[0.068]
Share of Semi-skilled Workers			0.051	0.043	0.055	0.066
			[0.073]	[0.073]	[0.073]	[0.074]
Share of Apprentices			-0.236**	-0.195**	-0.195**	-0.191**
			[0.093]	[0.093]	[0.093]	[0.094]
Share of Trained Workers			0.066*	0.049	0.047	0.055
			[0.036]	[0.036]	[0.036]	[0.037]
Share with Social Security				0.458***	0.411***	0.409***
				[0.068]	[0.068]	[0.068]
Share with Contract				0.172**	0.171**	0.144**
				[0.067]	[0.067]	[0.067]
Exporter					0.465***	0.437***
					[0.115]	[0.115]
Seasonal Activity					-0.287**	-0.322***
					[0.120]	[0.124]
Single Plant					-0.084	-0.097
					[0.110]	[0.113]
Access to Credit					0.157***	0.153***
					[0.032]	[0.032]
Primary Education						0.014
						[0.036]
Secondary Education						0.083**
						[0.037]
Post-secondary Education						0.176***
						[0.054]
Technical Training						0.008
						[0.032]
Industry Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Observations	4,304	4,304	4,083	4,070	4,023	3,945
R Squared	0.21	0.30	0.30	0.32	0.33	0.33

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).
The coefficients reported are the least square regression of the ln Productivity on different explanatory variables at the firm level. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Share of Unskilled Workers and No Education are the omitted schooling variables for the workforce and the entrepreneur, respectively. Industry fixed effects refer to the 2-digit industry or service.

Table 10. The Impact of Formality in the Egyptian Firm Productivity (2SLS)

	(1)	(2)
Method:	2SLS	2SLS
Registered	0.126**	0.124**
	[0.054]	[0.054]
Instruments	Registered at Start up, Ln Workers at Start up	Registered at Start up, Age of Firm, Ln Workers at Start up
Workforce, Firm and Entrepreneur Characteristics Included?	Yes	Yes
Industry Fixed Effects Included?	Yes	Yes
Region Fixed Effects Included?	Yes	Yes
p value of Sargan's test	-	0.24
Observations	3,896	3,859
R Squared	0.12	0.12

Source: Author's calculations based on *MSE Survey*s (Economic Research Forum).
The table reports the instrumental variables estimates of equation (3) in the text. All regressors of column (6) of table 6 are included in columns (2) and (4), but coefficients not reported. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Industry fixed effects refer to the 2-digit industry or service. The overidentification test we employ is due to Sargan (1958).

Table 11. The Impact of Formality in the Moroccan Firm Productivity (2SLS)

	(1)	(2)
Method:	2SLS	2SLS
Registered	0.367***	0.381***
	[0.039]	[0.039]
Instruments	Registered at Start up, Ln Workers at Start up	Registered at Start up, Age of Firm, Ln Workers at Start up
Workforce, Firm and Entrepreneur Characteristics Included?	Yes	Yes
Industry Fixed Effects Included?	Yes	Yes
Region Fixed Effects Included?	Yes	Yes
p value of Sargan's test	-	0.24
Observations	3,930	3,929
R Squared	0.33	0.33

Source: Author's calculations based on *MSE Survey*s (Economic Research Forum).
The table reports the instrumental variables estimates of equation (3) in the text. All regressors of column (6) of table 6 are included in columns (2) and (4), but coefficients not reported. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Industry fixed effects refer to the 2-digit industry or service. The overidentification test we employ is due to Sargan (1958).

Table 12. The Impact of Formality in the Egyptian Firm Paid Average Wage (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)
Method:	OLS	OLS	OLS	OLS	OLS	OLS
Registered	-0.184***	-0.033	-0.041	-0.016	-0.014	-0.034
	[0.034]	[0.033]	[0.033]	[0.038]	[0.038]	[0.038]
Ln Number of Workers	0.337***	0.208***	0.197***	0.195***	0.167***	0.121***
	[0.029]	[0.030]	[0.032]	[0.036]	[0.035]	[0.036]
Share of Woman			-0.248***	-0.251***	-0.266***	-0.246***
			[0.055]	[0.055]	[0.055]	[0.055]
Share of Skilled Workers			-0.067	-0.068	-0.049	-0.095
			[0.149]	[0.149]	[0.148]	[0.148]
Share of Semi-skilled Workers			0.155	0.153	0.177	0.124
			[0.156]	[0.156]	[0.155]	[0.155]
Share of Apprentices			-0.474**	-0.477**	-0.445**	-0.415**
			[0.188]	[0.188]	[0.186]	[0.187]
Share of Trained Workers			0.099	0.102	0.075	0.029
			[0.078]	[0.078]	[0.078]	[0.079]
Share with Social Security				-0.058	-0.084**	-0.093**
				[0.043]	[0.043]	[0.043]
Share with Contract				0.034	0.033	0.034
				[0.042]	[0.042]	[0.042]
Exporter					0.246	0.205
					[0.210]	[0.203]
Seasonal Activity					-0.213**	-0.237**
					[0.106]	[0.105]
Single Plant					-0.330***	-0.311***
					[0.071]	[0.071]
Access to Credit					0.270***	0.251***
					[0.053]	[0.052]
Primary Education						-0.0062
						[0.046]
Secondary Education						0.071*
						[0.038]
Post-secondary Education						0.251***
						[0.045]
Technical Training						0.076**
						[0.030]
Industry Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Observations	4,228	4,228	4,228	4,228	4,204	4,203
R Squared	0.04	0.13	0.14	0.14	0.15	0.16

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

The coefficients reported are the least square regression of the ln Average Wage on different explanatory variables at the firm level. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Share of Unskilled Workers and No Education are the omitted schooling variables for the workforce and the entrepreneur, respectively. Industry fixed effects refer to the 2-digit industry or service.

Table 13. The Impact of Formality in the Moroccan Firm Paid Average Wage (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)
Method:	OLS	OLS	OLS	OLS	OLS	OLS
Registered	0.317***	0.316***	0.300***	0.271***	0.261***	0.241***
	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]	[0.027]
Ln Number of Workers	0.328***	0.368***	0.381***	0.281***	0.253***	0.242***
	[0.017]	[0.018]	[0.019]	[0.020]	[0.020]	[0.023]
Share of Woman			-0.083**	-0.094**	-0.088**	-0.091**
			[0.038]	[0.037]	[0.038]	[0.038]
Share of Skilled Workers			0.242***	0.222***	0.224***	0.220***
			[0.057]	[0.057]	[0.057]	[0.058]
Share of Semi-skilled Workers			0.182***	0.169***	0.176***	0.187***
			[0.062]	[0.062]	[0.062]	[0.062]
Share of Apprentices			-0.205**	-0.151*	-0.160*	-0.155*
			[0.082]	[0.082]	[0.082]	[0.083]
Share of Trained Workers			0.11***	0.089***	0.078**	0.085**
			[0.032]	[0.032]	[0.031]	[0.033]
Share with Social Security				0.556***	0.534***	0.519***
				[0.058]	[0.058]	[0.058]
Share with Contract				0.135**	0.137**	0.119*
				[0.064]	[0.063]	[0.062]
Exporter					0.187**	0.155*
					[0.088]	[0.088]
Seasonal Activity					-0.378***	-0.393***
					[0.120]	[0.125]
Single Plant					-0.053	-0.051
					[0.092]	[0.093]
Access to Credit					0.137***	0.129***
					[0.029]	[0.029]
Primary Education						-0.020
						[0.032]
Secondary Education						0.082**
						[0.033]
Post-secondary Education						0.163***
						[0.047]
Technical Training						-0.004
						[0.028]
Industry Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects Included?	No	Yes	Yes	Yes	Yes	Yes
Observations	5,206	5,206	4,931	4,916	4,847	4,747
R Squared	0.14	0.21	0.22	0.25	0.26	0.26

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

The coefficients reported are the least square regression of the ln Average Wage on different explanatory variables at the firm level. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Share of Unskilled Workers and No Education are the omitted schooling variables for the workforce and the entrepreneur, respectively. Industry fixed effects refer to the 2-digit industry or service.

Table 14. The Impact of Formality in the Egyptian Firm Paid Average Wage (2SLS)

	(1)	(2)
Method:	2SLS	2SLS
Registered	0.024	0.023
	[0.044]	[0.045]
Instruments	Registered at Start up, Ln Workers at Start up	Registered at Start up, Age of Firm, Ln Workers at Start up
Workforce, Firm and Entrepreneur Characteristics Included?	Yes	Yes
Industry Fixed Effects Included?	Yes	Yes
Region Fixed Effects Included?	Yes	Yes
p value of Sargan's test	-	0.32
Observations	4,199	4,162
R Squared	0.15	0.15

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

The table reports the instrumental variables estimates of equation (4) in the text. All regressors of column (6) of table 6 are included in columns (2) and (4), but coefficients not reported. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Industry fixed effects refer to the 2-digit industry or service. The overidentification test we employ is due to Sargan (1958).

Table 15. The Impact of Formality in the Moroccan Firm Paid Average Wage (2SLS)

	(1)	(2)
Method:	2SLS	2SLS
Registered	0.279***	0.276***
	[0.034]	[0.034]
Instruments	Registered at Start up, Ln Workers at Start up	Registered at Start up, Age of Firm, Ln Workers at Start up
Workforce, Firm and Entrepreneur Characteristics Included?	Yes	Yes
Industry Fixed Effects Included?	Yes	Yes
Region Fixed Effects Included?	Yes	Yes
p value of Sargan's test	-	0.32
Observations	4,727	4,724
R Squared	0.26	0.26

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

The table reports the instrumental variables estimates of equation (4) in the text. All regressors of column (6) of table 6 are included in columns (2) and (4), but coefficients not reported. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Industry fixed effects refer to the 2-digit industry or service. The overidentification test we employ is due to Sargan (1958).

9. Appendix

Table A1. Variable Definitions

Variable	Definition
Registered	Dummy variable equal to 1 if the firm is commercially or industrially registered.
Registered at Start up	Dummy variable equal to 1 if the firm was commercially or industrially registered when started operations.
Tax Registered	Dummy variable equal to 1 if the firm has a tax number and is registered with the national tax department.
Regular Accounting	Dummy variable equal to 1 if the firm keeps regular (financial) accounts.
Productivity	Value added per month: sales - raw materials and purchase of inputs - energy consumption divided by the total number of workers (in USD, using the exchange rate at the time of the survey).
Ln Productivity	Natural logarithm of monthly productivity.
Wage	Firm's monthly wage bill divided by the number of workers, in USD (exchange rate at the time of survey).
Ln Wage	Natural logarithm of monthly average wage.
Capital	Value of the sum of buildings, tools and other equipments divided by the total number of workers in the firm (in USD, using the exchange rate at the time of the survey).
Ln Capital	Natural logarithm of firm's capital.
Single Worker, Micro, Very Small and Small	Dummy variables equal to 1 if the total number of workers in the firm is 1, between 2 and 4, between 5 and 9, or greater than 10, respectively.
Ln Number of Workers	Natural logarithm of firm's number of workers.
Ln Workers at Start up	Natural logarithm of the number of workers of firms when they started operations.
Age of Firm	Year of the survey minus the year when the firm started operating.
Exporter	Dummy variable equal to 1 if the firm is engaged in exporting.
Seasonal Activity	Dummy variable equal to 1 if the firm's period activity is temporary or seasonal and not permanent in time.
Single Plant	Dummy variable equal to 1 if the firm just has one operating location.
Access to Credit	Dummy variable equal to 1 if firm had access to credit during the last 12 months.
Sector of Activity	Two digit industries/sectors: Fishing and Mining; Manufacturing; Electricity; Construction; Trade; Hotels; Transports; Financial Services; Real Estate; Education; Health; Other Services.
Geographical Region Dummies	Geographical location for Egyptian firms: Metropolitan Area; Lower Egypt; Upper Egypt; and for Moroccan firms: Souss-Massa-Drâa; Gharb-Chrarda-Béni Hssen; Marrakech-Tensift-El Haouz; Oriental; Grand Casablanca; Rabat-Salé-Zemmour-Zaer; Doukkala-Abda; Meknès-Tafilalet; Fès-Boulemane; Taza-Al Hoceima-Taonate; Tangier-Tétouan.
Share with Social Security	Percentage of the total firm's workerforce that have social security.
Share with Contract	Percentage of the total firm's workerforce that have a written contract.
Share of Women	Percentage of the total firm's workerforce that are women.
Share of Skilled Workers, Share of Semi-skilled Workers, Share of Unskilled Workers, Share of Apprentices	Percentage of the firm's workforce that are skilled, semi-skilled, unskilled and apprentices, respectively.

Source: *Promoting Competitiveness in Micro and Small Enterprises in the MENA region* (Economic Research Forum), Egypt (2003) and Morocco (2002)

Table A1. Variable Definitions (cont.)

Share of Trained Workers	Percentage of the total firm's workerforce that received training related with present activity.
Share of Workers related with Entrepreneur	Percentage of the total firm's workerforce that are friends or family of the entrepreneur.
Manager	Dummy variable equal to 1 if the entrepreneur is manager (versus 0 if is owner).
Woman	Dummy variable equal to 1 if the entrepreneur is a woman.
Age	Age of the entrepreneur.
No Education, Primary Education, Secondary Education, Post-secondary Education	Dummy variables equal to 1 if the entrepreneur attended 0 years, 1-6 years, 7-12 years and more than 12 years of schooling, respectively.
Technical Training	Dummy variable equal to 1 if the entrepreneur had received formal or informal training, in the past, related with present activity.
Entrepreneur Sole Activity	Dummy variable equal to 1 if the entrepreneur has only one economic activity.

Source: *Promoting Competitiveness in Micro and Small Enterprises in the MENA region* (Economic Research Forum), Egypt (2003) and Morocco (2002)

Table A2. Determinants of Firm Formality in Egypt (for Different Definitions)

	Tax Registered	Regular Accounting
Micro [2-4]	0.110***	0.169***
	[0.012]	[0.012]
Very Small [5-9]	0.104***	0.357***
	[0.012]	[0.037]
Small [10-49]	0.126***	0.546***
	[0.0074]	[0.051]
Age of Firm	0.021***	-0.001
	[0.001]	[0.001]
Seasonal Activity	-0.118***	-0.079*
	[0.043]	[0.047]
Single Plant	-0.040	-0.186***
	[0.026]	[0.041]
Access to Credit	0.063***	0.011
	[0.015]	[0.034]
Manager	0.044***	0.038**
	[0.012]	[0.018]
Woman	-0.014	0.052**
	[0.016]	[0.025]
Age	0.008***	0.004
	[0.002]	[0.003]
Entrepreneur Sole Activity	0.108***	0.001
	[0.027]	[0.030]
Primary Education	0.057***	0.023
	[0.012]	[0.026]
Secondary Education	0.125***	0.177***
	[0.012]	[0.022]
Post-secondary Education	0.149***	0.287***
	[0.009]	[0.026]
Technical Training	0.063***	0.085***
	[0.011]	[0.017]
Industry Fixed Effects Included?	Yes	Yes
Region Fixed Effects Included?	Yes	Yes
Observations	4,866	4,848

Source: Author's calculations based on MSE Surveys [Economic Research Forum].
The table reports the marginal effect on the firm's propensity to be formal from probit regressions that consider two different possible definitions of formality. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Single Worker and No Education are the omitted size and entrepreneur's education groups, respectively. Age of Firm squared and Age squared are also included in the regressions [not reported]. Industry fixed effects refer to the 2-digit industry or service.

Table A3. Determinants of Firm Formality in Morocco (for Different Definitions)

	Tax Registered	Regular Accounting
Micro [2-4]	0.198***	0.109***
	[0.015]	[0.011]
Very Small [5-9]	0.154***	0.509***
	[0.011]	[0.048]
Small [10-49]	0.188***	0.791***
	[0.008]	[0.036]
Age of Firm	0.017***	0.001
	[0.002]	[0.001]
Seasonal Activity	-0.547***	-0.026
	[0.077]	[0.029]
Single Plant	-0.026	-0.079**
	[0.044]	[0.033]
Access to Credit	0.058***	0.060***
	[0.014]	[0.011]
Manager	0.090***	0.021**
	[0.014]	[0.009]
Woman	-0.123***	0.029**
	[0.019]	[0.012]
Age	0.016***	0.002
	[0.003]	[0.002]
Entrepreneur Sole Activity	0.030	-0.062***
	[0.029]	[0.022]
Primary Education	0.091***	0.015
	[0.013]	[0.013]
Secondary Education	0.171***	0.035***
	[0.014]	[0.014]
Post-secondary Education	0.174***	0.139***
	[0.010]	[0.029]
Technical Training	0.028**	0.021***
	[0.014]	[0.008]
Industry Fixed Effects Included?	Yes	Yes
Region Fixed Effects Included?	Yes	Yes
Observations	4,995	4,990

Source: Author's calculations based on MSE Surveys [Economic Research Forum].
The table reports the marginal effect on the firm's propensity to be formal from probit regressions that consider two different possible definitions of formality. Robust standard errors are in brackets. * significant at 10%, ** significant at 5%, *** significant at 1%. All variables are defined in Table A1. Single Worker and No Education are the omitted size and entrepreneur's education groups, respectively. Age of Firm squared and Age squared are also included in the regressions [not reported]. Industry fixed effects refer to the 2-digit industry or service.

Table A4. Switchers Analysis in Egypt

		Why Firms decided to register				
		Become Mandatory	Procedures Simplified	Become Advantageous	Other	Total
Why Firms did not register when they started operations	Too expensive	15	0	1	0	16
	Tedious	9	5	1	0	15
	Useless	24	3	7	0	34
	Other	13	0	3	1	17
	Total	61	8	12	1	82

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

The table reports the reasons pointed out by Egyptian firms for their behavior. We consider as switcher firms the ones that had began their operations without registering themselves and that decided to register afterwards.

Table A5. Switchers Analysis in Morocco

		Why Firms decided to register				
		Become Mandatory	Procedures Simplified	Become Advantageous	Other	Total
Why Firms did not register when they started operations	Too expensive	14	1	3	1	42
	Tedious	26	6	0	5	47
	Useless	30	6	0	7	95
	Other	20	2	0	7	61
	Total	90	15	3	20	245

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

The table reports the reasons pointed out by Moroccan firms for their behavior. We consider as switcher firms the ones that had began their operations without registering themselves and that decided to register afterwards.

Table A6. Summary Statistics of Initially Not Registered Egyptian Firms

Variable	Registered Afterwards (Switchers)		Still Not Registered (Non Switchers)	
	Obs.	Mean	Obs.	Mean
Firm Characteristics				
Number of Workers	106	1.89	1,259	1.72
Age of Firm	106	18	1,246	7
Exporter	106	0	1,255	0
Seasonal Activity	106	0.04	1,257	0.04
Single Plant	106	0.95	1,257	0.98
Access to Credit	106	0.05	1,259	0.04
Entrepreneur Characteristics				
Woman	106	0.03	1,259	0.15
Age	106	43	1,258	40
Education Level				
No Education	106	0.30	1,258	0.33
Primary Education	106	0.21	1,258	0.19
Secondary Education	106	0.33	1,258	0.37
Post-secondary Education	106	0.16	1,258	0.11
Technical Training	106	0.20	1,259	0.27

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).

Table A7. Summary Statistics of Initially Not Registered Moroccan Firms

Variable	Registered Afterwards (Switchers)		Still Not Registered (Non Switchers)	
	Obs.	Mean	Obs.	Mean
Firm Characteristics				
Number of Workers	442	3.11	2,654	2.07
Age of Firm	442	17	2,652	9
Exporter	440	0.002	2,642	0.002
Seasonal Activity	442	0.05	2,647	0.03
Single Plant	442	0.98	2,654	0.99
Access to Credit	440	0.27	2,638	0.14
Entrepreneur Characteristics				
Woman	442	0.08	2,654	0.20
Age	442	42	2,654	37
Education Level				
No Education	439	0.23	2,585	0.28
Primary Education	439	0.33	2,585	0.34
Secondary Education	439	0.37	2,585	0.33
Post-secondary Education	439	0.07	2,585	0.05
Technical Training	442	0.74	2.654	0.65

Source: Author's calculations based on *MSE Surveys* (Economic Research Forum).