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**MSES INFORMALITY AND PRODUCTIVITY:  
EVIDENCE FROM EGYPT**

**Hala Abou-Ali and Reham Rizk**

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**Send correspondence to:**

Reham Rizk

British University

[reham.rizk@bue.edu.eg](mailto:reham.rizk@bue.edu.eg)

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## Abstract

This paper assesses the impact of informality on household enterprise performance in terms of productivity and size of output. Furthermore, it pinpoints informality determinants with respect to different types of obstacles that impede their growth. The analysis uses the ELMPS 2012 data and finds that a firm's age and an entrepreneur's education level have a significant impact on the likelihood of belonging to the informal sector. Moreover, mobile enterprises, agricultural sector and household savings increase the probability of belonging to the informal sector. In sum, the results support the argument that informality has a deterrent impact on the level of productivity and the value of output of household enterprise in Egypt.

**JEL Classification:** D2, E26, O17, P42

**Keywords:** Productivity; Informality; MSEs; Egypt

## ملخص

تقيم هذه الورقة التأثير غير الرسمي على أداء مؤسسات الأسر المعيشية من حيث الإنتاجية وحجم الانتاج. وعلاوة على ذلك، فإنها تبرز المحددات غير الرسمية فيما يتعلق بأنواع مختلفة من العقبات التي تعيق نموها. يستخدم التحليل بيانات المسح التبعي لسوق العمل في مصر لعام 2012 ونجد أن عمر المؤسسة والمستوى التعليمي لصاحبها له أثر كبير على احتمال انتمائها إلى القطاع غير الرسمي. وعلاوة على ذلك، نجد أن شركات المحمول، القطاع الزراعي ومدخرات الأسر تزيد من احتمال انتمائها إلى القطاع غير الرسمي. وخلاصة القول إن النتائج تدعم الرأي القائل بأن القطاع غير الرسمي له تأثير رادع على مستوى الإنتاجية وقيمة الإنتاج لمنتجات الأسر المعيشية في مصر.

## 1. Introduction

Today stylized facts show, according to Angel-uridinola, Urdinola, & Tanabe, 2012, the informal sector in Egypt constitutes more than 58.3% of total employment. This is explained by the investment climate and barriers to entry faced by micro and small enterprises (MSEs)<sup>1</sup>. The difficulties take many forms. They could relate to complying with administrative procedures, availability of finance, infrastructure, skills and the difficulties due to informality and corruption. Such barriers contribute negatively to output and hence employment in Egypt. In succession to the global financial crises, the MENA region was hit by economic crisis and political upheavals, all having an adverse effect on labor markets, earnings profiles and employment opportunities. This led to a decline in GDP growth, a drop in household incomes and a shift in consumption patterns. Attention has rapidly grown towards satisfying domestic demands as a way for recovering developing economies relying on MSEs.

The contribution of MSEs to output and employment is evident and varies across countries. Using data for five African countries (Botswana, Kenya, Malawi, Swaziland and Zimbabwe) Mead (1994) finds that MSEs absorbed about 40% of the increase in labor force. Dantels (1999) argues that one-third of the working population in Kenya is employed in MSEs, which contribute 13 percent to the national income. The informal sector accounts for about 44 percent of GNP in Africa (Schneider and Enste 2003)<sup>2</sup>. Mead and Liedholm (1998) observe that the contribution of MSEs to output and employment is increasing especially during expansion periods in Jamaica, the Dominican Republic and Kenya. ILO (2003) estimates that MSEs role in employment amounts to 58 percent, 54 percent and 53 percent of total employment in Paraguay, Mexico and Bolivia, respectively.

It could be argued, as in Renooy (1990), that there are two groups of factors that increase the size of the informal sector in any economy. These are structural and opportunity factors. The structural factors include institutional regulations and financial pressures. The opportunity factors are related to individual characteristics, such as standard of living, education, and skills, or non-individual characteristics related to societal background, encompassing values, environment, cultural tradition and geographical factors. These factors especially that of opportunity, could explain the existence of the informal sector. Furthermore, the individual free choice could formulate the decision to pay tax based on lack of trust in the adequacy of the way taxes are spent by government. In light of this, the paper attempts to identify existing barriers to formality and to pinpoint factors that boost the conditions facing MSEs in Egypt. The reason why we concentrate on MSEs is that all informal businesses fall in this category. Consequently, we use MSEs and informal businesses interchangeably. Using the 2012 Egyptian Labor Market Panel Survey (ELMPS) on OAMDI (2013), a logit model is estimated to assess the informality determinants.

Another central argument of this paper is to assess the impact of informality on MSEs' productivity and size of output. While the bulk of existing work on informality focuses on its causes, characteristics and consequences, research devoted to understanding the drivers for efficient and profitable levels of production is scarcer, which makes this study a significant one. Therefore, the novelty of this paper is in testing productivity differences between two types of enterprises (formal/ informal) in Egypt. This is implemented through the estimation of an ordinary least squares (OLS) model. The remainder of the paper is organized as

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<sup>1</sup> There are several criteria for classifying enterprises as MSEs. The one adopted in this paper is the number of workers such that "micro" enterprises are the ones that employ less than 10 workers; and "small" enterprises are the ones that employ 10-to-49.

<sup>2</sup>The contribution of the informal sector to the GNP, derived from physical input method, 1989-1993, is estimated to be 39% in Latin America, 35% in Asia, 20% in Middle and Eastern Europe and 12% in OECD (Schneider and Enste 2003).

follows: Section 2 sketches the features of informality literature. Section 3 describes the available data. The description of the applied methodologies together with the results of the study and further discussion of the analysis are presented in Section 4. Section 5 puts forward some concluding remarks.

## **2. Informal Sector between Measurement and Application**

Academic thinking about the informal sector, until recently, thought that it is a marginal activity (Hart 1971). It is ignored in the development models and national records (Swaminathan 1991). The genesis of informal economy initiated by Hart is perceived either as a source of living outside the formal economy, or as a way of supplementing income (Bromley and Gerry 1979). Thus, the informal sector is limited to self-employment and small-scale activities. Presently, it is considered of crucial importance to the social and economic dynamics of any country, especially low-income countries (Gërkhani 1999). ILO (1972) emphasizes the role of incorporating the informal sector in the economy in order to provide subsistence to families. Informality, according to this report, is based on avoiding government regulations and taxes. De Soto (1989) establishes informality on the regulatory framework approach, which relates the emergence of the informal sector to excessive transaction costs and applied policies. It calls for the deregulation of markets and the development of the informal sector.

Anno (2003) classifies the definition of informal sector into two categories, namely: definitional and behavioral. The former category includes all unreported economic activity, while the latter refers to the relation between economic agents and institutional constraints. Hussmanns (2004) defines the informal sector as activities involving the production of goods and services and operating with less use of labor and capital that results in employment and income generation to the employers and employees. These activities do not include any kind of specialization between labour and capital and do not involve any formal guarantees.

The literature on the informal sector classifies the factors that contribute to informality into three main criteria: political, economic and social (Jenkins and Harding 1989). They describe the institutional pattern by which society shapes the informal sector. The political aspect involves lack of government regulation, illegal activities and, consequently, excessive errors in measuring GNP. For developing countries, errors in measuring GNP do not attract much attention. The economic factors are considered the most important and include a group of sub-criteria that could be summarized in five points: (1) The consequences of the informal sector on the labor market status, such as lack of social benefits, unreported labor force, and poor working conditions; (2) Tax evasion which is emphasized in many studies (see for instance, Frey 1989; Cowell 1990; Alm 1991; and Schneider and Enste 2000); (3) Size of the activity refers to the firms that contain less than ten informal workers - this criterion is widely used in developing countries as the majority firms in the informal sector are dominated by small-scale activities; (4) Professional status describes the dominance of certain professions in the informal sector such as self employed, family workers and domestic servants; and (5) Activity regulation and registration characterize the relation between government regulation and enterprise economic activity. Swaminathan (1991) defines the informal enterprises as entities that are not reported or licensed.

As concerns the social attributes, three main factors are identified, namely: social networks and ease of entry; autonomy and flexibility; and survival. Social networks show a very significant effect in developed countries studies on the informal sector (Bremar 1980). But it is not a widely used criterion in developing countries studies. Most of the entrepreneurs prefer to work in the informal sector because they have the freedom to choose the enterprise activity and to determine the working conditions and to develop and use their creativity, "autonomy and flexibility." Finally, the survival criterion of the informal sector is of marked

importance in developing countries, compared to their counterparts. The informal establishments are labour intensive, use primitive technology and generate low income and little accumulation to their participants. This implies that informality generates economic consequences for growth and accumulation. Furthermore, developing countries are characterized by a low rate of industrialization and productivity, besides a surplus of unskilled and semi-skilled labor that is embedded in the informal sector (Bremas 1980). This is supported empirically by the study of Johnson, Kaufmann, and Zoido-Lobaton (1998a) who argue that a laissez passer approach explains the emergence of informal activities in some Latin America countries. The remainder of this section highlights techniques of the informal sector and sketches the relationship between formal and informal sectors. Finally, some relevant empirical studies are presented.

### ***2.1 Methods of measuring the informal sector***

Three approaches are used to measure the size of the informal sector, namely: direct, indirect and latent (Schneider and Enste 2000). For the direct approach, the informal sector is measured based on sample surveys or tax auditing that measures the discrepancy between actual tax revenues and those reported by institutional checks. With reference to the indirect approach, cash demand or physical inputs are applied as proxies to the size of the informal sector. Transactions of the informal sector are usually carried through cash. Therefore, an increased activity of this sector entails an increase in cash demand. Conversely, the physical input is used to compare the difference between official GDP records and electricity consumption.

In the latent approach, the size of the informal sector is estimated based on structural equations. This type of estimation is used to link the unobservable indicator (informal sector) with observable indicators assumed to be influential. The latter are tax burden, the cost of red tape and government regulation, monetary indicators and labor force participation rate, in addition to the indicators that affect the size of the informal sector (Schneider 2002).

Regardless of the estimation approach the size of informal sector face two main problems. First, no consensus is reached on its definition for the informal sector. Second, data gathering on informal sector is very difficult since those engaged in such activities are not seeking recognition.

### ***2.2 The relation between the formal and informal sectors***

The main stream theories explained the relation between formal and informal sectors in two ways: either complementary or competitive (Abd El-Fattah 2012). The relation could be complementary via producing products in the informal sector rather than the formal one. On the other hand, it could be competitive via the benefiting from cheaper labor and lower prices. There are two sub-theories of the main stream theory. The first is the production – rationale theory, highlighting the role of government in monitoring the work of the informal sector. The objective of this theory is to integrate the informal economy into the formal one and to provide the government with true estimates of the size of the economy. This approach is suitable for the Egyptian case. The other theory emphasizes the free operation of the informal sector that leads to efficient allocation of resources (Jenkins and Harding 1989).

With respect to the effect of the formal sector on the informal sector, Lubell (1991) suggests that the effect could be pro-cyclical or anticyclical. On the one hand, whenever the economy faces recession, individuals become more engaged in the informal activities to earn their living (anti-cyclical). On the other hand, when the economy expands, there will be direct and indirect demand on goods and services produced in the informal sector, thus increasing its size. Greenfield (1993) supports the parallel development of both sectors. Schneider(1998) argues that two-thirds of earned incomes in the informal sector in Germany is spent in the

formal sector and consequently stimulates the economy. This conclusion is also supported by the work of Adam and Ginsburgh (1985) in Belgium. Alternatively, Feige (1997) reports a clash between informal and formal institutions because the informal sector cannot resort to courts. This discourages investment and growth as reported by De Soto (1989) in Peru.

### **2.3 Literature review**

Some studies focus on the *size* of the informal sector. According to Chen (2007), informal employment accounts for 50 to 75 percent of non-agricultural employment in developing countries (48 percent in North Africa; 51 percent in Latin America; 65 percent in Asia; and 72 percent in sub-Saharan Africa). This result is corroborated by Assaad (2006) who indicates that informal employment accounts for 55 percent of non-agricultural employment in Egypt. With reference to informal employment, using the 2006 Egyptian Labor Market Panel Survey (ELMPS) Wahba (2009) estimates the probability of graduating from the informal to the formal sector and finds that sector mobility is determined by two factors: education and gender. The probability to shift to formality is possible for highly educated male workers but it is considered a dead-end for the uneducated and for female workers.

Turning to the studies that cover the informal sector *characteristics*, Mahdi (2002) focuses on the characteristics of the informal sector and particularly MSEs. The study indicates that in 1998, 82 percent of the country's MSEs were informal. The growing contribution of the sector to Egyptian economic activity is attributable to the diminishing role of the public sector and to the slow pace of job opportunities being offered in the private sector, in addition to the recessionary atmosphere. Furthermore, the analysis indicates gender discrimination between the formal and informal sectors.

There is a massive literature on the definition of informality and determining its size. However, the relation between informality and economic development is still far from being understood.

With regard to *productivity and output*, there are two opposing views. The first represents a positive motive for development, as firms in the informal sector are not subject to any governmental regulation compared to the formal ones. Thus, informal firms can operate more efficiently (Schneider & Enste 2002). While the other view states that informality leads to various forms of distortions. Some authors argue that informal firms enjoy cost advantage compared to their formal counterparts through tax avoidance (Lewis 2004). Others claim that some informal firms reduce their level of operations to avoid being detected (Farrell 2004). Finally, another group make the case that informality impedes development because it benefits employment in less productive activities (Levy 2010).

In Mexico, (Ordonez 2010) sides with the adverse effect of MSEs on productivity. Since informality is associated with government inability to enforce taxes on all firms, the most productive firms (formal) pay taxes while the informal ones do not. Thus, informal firms enjoy cost advantage over the formal firms, which in turn would encourage less-productive firms to start new business. Moreover, informality decreases output level, since firms prefer not to increase their capital-labor ratios beyond a certain threshold to avoid government detection. The author finds that a policy of complete enforcement will increase labor productivity by 17%, which is driven by 45% increase in capital accumulation and 64% reduction in all tax levels. This is accompanied by 4% increase in total factor productivity and 9% increase in wages.

Amin (2009) classifies the informal sector into two categories of firms: opportunity and necessity. The former enters the informal sector by choice and takes advantages of business opportunities (opportunity entrepreneurs). The latter joins the informal sector due to lack of choices. The study shows that opportunity firms are almost twice as efficient as necessity



firms, using labor productivity as a measure of firm efficiency in three African countries (Ivory Coast, Madagascar and Mauritius).

Galal (2004) investigates the extent by which the formalization process affected the society. According to the pessimistic scenario, the net annual gain to government, entrepreneurs and employees is 0.8, 0.6 and 0.7 percent of GDP, respectively. However, consumers and taxpayers lose 1.7 and 0.04 percent of GDP, respectively. In the optimistic scenario, government, entrepreneurs and employees achieve 2.5, 2.2 and 1.1 percent of GDP, respectively. Meanwhile, consumers and taxpayers forgo 2.1 and 0.04 percent of GDP, respectively.

Abd El-Fattah (2012) explored job satisfaction and profitability in Egypt's informal sector using a survey eliciting the views of 90 and 180 employers regarding informality. The analysis indicates that employers tend to realize more profits in the trade and manufacturing sectors, with a higher probability to remain informal. With respect to employees, job satisfaction is higher in the manufacturing sector. Education tends to be positively correlated with employers' profitability and negatively correlated with employees' job satisfaction. In addition, this analysis motivates the gradual graduation of the informal sector to formal sector by linking upstream informal entities with downstream formal ones, and decent work conditions are crucial for profitability and job satisfaction.

El-hamidi (2011) provides gender-based empirical evidence and compares the perception of growth, employment and survival of MSEs for both male and female entrepreneurs in Egypt. The study finds that women are better than men in generating revenues; although their revenues are one third of males. However, there is no difference between them in employment growth and efficiency of running businesses.

### **3. Data**

This study makes use of the 2012 ELMPS. The survey is a follow-up survey to the ELMPS 1998 and ELMPS 2006. It was carried out by the Economic Research Forum in cooperation with the Egyptian Central Agency for Public Mobilization and Statistics. The field work for the survey in question was carried out from March to June of 2012. The ELMPS 2012 includes 12,060 households, consisting of 6,752 households from the 2006 sample, 3,308 new households as a result of splits emerging from the original households, and a sample refresher of 2,000 households. Of the 37,140 individuals interviewed in the 2006 survey, 28,770 (77 percent) were successfully re-interviewed in 2012. Of which 13,218 individuals were also tracked in 1998, forming a panel that can be used for longitudinal analysis. The 2012 sample also includes 20,416 new individuals. Of these new individuals, 5,009 joined original 2006 households, 6,900 joined split households, and 8,507 were members of the refresher sample of households. Furthermore, the survey instrument consists of three chapters. The first chapter introduces the household questionnaire that contains information on basic characteristics, housing services and facilities, and durable goods. The second chapter presents the individual questionnaire that includes information on father's and mother's characteristics, siblings and health, in addition to detailed female module, as well as education and earnings. The third chapter proposes information about migration, remittances, and non-agricultural and agricultural enterprises.

Our research focuses on non-agricultural household enterprises, concerning the distribution of the sample. Table 1 shows that around 60% of the entrepreneurs' aged between 15 to 30 are working in informal sector. Table 2 displays that 55.2 percent of informal household enterprises are located in rural areas, while Greater Cairo, Alexandria and Suez Canal only holds 16.8 percent from informal household enterprises. Table 3 indicates that 67.6 % of entrepreneurs who are illiterate or with basic education (primary and preparatory certificate) tend to start up their business informally. However, there is a tendency between the 8.3% of

the entrepreneurs holding university degrees and above to start up businesses informally. Table 4 reveals that 30.45% of informally operating household enterprises are working in the services sector, and 23.65% in manufacturing. Table 5 shows that 18.65%, 24.53% and 23.02% of household enterprises operating in the informal sector belong to first, second and third wealth quintiles, respectively. Table 6 exhibits the likelihood of informal household enterprises active in mobile places or working at their own home amounts to 42.74% and 18.44%, respectively. Table 7 portrays the descriptive statistics of the variables deployed in the estimated models.

#### 4. Econometric Analysis

##### 4.1 Methodology

The objective of this paper is to highlight the difference between formal and informal firms in terms of productivity and output. To do so, a logit regression model is applied to determine the characteristics that drive entrepreneurs' choice to go formal or informal.

The model is defined as (Greene 2002),

$$I_i = \begin{cases} 1 & \text{if } \gamma X_i + \mu_i > 0 \\ 0 & \text{if } \gamma X_i + \mu_i \leq 0 \end{cases}$$

$$\text{Informal: } y_{1i} = Z_{1i}\beta_1 + \varepsilon_{1i} \quad \text{if } I_i = 1$$

$$\text{formal: } y_{0i} = Z_{0i}\beta_0 + \varepsilon_{0i} \quad \text{if } I_i = 0$$

where  $I_i$  denotes informality status if the firm selects to work in the informal sector. It is equal to one for informal and 0 for formal.  $X_i$  's include variables on the entrepreneur characteristics such as age and educational level; marital status, location, economic activity, age groups, gender, and workplace description of enterprise. Moreover, availability of loans, description of the workplace and household wealth are captured.  $\beta_1$ ,  $\beta_0$  and  $\gamma$  are vectors of parameters to be estimated. It is assumed that  $\mu_i, \varepsilon_{1i}, \varepsilon_{0i}$  have a trivariate normal distribution with zero mean and covariance matrix  $\Sigma$ , i.e.,  $(\mu_i, \varepsilon_{1i}, \varepsilon_{0i}) \sim N(0, \Sigma)$ .

As a second step of the analysis, the paper examines the impact of informality on output and productivity of the enterprise. OLS regression model is used to determine the impact of informality on output and productivity. Our approach is similar Trang Do (2009) and (Goedhuys 2002). Equation to be estimated is written as follows.

$$\text{Ln}(\text{output}_i) = \Pi_0 + \Pi_1 X_1 + \Pi_2 \text{Informal}_i + \varepsilon_1 \quad (1)$$

$$\text{Ln}(\text{Productivity}_i) = \Pi_3 + \Pi_4 X_2 + \Pi_5 \text{Informal}_i + \varepsilon_2 \quad (2)$$

where  $\text{Ln}(\text{output}_i)$  is defined as enterprise's average net earnings per month in 2012 measured in local currency.  $\text{Informal}_i$  is a dummy variable that takes the value of 1 if the firm is informal (has no business license nor accounting books) and 0 otherwise.  $X_i$ 's include different groups of explanatory variables to capture various dimensions. It includes factors of production (labor and raw material all measured in log form) in addition to estimated value of capital when the firm started (categorical variable), access to infrastructure (electricity, water, laptop, mobile and internet), ownership of assets (land, buildings, vehicles, cars and machinery), access to finance (household savings and loans), the enterprise location (Great Cairo, Alexandria and Suez, upper and lower Egypt), enterprise economic activity (agricultural, wholesale trade, service and industrial sector), description of the firm's place (own home, fixed place as shop or mobile place as taxi, carriage, etc.), and firm's age in logarithm form. In addition to the worker's educational level, which is captured by years of schooling in logarithm form. In equation (2), the dependent variable is  $\text{Ln}(\text{productivity})$  and

measured as total output per worker. Asset ownership index and infrastructure index are constructed to test their impact on firm's productivity (Moser and Felton 2009).  $\varepsilon_1$  and  $\varepsilon_2$  represent the discrepancy terms.

## **4.2 Empirical results**

### *4.2.1 Determinants of informality*

Table 8 displays the determinants of informality in Egypt in 2012. Concerning the impact of age on informality, we find that informality is inversely related to entrepreneur's age. Since at a younger age, entrepreneurs tend to be informal and later as they get older switch to the formal sector. The results further show that the probability of informality declines with level of education and firm's age. This is consistent with theories of life cycle that explain the declining tendency of enterprises to operate informally with entrepreneur's education and firm's age. Moreover, concerning access to finance, household savings are the most important startup business and it is clear that household savings increase the probability of informality as they do not require any official paper as compared to formal loan applications.

The results exhibit that informality increases in Greater Cairo as compared to Alexandria and Suez Canal region. Informality increases in rural Lower Egypt. This is because rural areas suffer from high levels of poverty, resulting in low levels of individual income and lower access to finance and social networks. Moving to enterprise economic activity, the probability of having informal household enterprises are focused in transforming agricultural products, services and manufacturing, compared to wholesale trade sector. This is because agriculture uses less labor and capital. In such cases, informal papers and a license are not needed to start up a business.

The probability of informality declines at top household wealth quintile', where finance and social networks are available to the household, leading to a diminishing tendency to work in the informal sector. The probability of informality substantially increases in household enterprises if the workplace is the entrepreneur's home or is mobile, such as a carriage or taxi.

### *4.2.2 Determinants of output and productivity*

Table 9 depicts the results of informality's impact on output. The results confirm that informality reduces output. Therefore, we can say that informality in Egypt is considered one of the obstacles that impede growth of household enterprises in Egypt. Access to labor and energy usage increases level of output. Moreover, capital is directly related to output. Additionally, asset ownership, such as buildings, land and machinery allows enterprises to produce more output. Access to electricity, water, laptops and mobiles provide a positive and significant boost to output. It is obvious that enterprises located in Greater Cairo produce more, relative to different regions of Egypt. This may be explained by the presence of externalities coming from other firms located in the same area. Educational level, measured by years of schooling, has a positive and significant impact on output. Moreover, household savings have a positive and significant effect on the output of household enterprises. Moving to firm's age, as it increases output increases and belonging to the highest wealth quintile, household enterprises will produce more and market their products due to availability of finance and social networks. Moving to the place of enterprise, both the entrepreneur's own home and mobile places reduces output compared with if the enterprise has a fixed pace, such as a shop or factory.

Moving to the link between informality and productivity, the results in Table (10) illustrate an insignificant negative relation between informality and productivity of household enterprise. We also find that raw materials, energy usage, and capital boost productivity of firms. Also, firm age and ownership of assets by the entrepreneur have a positive impact on firm productivity. Belonging to top wealth quintile also boosts firm productivity, as well as a

firm's location in Greater Cairo compared to other regions. Finally, if the place of enterprise is mobile, this decreases enterprise productivity.

## **5. Conclusion**

The paper evaluates the impact of informality on household enterprise performance in terms of productivity and output in Egypt. It highlights the types of obstacles that are faced by household enterprises leading to informality. The paper also pinpoints the determinants that enhance productivity and output of household enterprises. Using ELMPS 2012, with a focus on household enterprises in Egypt, the paper finds that firm age, owners and managers' level of education have a significant impact on the probability of firm belonging to the informal sector. In addition, the entrepreneur that lies in the age group between 15-25 years old tends to belong to the informal sector. The paper also finds that informality has a significant and negative impact on productivity and output of household enterprises in Egypt during 2012.

As mentioned earlier, informal sector activity in Egypt absorbs 58.3 percent of total employment. This is considered a significant percentage. It is due to red tape and routine faced by household enterprises in starting up new business. Government should interfere extensively through issuing laws and providing a business environment capable of encouraging household enterprises to switch from the informal to the formal sector. In addition, difficulties facing finance availability require collaterals, such as deposit accounts, fixed assets or personal assets. Finally, infrastructure obstacles include access to roads, clean water, electricity and internet. Policymakers should work on improving the investment climate via reducing the aforementioned obstacles and providing extensive reform to the regulatory framework and paperwork cycle in the Egyptian economy. Moreover, government should facilitate the availability of formal loans to household enterprises in order to improve their performance and ensure their sustainability.

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**Table 1: Distribution of the Sample According to Age Groups (%)**

Age group	Informal	Formal
Age group 1 (15-25)	31.54	29.35
Age group 2 (26-35)	27.14	25.73
Age group 3 (36-45)	16.01	16.72
Age group 4 (46-55)	13.64	14.94
Age group 5 (56-65)	7.1	8.77
Age group 6 (66- above)	4.56	4.48

**Table 2: Distribution of the Sample According to Regions (%)**

Regions	Informal	Formal
Great Cairo	10.52	16.67
Alex, Suez Canal	6.28	10.75
Urban Lower Egypt	13.85	19.86
Urban Upper Egypt	14.32	19.47
Rural Lower Egypt	30.17	19.76
Rural Upper Egypt	24.86	13.49

**Table 3: Distribution of the Sample According to Educational Level (%)**

Education status	Informal	Formal
Illiterate	54.31	49.54
Basic education (primary and preparatory )	13.29	9.54
Secondary	22.02	20.19
Post Secondary	2.05	4.39
University and above	8.33	16.43

**Table 4: Distribution of the Sample According to Economic Activity (%)**

Economic Activity	Informal	Formal
Wholesale trade	43.04	58.84
Service	30.45	24.96
Agriculture	1.37	0.1
Manufacturing	23.65	15.28

**Table 5: Distribution of the Sample According to Household Wealth Quintiles (%)**

Household quintiles	Informal	Formal
First Quintile	18.65	5.49
Second quintile	24.43	9.54
Third Quintile	23.02	16.92
Fourth Quintile	20.04	22.65
Fifth quintile	13.76	45.40

**Table 6: Distribution of the Sample According to Place of Work (%)**

Place of Work	Informal	Formal
Own home	18.44	3.61
Fixed places	38.83	90.41
Mobile places	42.74	5.98

**Table 7: Summary Statistics**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Log (Output )	6190	7.388	1.275	0	13.49
Log (Productivity)	1757	7.339	1.182	4.83	11.51
Informal	6190	0.665	0.472	0	1
Log (Firm age)	6190	2.114	1.104	0	4.28
<b>Factors of Production</b>					
Labor	6190	0.806	2.228	0	40
Capital (0-999)	6190	0.441	0.497	0	1
Capital (1000-10,000)	6190	0.339	0.473	0	1
Capital (10,000-49,000)	6190	0.150	0.357	0	1
Capital (50,000-above)	6190	0.071	0.256	0	1
Log (raw material)	6190	0.770	2.105	0	11.00
Log (Energy)	6190	0.817	1.945	0	9.62
<b>Infrastructure</b>					
Access Electricity	6190	0.511	0.500	0	1
Access Water	6190	0.203	0.403	0	1
Access Laptop	6190	0.028	0.164	0	1
Access Mobile	6190	0.699	0.459	0	1
Access Internet	6190	0.114	0.318	0	1
<b>Marital Status</b>					
Single	6190	0.281	0.450	0	1
Widow and Divorced	6190	0.057	0.232	0	1
Married	6190	0.662	0.473	0	1
<b>Educational Level</b>					
Illiterate	6190	0.527	0.499	0	1
Basic education (primary and preparatory )	6190	0.120	0.325	0	1
Secondary	6190	0.214	0.410	0	1
Post Secondary	6190	0.028	0.166	0	1
University and above	6190	0.111	0.314	0	1
Log (years of Schooling)	6190	1.865	0.952	0	2.995732
<b>Age</b>					
Age group 1 (15-25)	6190	0.307	0.461	0	1
Age group 2 (26-35)	6190	0.267	0.442	0	1
Age group 3 (36-45)	6190	0.162	0.369	0	1
Age group4 (46-55)	6190	0.142	0.349	0	1
Age group 5 (56-65)	6190	0.077	0.267	0	1
Age group 6(66- above)	6190	0.044	0.206	0	1
<b>Access to Finance</b>					
Household Savings	6190	0.783	0.412	0	1
Loans	6190	0.121	0.326	0	1
<b>Ownership of Assets</b>					
Own Building	6190	0.182	0.386	0	1
Own Land	6190	0.074	0.263	0	1
Own Machinery	6190	0.400	0.490	0	1
Own Transport Assets	6190	0.166	0.372	0	1
Female	6190	0.488	0.500	0	1
Male	6190	0.512	0.500	0	1
<b>Regions</b>					
Great Cairo	6190	0.127	0.333	0	1
Alex, Suez Canal	6190	0.078	0.268	0	1
Urban Lower Egypt	6190	0.160	0.366	0	1
Urban Upper Egypt	6190	0.159	0.366	0	1
Rural Lower Egypt	6190	0.263	0.440	0	1
Rural Upper Egypt	6190	0.213	0.410	0	1
<b>Economic Activity</b>					
Wholesale trade	6190	0.481	0.500	0	1
Service	6190	0.286	0.452	0	1
Manufacturing	6190	0.211	0.408	0	1
Agriculture	6190	0.009	0.095	0	1
<b>Household wealth</b>					
First Quintile	6190	0.142	0.349	0	1
Second quintile	6190	0.195	0.396	0	1
Third Quintile	6190	0.211	0.408	0	1
Fourth Quintile	6190	0.208	0.406	0	1
Fifth Quintile	6190	0.245	0.430	0	1
<b>Place of Enterprise</b>					
Own home	6190	0.136	0.343	0	1
Mobile places	6190	0.306	0.461	0	1
Fixed places	6190	0.558	0.497	0	1



**Table 8: Determinants of Informality**

<b>Variables</b>	<b>Coefficients</b>	<b>St. Errors</b>
<b>Age Groups (reference group = age group 1(15-25)</b>		
Age group 2 (26-35)	-0.204*	-0.117
Age group 3 (36-45)	-0.270**	-0.131
Age group4 (46-55)	-0.470***	-0.155
Age group 5 (56-65)	-0.420**	-0.176
Age group 6(66- above)	-0.605***	-0.221
<b>Marital Status (reference group = married )</b>		
Single	-0.292***	-0.11
Widow and Divorced	0.086	-0.173
<b>Educational Level (reference group = illiterate)</b>		
Basic education (primary and preparatory )	-0.284**	-0.13
Secondary	-0.188*	-0.111
Post Secondary	-0.761***	-0.206
University and above	-0.326***	-0.124
Log (firm age)	-0.104***	-0.032
Female share	-0.08	-0.252
<b>Economic Activity (reference group = wholesale trade)</b>		
Agriculture	3.194***	-0.735
Service	0.184**	-0.082
Manufacturing	0.418***	-0.093
<b>Access to Finance (reference group = loans)</b>		
Household Savings	-0.593***	-0.09
<b>Household Wealth (reference group = fifth quintile)</b>		
First Quintile	1.810***	-0.136
Second quintile	1.660***	-0.113
Third Quintile	1.140***	-0.099
Fourth Quintile	0.798***	-0.095
<b>Place of Enterprise (reference group = fixed places)</b>		
Own home	2.081***	-0.133
Mobile places	2.540***	-0.105
<b>Region (reference group= Great Cairo)</b>		
Alex, Suez Canal	-0.176	-0.144
Urban Lower Egypt	-0.294**	-0.124
Urban Upper Egypt	-0.118	-0.124
Rural Lower Egypt	0.232*	-0.119
Rural Upper Egypt	0.133	-0.13
Constant	0.04	-0.196
Number of Observation	6190	

**Table 9: Impact of Informality on Output**

<b>Variables</b>	<b>Coefficients</b>	<b>Standard Errors</b>
Informal	-0.248***	-0.038
Labour	0.064***	-0.007
Capital (1000-10,000)	0.298***	-0.035
Capital (10,000-49,000)	0.525***	-0.048
Capital (50,000-above)	0.952***	-0.065
Log (raw material)	0.003	-0.007
Log (Energy)	0.01	-0.009
Access Electricity	0.035	-0.048
Access Water	0.269***	-0.042
Access Laptop	0.317***	-0.092
Access Mobile	0.095***	-0.036
Access Internet	0.012	-0.049
Household Savings	0.061*	-0.035
Log (Firm's age)	0.066***	-0.013
Own Building	0.076	-0.046
Own Land	0.316***	-0.064
Own Machinery	0.054*	-0.033
Own Transport Assets	0.126**	-0.049
Female	0.029	-0.029
Service	-0.415***	-0.103
Manufacturing	-0.398***	-0.106
Wholesale Trade	-0.399***	-0.102
First Quintile	-0.478***	-0.058
Second quintile	-0.233***	-0.051
Third Quintile	-0.115**	-0.048
Fourth Quintile	-0.121***	-0.045
Log (years of Schooling)	0.029*	-0.017
Own home	-0.339***	-0.051
Mobile places	-0.043	-0.05
Alex, Suez Canal	-0.096	-0.065
Urban Lower Egypt	-0.306***	-0.054
Urban Upper Egypt	-0.266***	-0.054
Rural Lower Egypt	-0.310***	-0.051
Rural Upper Egypt	-0.193***	-0.056
Constant	7.598***	-0.134
<b>Number of Observations</b>	6190	
<b>R-square</b>	0.275	

**Table 10: Impact of Informality on Productivity**

<b>Variables</b>	<b>Coefficients</b>	<b>Standard Errors</b>
Informal	-0.053	-0.065
Labour	-0.124***	-0.008
Capital (1000-10,000)	0.015	-0.065
Capital (10,000-49,000)	0.202**	-0.079
Capital (50,000-above)	0.706***	-0.096
Log (raw material)	0.055***	-0.01
Log (Energy)	-0.015	-0.013
Infra structure Index	0.022	-0.052
Household Savings	0.085	-0.071
Log (Firm's age)	0.086***	-0.026
Ownership Asset Index	0.135***	-0.038
Female	0.012	-0.049
First Quintile	-0.720***	-0.127
Second quintile	-0.441***	-0.099
Third Quintile	-0.181**	-0.077
Fourth Quintile	-0.372***	-0.069
Log (years of Schooling)	0.013	-0.034
Own home	-0.398***	-0.114
Mobile places	-0.295***	-0.093
Alex, Suez Canal	-0.291***	-0.1
Urban Lower Egypt	-0.452***	-0.083
Urban Upper Egypt	-0.511***	-0.085
Rural Lower Egypt	-0.494***	-0.082
Rural Upper Egypt	-0.279***	-0.101
Constant	7.995***	-0.153
<b>Number of Observation</b>	1757	
<b>R-square</b>	0.27	