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**ASSESSING THE IMPACT OF TRADE REFORMS
ON INFORMALITY IN EGYPT**

Irène Selwaness and Chahir Zaki

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Abstract

This paper proposes an empirical investigation of the effect of trade liberalization on informality in Egypt. The literature does not indicate a clear relationship between informality and trade liberalization. While some studies find that it is more profitable to enter the formal sector rather to remain informal when trade openness increases, others argue that trade liberalization may lead to an increase in informality. This effect of trade liberalization on the informal sector has been widely discussed at both empirical and public policy levels but was never tested empirically in Egypt. Thus, combining a microeconomic dataset (the Egyptian Labor Market Panel Survey) with some macroeconomic variables (tariffs), we try to assess to what extent trade reforms affected the informal sector in Egypt. Our main findings show that trade liberalization has indeed decreased informality in Egypt. In fact, trade liberalization (i.e. lower trade costs) implies that some firms will find it more profitable to enter the formal sector rather to remain informal. The least productive informal firms will be forced to exit the industry and only the most productive (formal) firms will export to international markets. Moreover, the degree of labor market flexibility associated to the labor reform of 2003 is likely to be one of the reasons behind this change.

JEL Classification: F10, F26

Keywords: Trade Liberalization; Informality; Egypt.

ملخص

تقترح هذه الورقة اجراء تحقيقا تجريبيا لتأثير تحرير التجارة على القطاع غير الرسمي في مصر. لا تشير الأدبيات إلى وجود علاقة واضحة بين القطاع الغير لرسمي وتحرير التجارة. وفي حين أن بعض الدراسات وجدت أن الدخول إلى القطاع الرسمي يكون أكثر ربحية بدلا أن تبقى غير رسمية عند زيادة الانفتاح التجاري، إلا أن البعض الآخر يرى أن تحرير التجارة قد يؤدي إلى زيادة في القطاع غير الرسمي. وقد سبق مناقشة ذلك الأثر في تحرير التجارة على القطاع غير الرسمي على نطاق واسع على مستوى السياسة التجريبية و السياسة العامة على حد سواء ولكن لم يتم اختبار تجريبيا أبدا في مصر. وهكذا، نحاول تقييم مدى تأثير التجارة بالإصلاحات في القطاع غير الرسمي في مصر عن طريق الجمع بين مجموعة بيانات الاقتصاد الجزئي (على المسح التتبعي لسوق العمل في مصر) مع بعض متغيرات الاقتصاد الكلي (الرسوم الجمركية). وتظهر نتائجنا الأساسية ان تحرير التجارة أدى الى انخفاض القطاع غير الرسمي في مصر. وفي الواقع فان تحرير التجارة (أي خفض تكلفة التجارة) يعني أن بعض الشركات سوف تجد أنه الدخول إلى القطاع الرسمي بدلا أن تبقى غير رسمية يكون أكثر ربحية. وعليه سوف تضطر الشركات الأقل الإنتاجية الغير رسمية للخروج من الصناعة وسوف تقوم الشركات الأكثر إنتاجية (الرسمية) بالتصدير إلى الأسواق الدولية. وعلاوة على ذلك، فإن درجة مرونة سوق العمل المرتبطة بإصلاحات سوق العمل من عام 2003 ستكون من المرجح أحد الأسباب وراء هذا التغيير.

1. Introduction

Trade liberalization policies and the labor market are not dissociated. There are many claims that trade openness and markets' exposure to foreign competition could widen the wage inequality and increase labor movements towards the informal sector. This is why trade openness can increase the share of informality in the labor market through several mechanisms. After trade reforms, formal firms could get exposed to fiercer foreign competition. Consequently, in order to keep their competitiveness, firms try to reduce labor costs by cutting workers benefits, replacing permanent workers with part-time labor and not providing workers with formal contracts or social security. They can also lay off some of their workers. The latter group may seek informal employment afterwards if they cannot afford unemployment and if formal employment opportunities are limited. Moreover, firms can also outsource to the informal sector, such as subcontracting to home-based or self-employed micro-entrepreneurs.

The Egyptian case is quite interesting since Egypt experienced an increase in both trade openness and informality. During the Economic Reform and Structural Adjustment Program (ERSAP) introduced in the early 1990s, trade reforms in Egypt were adopted in order to liberalize the trade regime, which was described as highly restrictive. Through reductions in tariff and non-tariff barriers over two decades, Egypt has significantly liberalized its external trade. Specifically, according to the Egyptian Ministry of Trade and Industry, the maximum tariff rate has decreased from 110% at the end of the 1980s to reach 40% by the end of 1990s. In 2004, the government of Egypt launched the second wave of liberalization. Its objectives were twofold: first, to reduce tariffs and rationalize the tariff structure; and second, to reduce the number of products subject to non-tariff barriers. Both nominal and effective protection in the manufacturing sector dropped from 21.3% to 12.1% and from 23.3% to 14% respectively after the 2004 reform. Consequently, exports and imports in Egypt experienced significant increases since the early 1990s and in a more pronounced way after 2004, where, on average, exports increased annually by 5% before 2004 and 24% after this date, while imports increased by 2% and 24% respectively.

On the other hand, the Egyptian labor market has experienced an increase in informality during the 1990s—also associated with ERSAP. Drawing on recent Egyptian studies, we find that there was a significant increase in the share of informal employment in total employed. Earlier studies have shown that the majority of the jobs created between 1988 and 1998 were unprotected by legal contracts and that the share of growth of the unprotected regular jobs was the highest in the private sector non-agricultural sector (Assaad 2009).

The empirical literature on the impact of trade reforms on the informal sector is limited despite the regular discussion of this question in public debate. In their seminal work, Currie and Harrison (1997) found that, in Morocco, firms started hiring more temporary workers after the completion of a comprehensive trade liberalization program. In addition, Goldberg and Pavcnik (2003) found that, in Brazil, there is no evidence of a relationship between trade policy and informality. Yet, in Colombia, they argued that there is evidence of such a relationship, but only for the period preceding a major labor market reform that increased the flexibility of the Colombian labor market. The effect of trade liberalization on the informal sector was never studied empirically in Egypt.

This paper proposes an empirical investigation of the impact of trade liberalization on informality in Egypt. Thus, through combining a microeconomic dataset [(the Egyptian Labor Market Survey 1998 (ELMS98) and the Egyptian Labor Market Survey 2006 (ELMPS06)], with macroeconomic variables (tariffs), we try to assess to what extent different trade reforms have affected the prevalence of informal jobs in the manufacturing sector in Egypt. Therefore, a two-step estimation procedure is followed as in Goldberg and

Pavnick (2003) where the change in the probability of informal employment in each industry, and each year, is related to trade reforms and explained by tariffs. In the first step, the probability of informal employment is estimated including worker and job characteristics in addition to industry indicators. Then, in the second step, the coefficients of the industry indicators extracted from the first step are regressed on the tariff variable. This second-step analysis determines the impact of different trade reforms on what's called the "informality premia". Our main findings show that trade reforms reduced informality in Egypt.

This paper is organized as follows. Section 2 reviews briefly the literature related to the theoretical and empirical contributions on trade and informality. Section 3 presents some stylized facts on trade and informality in Egypt. Section 4 describes the methodology. Section 5 summarizes the data sources. Section 6 displays the results and section 7 concludes.

2. From Theory to Empirics

2.1 Theoretical Models

As mentioned before, after trade reforms, formal firms can more likely get exposed to fiercer foreign competition. Consequently, in order to keep their competitiveness, firms try to reduce labor costs by cutting workers benefits, replacing permanent workers with part-time labor and not providing workers with formal contracts or social security. They can also lay off some of their workers. This latter group may seek informal employment afterwards if they cannot afford unemployment and if formal employment opportunities are limited. Moreover, firms can also outsource to the informal sector, such as subcontracting to home-based or self-employed micro-entrepreneurs.

The theoretical literature does not indicate a clear relationship between informality and trade liberalization. While some studies find that it is more profitable to enter the formal sector rather to remain informal when trade openness increases, others argue that trade liberalization may lead to an increase in informality.

From the first group of studies, we can cite the heterogeneous firm model of Aleman-Castilla (2006) where trade liberalization (i.e. lower trade costs) implies that some firms will find it more profitable to enter the formal sector rather to remain informal. The least productive informal firms will be forced to exit the industry and only the most productive (formal) firms will export to international markets. Moreover, both, the exit of the least productive firms and the rise in output of the most productive (formal) firms lead to an aggregate increase in productivity. Yet, according to Fugazza and Fiess (2008), considering that all goods are tradable is a strong assumption. If some goods are allowed to be non-tradable, the impact of trade liberalization on informality will additionally depend on the reaction of the real exchange rate and/or relative sector productivities. For instance, if the informal sector is equated with the non-tradable goods sector, and, if non-tradable goods are only for consumption, then the relationship between trade openness and informality could become negative. In this context, trade liberalization would lower the price of the non-tradable good in terms of the tradable good (i.e. a real depreciation) and this would decrease the size of the informal sector.

The second group of theoretical models show, by contrast, that trade liberalization will increase informality. For instance, Paz (2012) developed a theoretical model in which both domestic and foreign import tariffs affect two industry-level labor market outcomes: the share of informal workers and the formal-informal wage gap. His predictions show that a decrease in domestic import tariffs increases both the informality share and the formal-informal wage gap, whereas a decrease in foreign tariffs has the opposite effect. A distinct feature of this model is the introduction of a realistic labor market distortion, payroll taxes, which endogenously generates informal jobs in the economy. He tested his model on Brazilian data

(1989-2002) and found a significant negative impact of own liberalization on informality with a percentage point decrease in import tariffs leading to a 0.8 percentage point increase in informality share and a 0.4 percentage point increase in the wage gap. In the same line, Heid et al. (2011) developed a heterogeneous-firm model with imperfect labor markets that captures the differences between maquila and non-maquila manufacturing plants and the existence of an informal sector. It is worth mentioning that one of the key drivers behind Mexico's impressive export growth has been the maquila sector. Maquila plants, or maquiladoras for short, focus on assembling imported intermediate inputs which are then re-exported either for further assembly or as finished goods, mostly to the US. They found that the expansion of the maquila sector during the 1990s was a mixed blessing for Mexico since the skill premium decreased by 2.7%, informality increased by 0.9% and overall welfare decreased by 3.7%.

Moreover, if pre-trade reform formal wages are determined by labor regulation (e.g. a binding minimum nominal wage), upward pressures on formal wages post trade reform might be slightly undermined; this would increase the chance to observe more informality as a consequence of trade liberalization. Finally, the fiscal environment can also influence the relationship between trade liberalization and informality. Existing models generally assume that public expenditures fully adapt to fiscal revenues without specifying how fiscal adjustment is actually achieved. Fiscal consolidation may require higher taxes or new fiscal instruments and both are likely to affect firms' incentives to extend informal inputs and workers' choices to become informal.

2.2 Empirical Evidence

Similar to theoretical models, empirical studies have been inconclusive on the effect of trade liberalization on informality. They suggest that informality can respond to trade liberalization either positively or negatively, depending on country and industry characteristics.

First, Aleman-Castilla (2006) uses the NAFTA experience to assess the impact of trade liberalization on informality in Mexico. Using Mexican and US import tariff data and the Mexican National Survey of Urban Labor, the study's findings suggest that lower import tariffs are related to lower informality in tradable industries. Results also suggest that informality decreases less in industries where import penetration is high and more in industries with greater export orientation

Second, Goldberg and Pavcnik (2003) use household survey data for Brazil and Colombia collected over the 1980s and the 1990s. They find no evidence of any significant relationship between trade liberalization and informality in Brazil, whether positive or negative. For Colombia, they present evidence that informality had increased after trade liberalization. However, this finding appears directly related to the degree of labor market flexibility. Goldberg and Pavcnik (2003) reports that prior to labor market reform, when costs of firing formal workers were high, an industry-specific tariff reduction was associated with a greater likelihood of becoming informal. After labor market reform, however, industry-specific tariff reductions were associated with smaller increases in the probability of becoming informal. In these studies, Goldberg and Pavcnik (2003) and Aleman-Castilla (2006) use a similar two-step estimation approach. In a first step, a linear probability model of informal employment is estimated. Explanatory variables include worker characteristics and industry dummies capturing workers' industry affiliation. Coefficients of the latter are defined as industry-informality differentials. These differentials are then used as the dependent variable in the second-step estimations. They are regressed against import tariffs across years and resulting coefficients are taken as measures of the impact of trade liberalization on informality.

Bosch et al. (2012) studies gross worker flows to explain the rising informality in Brazil's metropolitan labor markets from 1983 to 2002. This period covers two economic cycles, several macroeconomic stabilization plans, a far-reaching trade liberalization, and changes in labor legislation through the constitutional reform of 1988. Secular movements in the levels and the volatility of gross flows suggest that the rise in informality during that period was largely caused by a reduction in job finding rates in the formal sector. Part of the remainder is linked to the constitutional reform which contributed to rising labor costs and reduced labor market flexibility; only a small fraction of the observed rise in informality is explained by trade liberalization. In other words, trade liberalization accounts for roughly 1% of the increase in informality, while the constitutional reforms account for 40-50%.

Andersen (2004), using a four-sector, two-factor general equilibrium model of a small, open, developing economy, showed that the existence of an informal sector in the model, where wages are more flexible in the short run than they are in the formal sector, may significantly lower short-term adjustment costs from trade liberalization, as the informal sector may quickly absorb some of the labor released from the sectors adversely affected by the trade liberalization.

An earlier study, Currie and Harrison (1997) assesses the impact of trade reform on employment in manufacturing firms in Morocco in the 1980s. It found that firms started hiring more temporary workers after the completion of a comprehensive trade liberalization program. The study argues that government-controlled firms behaved quite differently from privately-owned firms since the former actually increased employment in response to tariff reductions, mostly by hiring low-paid temporary workers.

Given the variety of results, the magnitude and direction of the impact of trade openness on informal employment has to be resolved empirically. In the following two subsections, we discuss existing evidence relating trade to labor market outcomes, namely informality prevalence and present some new evidence about the Egyptian case.

3. Stylized Facts

3.1 Informality in Egypt

The informal sector is mainly characterized by employment relationships that do not comply with labor regulations i.e. not protected by legal contracts or not covered by social security. Likewise, informality in the broader definition can be expressed by many terms such as informal enterprises, informal sector, informal jobs and informal employment. Informal sector is the sum of all informal enterprises, whose size does not exceed a determined threshold (5-10 workers depending on the national context) and are not registered/licensed or not subject to tax legislation, social protection or labor regulations. Jobs described as informal are own-account workers (self-employed), employers, employees in informal enterprises, subsistence workers (whose goods' production are for household consumption purposes), unpaid or contributing family workers, and employees in formal enterprises whose employment relationships are not subject to labor regulations, social protection systems, and/or taxation, for certain reasons. Informal employment includes all these types of informal jobs whether inside formal or informal establishments. This paper uses the lack of both legal contracts and social security coverage as indicators of informality.

In Egypt, the ELMPS shows that the share of the manufacturing sector workers among all workers was about 12.91% in 1998 and 11.84% in 2006 (a sample of 1,071 and 1,699 workers). This sector also employed around 16.95% and 12.95% in 1998 and 2006, respectively of overall informal employment in the Egyptian labor market.

From 1998 to 2006, in the manufacturing sector, the proportion of workers who neither had a contract nor social security coverage (i.e. informal workers) increased from 44.44% to

51.61%. The manufacturing sector was not the only sector experiencing an increase in informal employment. The proportion of informal workers also increased in the construction sector, wholesale and retail trade, transportation and storage, real estate and business sectors from 1998 to 2006 (figures 1 and 2)¹.

The share of informal workers is examined by gender, age, educational attainment, region, size of the firm in terms of workers, and employment status as given in table 1. It shows that the increase in informal employment in the manufacturing sector between 1998 and 2006 was prevalent across almost all different groups of workers. For instance, the proportion of informal men workers increased from 42.1% to 50.1% of total working men during the 88-06 period. Informality also increased across age groups, educational levels, different regions and different sizes of the establishment (in terms of workers). The only exception was the young who experienced a decline in the share of those who were informally employed from 68.4% to 65.5%. The share of informal workers among females also declined slightly. Workers in firms with more than 50 employees become less likely informal (proportion of informal workers in such firms went down to 23.6% in 2006 from 29.7% in 1998).

Informal workers in the manufacturing sector generally have the known characteristics of informal workers as presented in the first two chapters of this paper. Females are more likely to be informal than males. Moreover, the older the worker, the less likely he could be informal. Specifically, the percentage of informal workers among the 15 to 29 worker groups is the highest as compared to their percentage among the 30 to 49 or the 50 to 64 worker groups. Being married or head of the household reduces the incidence of informal employment. In addition, the share of informal workers declines with higher educational levels. Informal workers represent around 17.1% and 26.7% of those with above intermediate education level as compared to 60% and 70.9% among non-educated workers in 1998 and 2006, respectively. Workers living in Alexandria and Suez cities are the least likely to be informal relative to workers living in other areas across Egypt. In 1998, the most likely to be informal were the workers living in rural Lower Egypt. This changed in 2006 where workers living in rural Upper Egypt became the most likely to be informal (68.7% of all workers in rural Upper Egypt are informal). In general, rural workers are more likely than their urban peers to be informal, and as expected, informal workers are heavily concentrated in firms with less than 10 workers where around three quarters of these firms work force are informal.

It is worth observing that the majority of the self-employed and the unpaid family workers are informal (75% and 86.7%, respectively in 1998 and 85.9% and 98.1%, respectively in 2006). In 1998, 40.9% of wage workers were informal against 35.6% of employers, suggesting that the former were more likely to be informal. In 2006, both categories of workers witnessed an increase in informality, yet employers were more inclined towards informality with a share of 54.2% as compared to 45.9% of wage workers.

Table 2 presents the share of informal workers (in percent) in each industry within the manufacturing sector. In 1998, informality was mainly prevalent in the wood production, furniture, garments, leather products and metal production industries. In other words, workers in these industries were the most likely to be informal. Between 1998 and 2006, the share of informal workers in these sectors, mainly wood production, furniture, metal production, and leather products continued to grow. Also, the share of informal workers in food and beverage industries increased from 41.3% to around 45% of the industry's total workers. There was also an increase in informality in sectors such as textiles, paper production, chemical production, medical production, non-metal minerals, and other transportation production. On the other hand, the percent of informal workers in the garments sector declined to around 61%. In addition to the garments industry, tobacco, coke and petroleum production,

¹ These numbers are calculations based on the ELMS 1998 and the ELMP5 2006, described in section 3.4

publishing and printing, machinery and equipment experienced a decline in their share of informal workers.

The characteristics of informal workers by individual, household and job characteristics are presented in table 3, which shows a similar trend as that presented in table 2.

Using the panel dimension, it is interesting to look at the transition patterns. Across all sectors, there are around 25.4% of the individuals working in the informal sector who shifted to the formal sector between 1998 and 2006 as compared to 10.3% who shifted from formal to informal jobs (table 4). Concerning the manufacturing sector, around 21.5% of informal workers became formal compared to around 9.2% of formal workers who shifted to informal jobs in 2006. This suggests—from descriptive and not empirical analyses—that workers were more likely to shift to formal jobs than to informal ones in 2006.

Furthermore, table 5 describes the transition to the manufacturing sector in 2006, from five different states in 1998: informal job in the manufacturing sector, formal job in the manufacturing sector, informal job in any other economic activity sector, formal job in any other sector, and not working. The table shows that around two-thirds of those who did not work in 1998 (64.2%) became informal workers in the manufacturing sector in 2006. It is worth noting that this table only focuses on the manufacturing sector as being the entry state. This means that if those without jobs in 1998 got a job in the manufacturing sector in 2006, 64.2% of them will be informal. This could also indicate that the new entrants in 1998 were more likely to get informal jobs in the manufacturing sector in 2006. Those who were not working in 1998 or were working informally in other sectors than manufacturing were more likely to move to informal jobs in the manufacturing sector in 2006 than those who were in the formal sectors including the manufacturing.

3.2 Trade Reforms

Both exports and imports in Egypt experienced significant increases since the early 1990s and in a more pronounced way after 2004. Figure 3 plots the evolution of exports and imports from 1990 to 2009. On one hand, both the increases in exports and imports after 2004 were much higher than increases before 2004. On average, exports increased annually by 5% before 2004 and 24% after, while imports increased by 2% before and 24% after, respectively. These facts are confirmed by figure 4 which depicts the share of exports and imports to GDP over the period. It follows a U-shaped curve showing the incline in the share of exports and imports following the ERSAP until 1992, then the slope takes a downward curve until early 2000 after which it curves upward again after the 2004 reform. The same trend applies for imports. On the other hand, Egypt's trade balance was in continuous deficit throughout the period of the study. Imports exceeded exports as a result of the upsurge in the volume of imports mainly concentrated in raw materials, investment goods or semi-finished products that are used in the production process.

Despite the wide deficit in the trade balance, the surplus on the current account (before the financial crisis) was the outcome of the rise in the services surplus and net unrequited transfers. In addition, the net inflow realized by the capital and financial account was due to the increase in foreign direct investment (FDI) especially in petroleum, manufacturing and financial services.

In order to explain the rise in exports and imports, it is important to present how tariffs and other trade barriers have evolved over time. Over the last two decades, Egypt has significantly liberalized its external trade. The maximum tariff rate decreased from 110% at the end of the 1980s to 40% by the end of 1990s. In 2004, the government of Egypt launched the second wave of liberalization. Its objectives were twofold: first, to reduce tariffs and rationalize the tariff structure; and second, to reduce the number of products subject to non-

tariff barriers. The number of tariff bands was narrowed from 27 tariff brackets to 6, tariff dispersion measured by standard deviation declined from 16.1 in 2000 to 12.7 in 2004 and tariff lines were reduced from 8,000 to 6,000. Both nominal and effective protections have declined in the manufacturing sector from 21.3% to 12.1% and from 23.3% to 14% respectively after the 2004 reform. All those measures were meant to simplify procedures, minimize tariff evasion, and remove possibilities of discretion and corruption (Zaki 2011). Therefore, the increase in exports and imports can be attributed to these trade reforms. Valdes and Foster (2011) have found that trade liberalization since the late-1990s has had a considerable impact on reducing protection for some industries. Yet, some sectors, such as the food and tobacco sectors, remain highly protected, due to tariff escalation and non-tariff barriers on the trade side, and due to energy subsidies on the input side. The study found that the effective rate of protection (ERP) had decreased from 85.6% in 1999 to 45% in 2009 for private business and from 122.5% to 37% for public enterprises over the same period. In addition, they argued that the dispersion of effective rate of protection fell between 1999 and 2009 from 192% to 57%, but it remained higher than the low dispersion of nominal tariffs due first to tariffs and output subsidies, and second to energy subsidies.

Nearly 99% of Egypt's tariff rates are bound to the WTO. Most favored nation (MFN) tariffs on non-agricultural products are generally lower, with an average of 12.8%. Tariffs on agricultural goods remain high, with an average of 66.4%. This high tariff on agricultural goods is explained by a soaring average tariff on beverages and spirits (over 1,000%). Table 6 presents both applied and MFN tariff rates². It is noteworthy that the simple (weighted) average³ of applied tariffs has declined significantly, in particular between 2002 and 2004, reaching 20.3% (13.1%) down from 47.9% (23.7%). Despite a significant liberalization of the manufacturing sector, the primary sector remains relatively protected given the fact that its simple average of MFN tariffs was 41% in 2009, while the manufacturing's was 9%. Finally, the difference between applied and weighted tariff rates is much larger for the primary sector (37.5% and 6% respectively) than for manufacturing (9.3% and 9.12% respectively). This is due to the fact that some products in the primary sector are subject to high tariffs (such as tobacco and alcohol) whereas their weights in international trade are significantly low.

Table 7 shows both imports penetration rate and exports performance for agriculture, manufacturing and services. It is quite clear that the picture had changed between 2006 and 2011. In 2006, the highest imports penetration rate was for services, followed by fuels, manufactures and agriculture. Yet, services and fuels exports performance are much higher than imports penetration making Egypt a net exporter of oil and services. Between 2006 and 2008, exports performance of agriculture, fuel, manufactures and services steadily increased until the international financial crisis in 2008. The popular uprising that demanded the overthrow of Mubarak's regime in 2011 also negatively affected Egypt's international trade. For this reason, in 2011, table 7 shows that for services and fuel, exports performance is still higher than their imports penetration ratios. In contrast, for manufacturing and agriculture, imports penetration is almost twice exports performance.

Figure 5 illustrates the tariff structure for the manufacturing sectors. It is quite clear that tobacco, garments, and leather products have a high tariff rate while paper manufacturing, basic metal, and transport equipment have low protection. At the same time, we notice that, with the exception of the tobacco sector, workers in the garments and leather products are more likely to be informal than workers in the paper production, basic metal or transport

² MFN tariffs are what countries promise to impose on imports from other members of the WTO, unless the country is part of a preferential trade agreement (such as a free trade area or customs union). This means that, in practice, MFN rates are the highest (most restrictive) that WTO members impose on one another. Applied tariff rates are the average of effectively applied rates for all products subject to tariffs calculated for all traded goods

³ Weighted mean tariff is the average of tariff rates weighted by the product import shares corresponding to each partner country. Simple mean tariff is the unweighted average of tariff rates for all products subject to tariffs calculated for all traded goods

equipment (table 2). Between 1997 and 2005, food and beverages, textiles, garments, leather products, motorized vehicles production, and paper production experienced important declines in applied tariff rates. Looking at the evolution of the percent of informal workers in these sectors, table 2 shows that these sectors were also among the ones whose workers were more prone to informality in 2006, with the exception of motorized vehicles.

Along with these unilateral trade liberalization efforts that took place since the 1990s, Egypt has signed many bilateral and multilateral free trade agreements (FTA). On the bilateral front, Egypt has free-trade agreements with the European Union (2004), the members of EFTA [the Republic of Iceland, the Principality of Liechtenstein, the Kingdom of Norway, the Swiss Confederation (2004)], Turkey, and other Arab countries. At the regional level, Egypt has signed to the Greater Arab Free Trade Area (GAFTA), the Common Market of Eastern and Southern Africa (COMESA) and the Agadir Free Trade Agreement (with Tunisia, Jordan and Morocco). Egypt has also started negotiating some other agreements that would eventually turn into FTA such as the agreement with the MERCOSUR countries and that with UEMOA (Union Economique et Monetaire Ouest Africaine). Finally, Egypt has also signed the Qualified Industrial Zones (QIZ) Protocol⁴ in December 2005 with the United States and Israel. All these agreements have contributed to the boom of exports and imports in Egypt starting 2004.

At the sectoral level, figures 6 and 7 present exports performance (defined as the ratio of exports to total output) and import penetration (defined as the ratio of imports to domestic absorption, which is output minus exports plus imports) for manufacturing sectors in Egypt. Sectors characterized by an important comparative advantage have a high export performance such as textiles, garments and leather. Yet, between 1997 and 2005, many sectors experienced significant increases in terms of their export performances especially food and beverages, metal products, machines and equipments and furniture. On the other hand, import penetration increased for several sectors such leather goods, machines and professional equipments.

According to these stylized facts related to the informal market and trade reforms, the change in trade variables between 1998 and 2006 may have potential influence on the level of informality in the manufacturing sector in Egypt. However, in order to verify such correlation, it is necessary to empirically assess the impact of such trade reforms on informality in this sector.

4. Methodology

To understand the impact of trade effect on labor market informality, a two-step analysis approach is adopted, following Goldberg and Pavcnik (2003). In this approach, the informality premia are regressed on the tariffs in order to determine the impact of different trade reforms on informality premia. The informality premia is the change in the probability of informal employment that is only due to the industrial affiliation of the workers.

Two steps are undertaken in this approach. In the first step, a probit model for the probability of working in the informal sector is estimated while controlling for the individual, household and regional variables, and the industry indicators. The first stage regressions are estimated separately for each year in our sample (1998 and 2006) as follows:

$$Informal_{ijt} = \alpha_1 X_{ijt} + \alpha_2 H_{ijt} + \alpha_3 R_{ijt} + \alpha_4 IP_{jt} + v_{ijt} \quad (1)$$

where v_{ijt} is the discrepancy term.

⁴ Qualifying Industrial Zones (QIZ) are designated geographic areas, within Egypt, that enjoy a duty free status with the United States. Companies located within such zones are granted duty free access to the U.S. markets, provided that they satisfy the agreed upon Israeli component of 10.5%, as per the pre-defined rules of origin.

The dependent variable is a binary variable that takes the value of 1 if the individual i , employed in sector j at time t is working in the informal sector and 0 otherwise. The regressors consist of the individual characteristics X_{ijt} which include gender (a dummy for being a female), age, age squared, marital status (a dummy for being married), education level (three dummies for less than intermediate, intermediate, and above intermediate levels), and a dummy for membership in a trade union. The household characteristics H_{ijt} are mainly captured by the household size, a dummy for being head of household, the share of dependents aged 0 to 14 or above 65 years old in the household, and the share of the out of labor force 15 to 64 years old. We add five regional dummies (Alexandria and Canal Cities, urban Lower Egypt, urban Upper Egypt, rural Lower Egypt, and rural Upper Egypt) to control for regional characteristics R_{ijt} . Finally, industry indicators IP_{jt} are added to control for the unobserved industry-specific characteristics. The coefficient of the industry dummy is considered as being “the informality premium”, capturing the part of the variation in the probability of being informal that cannot be explained by the worker characteristics, but rather by the workers’ industry affiliation.

It is worth mentioning that merging aggregate data (the tariffs) with micro observations in order to measure the impact of the former on the latter implies that tariffs are the same for each industry. This may violate the assumption that observations are independent and identically distributed since individuals within the aggregated level, such as economic activity, are in fact more similar to one another than individuals from another economic activity. Consequently and according to Moulton (1990), the classical estimation methods may result in standard errors that are biased downward. For this reason, in the probit estimations for 1998 and 2006, errors are clustered by economic activities to correct for the variance covariance matrix.

In the second step, the industry coefficients α_4 , retrieved from the first step regressions, are pooled over time (for 1998 and 2006) and are then regressed on the tariffs. These coefficients are obtained by filtering out the effects of observable worker characteristics and thus indicate the variation in the probability of informality that is due to the workers’ affiliation to this industry, and known as the industry informality differentials according to Goldberg and Pavnick (2003). Therefore, by regressing the tariffs on the informality differentials, such methodology permits explaining the change in informality in each industry by the trade policy.

$$IP_{jt}^* = \delta_1 Tar_{jt} + \delta_2 D_j + \delta_3 D_t + v_{jt} \quad (2)$$

where v_{jt} is the discrepancy term.

Contrary to Goldberg and Pavnick (2003) who included lagged values of trade flows (both exports and imports) with tariffs, we opt to measure trade policy by applied tariffs only since exports and imports depend upon tariffs, and hence might lead to an endogeneity bias.

The dependant variable IP_{jt}^* , used in the second step, is the estimated industry coefficients after being transformed and expressed as deviations from the employment-weighted average informality differential. Such transformation is undertaken in order to remedy for the sensitivity of the estimated industry informality differentials with respect to the omitted industry dummy. It ensures that both the coefficients and their standard errors are independent of the base industry choice (Haisken-DeNew and Schmidt 1997). The normalization procedure of the industry coefficients and their standard errors are adopted following Haisken-DeNew and Schmidt (1997) and this procedure is known as the two-step restricted least squares procedure (Haisken-DeNew and Schmidt 1997). It consists of transforming each industry coefficient, estimated through equation 1, to a deviation from the employment-share weighted average of all other estimated industry coefficients. Thus, each

industry coefficient is not affected by the choice of the reference industry omitted. More specifically, each normalized informality differential (or industry dummy coefficient) IP_{jt}^* can, hereafter, be interpreted as the percentage point difference in the probability of informal employment for a worker in a given industry relative to an average worker in all industries with the same observable characteristics (Goldberg and Pavnick 2003, 22).

The Haisken-DeNew and Schmidt transformation is described as follows:

$$IP_j^* = W * \begin{bmatrix} IP_1 \\ IP_2 \\ \vdots \\ IP_{j-1} \\ 0 \end{bmatrix}$$

where IP_j^* are the normalized industry differentials and W is the weighting matrix defined as:

$$W = \begin{bmatrix} 1 - \bar{I}_1 & -\bar{I}_2 & -\bar{I}_3 & \dots & -\bar{I}_j \\ -\bar{I}_1 & 1 - \bar{I}_2 & -\bar{I}_3 & \dots & -\bar{I}_j \\ -\bar{I}_1 & -\bar{I}_2 & 1 - \bar{I}_3 & \dots & -\bar{I}_j \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ -\bar{I}_1 & -\bar{I}_2 & -\bar{I}_3 & \dots & 1 - \bar{I}_j \end{bmatrix}$$

The average industry employment share is given by \bar{I}_j .⁵ Thus, equation 2 is estimated using the normalized industry informality differentials not the raw estimated ones.

Similarly the variance-covariance matrix $VC(IP_j^*)$ can be derived from the $VC(IP_j)$ retrieved from the first-step regression equation (1) as follows:

$$VC(IP_j^*) = W * VC * W' \quad (3)$$

where

$$VC = \begin{bmatrix} VC(IP_j) & 0 \\ 0 & 0 \end{bmatrix} \quad (4)$$

In addition, because our dependent variable in the second stage is estimated, we estimate equation (2) with weighted least squares (WLS) considering the inverse of the transformed variance of the informality coefficients $VC(IP_j^*)$ as weights. Goldberg and Pavnick (2003) argue that using such weights puts more weight on industries with smaller variance in informality differentials.

Consequently, it is possible to determine the effect of trade variables on the inter-industry informality premium.

5. Data

Trade policy variables have different sources. Tariff data comes from the World Trade Organization Tariffs Profile based on the Egyptian customs authority data. The applied tariff levels are available for 1997 and at 2005 at the 2 digits level.

We relate the trade variable to two household surveys, the Egyptian Labor Market Survey 1998 (ELMS98) and the Egyptian Labor Market Survey 2006 (ELMPS06). Both surveys were conducted by the Economic Research Forum in cooperation with the Central Agency for Public Mobilization and Statistics (CAPMAS). ELMS98 and ELMPS06 were carried out on a nationally representative sample of 4816 and 8349 households, and included 23,997 and 37140 individuals, respectively. The ELMPS06 is the follow up of the ELMS98, forming a

⁵ $\bar{I}_j = (n_j / \sum_j n_j)$, where n is the number of workers in industry j .

periodic longitudinal survey that tracks the labor market and demographic characteristics of the households and individuals interviewed in 1998, and any new households that might have formed as a result of splits from the original households. Specifically, there are 3684 households from the original ELMS98 who were followed and re-interviewed in 2006, in addition to around 2167 split households. For the 2006 data to remain nationally representative, the ELMPS06 collects data on a refresher sample of households (2498).⁶ Both datasets provide information on individual and household demographic characteristics (age, gender, education level, parental background and household structure), job characteristics (hours-of work, wage earnings, occupation, economic activity, sector of employment, etc) and region. The available industry of employment related to the trade data are 22 industries per year in the manufacturing sector.

The two-step analysis, explained earlier, relies on the cross-sectional samples from ELMS98 and ELMPS06. As explained above, the first stage of this two-step method entails the estimation of the probability of informal employment controlling for industry indicators, in addition to the individual, regional and household characteristics. Such estimation is done separately for 1998 and 2006. Then, coefficients of industry indicators from both years' estimations are captured, normalized and then pooled and regressed on tariffs, year dummies and once again industry indicators. This is done to explain such coefficients, the so-called industry informality differentials or the informality premia, by trade variables while taking into account the time effect but also the industry-specific unobservable characteristics captured in the industry indicators.

6. Empirical Results

Table 8 shows the estimation results of the probability of being informally employed in the manufacturing sector, separately for 1998 and 2006. Explanatory variables were mainly individual, household characteristics as well as industry dummies (21 dummies for which tariff levels were available⁷). Including the latter allows controlling for any industry-specific characteristic that can affect the probability of informality. The reference category is male, not married, not head of household, illiterate or can read or write, living in greater Cairo, and working in food and beverages production.

The estimated coefficients of the individual and household characteristics confirm the stylized facts concerning informal workers characteristics described in section 3 and are in line with the previous literature on the determinants of informal employment (Wahba 2009; Wahba and Mokhtar 2002). Results show that, in 1998, women, younger, and less educated workers who do not reside in metropolitan areas are more likely to be informal (table 8). Regional dummies show that residing in Alexandria and Canal Cities decreases the probability of informality relative to the reference region (Greater Cairo), even though the marginal effect is significant at the 5% significance level. Living in rural Upper Egypt increases significantly the probability of informal employment. By contrast, the household structure does not have any impact on the probability of informal employment in 1998. In 2006, while the education levels maintain the same impacts as for 1998 (negative and significant on the probability of informal employment), gender and age impacts become insignificant. The likelihood of working informally still decreases in Alexandria and Canal Cities as compared to the reference region. Moreover, only the rural part of Lower and Upper Egypt increases the likelihood of informal employment relative to the reference. The higher the share of inactive adults in the household is, the more likely the worker is formal (i.e. employed with contracts or with social security coverage).

⁶ See Assaad (2009), and Assaad and Roushdy (2009) for more details on data description

⁷ There are 22 industry sectors for which the data on tariff levels are available. In the estimation, the food and beverages are excluded as the reference industry dummy

Table 9 shows the second stage of the two-step analysis. As mentioned above, since we control for workers characteristics in the first stage (and thus control for industry composition each year), our second stage results are not driven by differences in worker composition across sectors. We run the second stage for 1998 and 2006 separately. Moreover, we pool both years together including a year dummy among the regressors to take into account the fluctuations in business cycles that can affect simultaneously the tariff formation and informal employment. Industry dummies were also controlled for in the pooled regression. Inclusion of these controls additionally reduces the potential estimation biases.

Overall, estimations were fit using two techniques, both yielding similar results. The first one is the ordinary least-squares weighted by the inverse of the estimated transformed variance as presented above (Haisken-DeNew and Schmidt 1997). The second one is the variance-weighted least squares which differs from ordinary least-squares (OLS) regression in that it does not assume homogeneity of variance, but requires that the conditional variance of the dependent variable be estimated prior to the regression. The estimated variance need not be constant across observations. This method treats the estimated variance as if it was the true variance when computing the coefficients standard errors.

First, industry indicators in the first stage are statistically different from 0. This suggests that even conditional on worker characteristics, industry affiliation is an important determinant of the probability of working in the informal sector. From the second step, it is worth mentioning that the year 1998 is associated with lower industry informality differentials, suggesting that the informality levels in the manufacturing sector increased in 2006. Finally, the coefficient on tariff is significantly positive, yet small in magnitude. These results imply that trade liberalization has a positive effect on the labor market in terms of decreasing informality⁸. This is in line with the heterogeneous firm model of Aleman-Castilla (2006) where trade liberalization (i.e. lower trade costs) implies that some firms will find it more profitable to enter the formal sector rather than to remain informal. The least productive informal firms will be forced to exit the industry and only the most productive (formal) firms will export to international markets. Thus, lower tariffs imply less informality. Moreover, such a change in results might be imputed to the change in the degree of labor market flexibility introduced by the new labor law (12/2003). The positive impact of tariffs, suggesting that the reductions in tariffs were accompanied by a similar reduction in the likelihood of informal employment, can be in line with Goldberg and Pavnick (2003). According to them, the relationship between trade and informality depends on the degree of labor market flexibility. In the Egyptian case, Wahba (2009) showed that the new law has had a positive impact on those who were employed in 1998 in the private non-agricultural sector and in the private non-agricultural waged sector. In other words, the labor flexibility induced by the 2003 labor law reform increased formal employment in Egypt.

7. Conclusion

This paper proposes a preliminary empirical investigation of the effect of trade liberalization on informality in Egypt. The relationship between the trade policy and the informal sector is ambiguous and heterogeneous between countries, and across time within the same country. Some country-based evidence shows that trade reforms are likely to increase the share of informal employment in the labor market by exposing the formal firms to intense foreign competition. Others do not find evidence for such a relationship. Time might be an important factor in formulating this relationship, in addition to the business cycle and the degree of labor market rigidity. While the effect of trade liberalization on the informal sector has been widely discussed at both empirical and public policy levels, it was never tested empirically in

⁸ Since tariffs may suffer from an endogeneity problem, a Sargan test is run. We conclude that tariffs are not endogenous. Even if endogeneity of tariffs is assumed, instrumenting them by the tariffs of the principal trade partner leads to the same results. The impact of tariffs remains negative and significant in 1998 and positive and significant in 2006.

Egypt. Thus, combining a microeconomic dataset (ELMS98 and ELMPS06) with some macroeconomic data (tariff levels), we try to assess to what extent different trade reforms have affected informal employment and its prevalence in the Egyptian manufacturing sector. Our main findings show that trade reforms reduced informality in Egypt. Further investigation on this relationship is needed to ensure robustness.

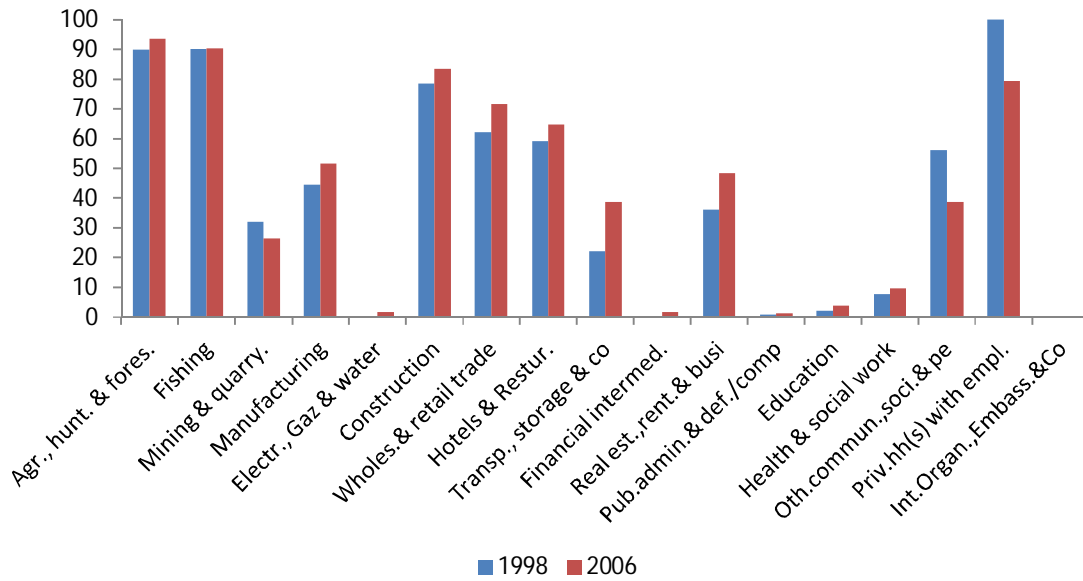
As the informal sector is an important employer in the Egyptian labor market, new mechanisms have to be implemented to attract the informal sector to the mainstream business community. Such formalization should strengthen the competition in the Egyptian market since the informal sector represents a wasted opportunity. Among the mechanisms that may be adopted to raise the competitiveness of the informal sector and may push towards its formalization, the following can be proposed: simplifying the rigid regulations, boosting the spirit of entrepreneurship through widened vocational educational training or financial training, encouraging the micro-finance institutions, and reforming the tax systems for these medium and small enterprises. On the side of informal employment (i.e. informal jobs without contract or social security), the reduction in total cost for the employer seems to be a necessity to formalize these workers. Finally, it is worth noting that the informal sector should benefit from the trade openness effects when it is formalized.

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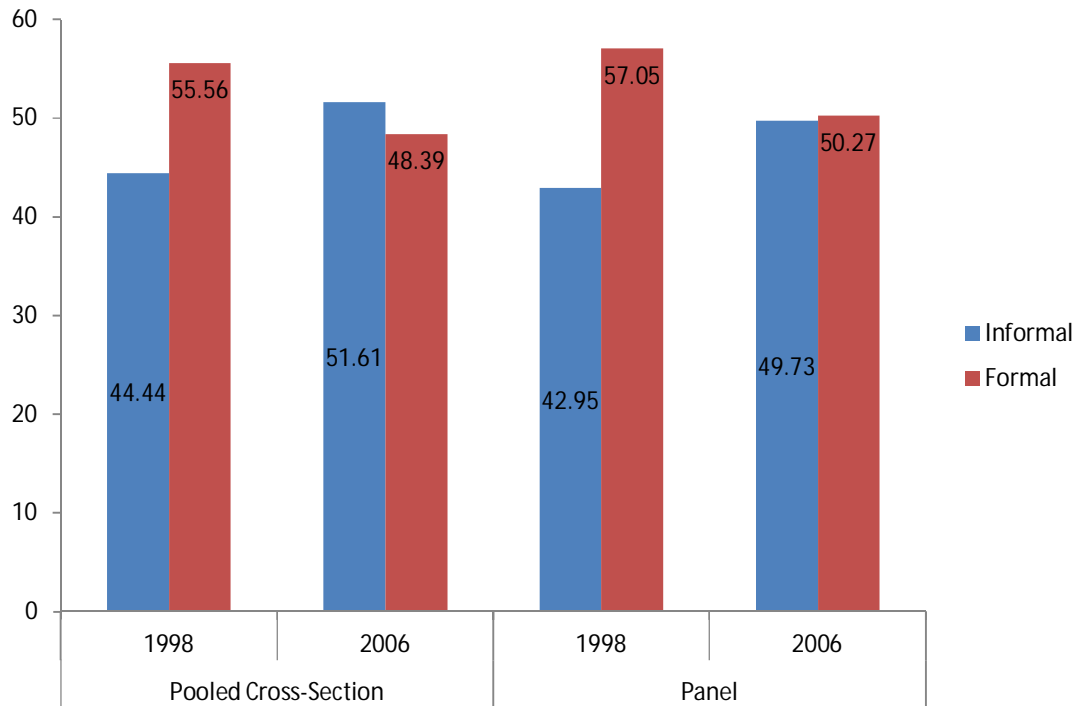
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Figure 1: The Distribution of Informal Workers by Economic Activity Sector in 1998 and 2006



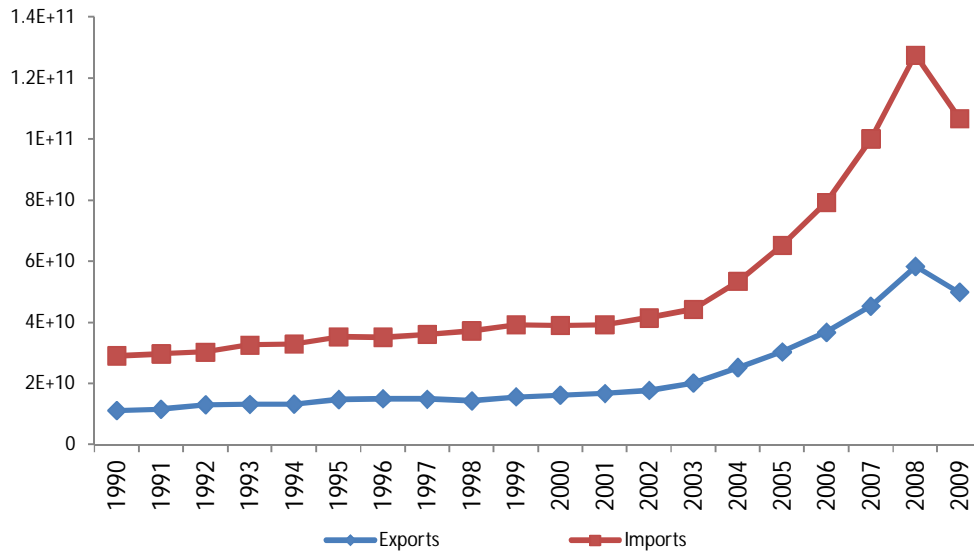
Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Figure 2: The Distribution of Manufacturing Sector Workers, by Formality Status in 1998 and 2006



Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Figure 3: Exports and Imports Evolution (in billion USD)



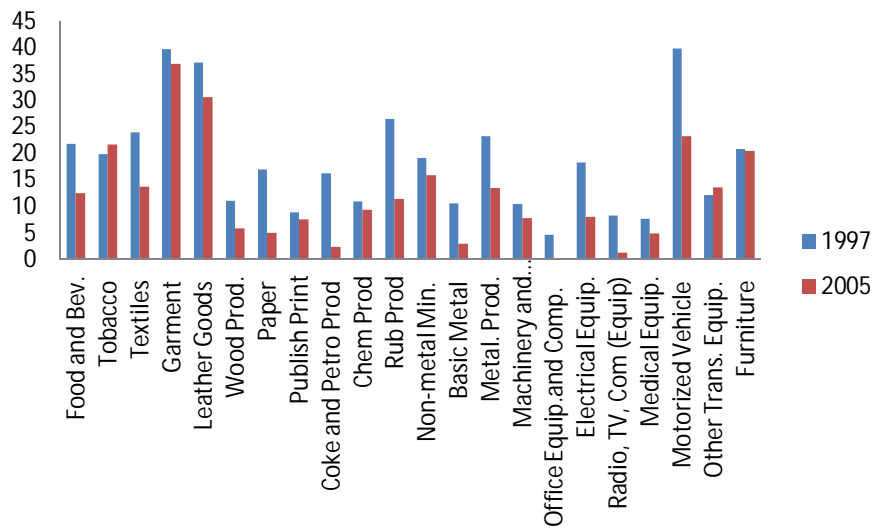
Source: The Central Bank of Egypt.

Figure 4: Exports and Imports as Share of GDP (%)



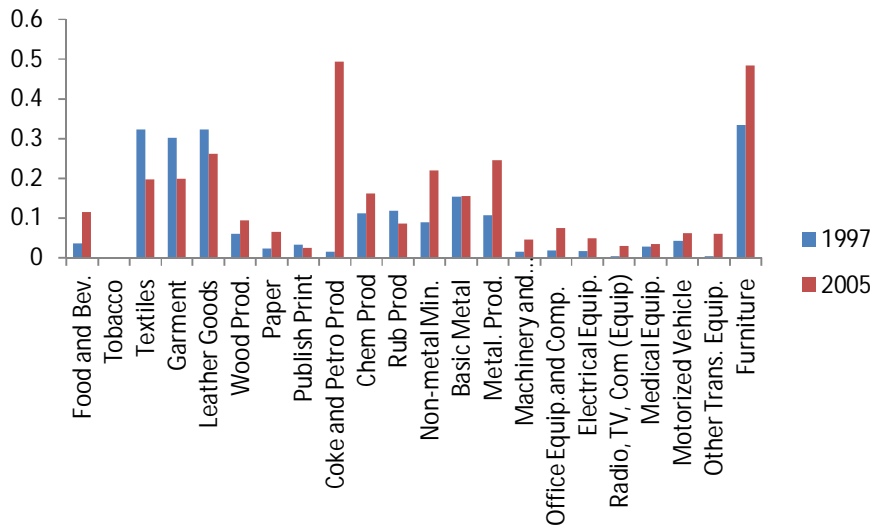
Source: The Central Bank of Egypt.

Figure 5: Tariffs in Manufacturing Sector (%)



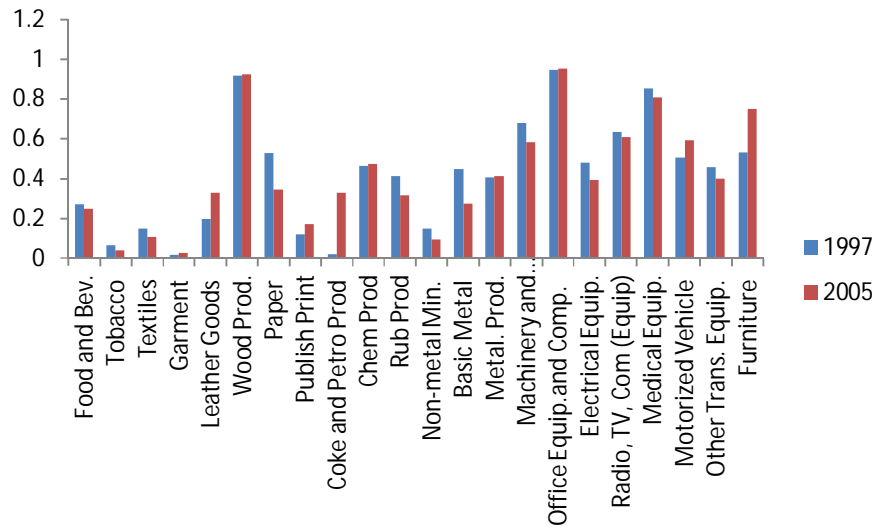
Source: The Ministry of Industry and Foreign Trade.

Figure 6: Export Performance in Manufacturing Sector



Source: The Ministry of Industry and Foreign Trade.

Figure 7: Import Penetration in Manufacturing Sector



Source: The Ministry of Industry and Foreign Trade.

Table 1: Characteristics of Informal Workers in The Manufacturing Sector, Working Age-Population (15-64), Repeated Cross-Sectional Samples ELMS98-ELMPS06

	1998	2006
<i>Gender</i>		
Male	42.06	50.07
Female	62.2	60.99
<i>Age Group</i>		
15-29	68.39	65.54
30-49	30.94	43.61
50-64	20.37	26.13
<i>Education</i>		
Illiterate/read and/or write	60	70.9
Less than intermediate	52.43	58.59
Intermediate	32.99	42.6
Above intermediate	17.09	26.67
<i>Marital Status</i>		
Married	29.34	43.07
Non married	67.86	66.32
<i>Household Position</i>		
Head	28.25	39.35
Non-head	62.87	66.12
Household size (mean)	6.08	5.2
Household size (s.d.)	(2.72)	(2.25)
<i>Region</i>		
Gr. Cairo	30.77	40.63
Alx, Sz C.	20	25.41
Urb. Lwr.	48.78	55.82
Urb. Upp.	57.14	62.11
Rur. Lwr.	67.53	62.53
Rur. Upp.	56.7	68.75
<i>Urban</i>	37.18	44.14
<i>Rural</i>	63.92	64.59
<i>Number of Workers</i>		
0-4	76.25	75.79
5-9	78.2	73.81
10-29	55	65.55
30-49	35.9	44.07
50+	29.73	23.57
DK/miss	7.14	8.57
<i>Employment Status</i>		
Wage worker	40.95	45.9
Employer	35.56	54.19
Self-employed	75	85.95
Unpaid family worker	86.67	98.08
Proportion of informal	44.44	51.61
Sample	476	818
Total	1,071	1,585

Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Table 2: Percent of Informal Workers by Economic Activities Within The Manufacturing Sector, Cross-Sectional ELMS98 and ELMPS06

	1998		2006	
	Informal	Total	Informal	Total
Food and Bev.	41.32	167	44.96	278
Tobacco	9.09	11	0	8
Textiles	28.45	116	32.86	140
Garment	71.67	120	61.19	201
Leather Goods	62.5	24	68.75	32
Wood Prod.	79.1	67	87.64	89
Paper	12.5	8	50	20
Publish Print	35.48	31	34.88	43
Coke and Petro Prod	11.59	69	8.93	56
Chemical Production	3.33	30	24.44	90
Rub Prod	0	4	25	12
Non-metal Min.	48.39	62	53.98	113
Basic Metal	0	28	10.34	29
Metal. Prod.	63.29	79	65.45	110
Machinery and Equipment	22.22	54	8.77	57
Office Equip. and Comp.	0	4		
Electrical Equip.	0	19	42.86	7
Radio, TV, Com (Equip)	10	10	10	10
Medical Equip.	20	5	40	5
Motorized Vehicle	20	10	15.38	13
Other Trans. Equip.	17.65	17	28.57	7
Furniture	75.97	129	82.26	265
Total	476	1,071	932	1,699
	44.44	100	54.86	100

Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Table 3: Characteristics of Informal Workers by Individual, Household and Job Characteristics, Panel ELMS1998-ELMPS2006

	1998	2006
Gender		
Male	38.6	47.53
Female	63.33	59.09
Age_Group		
15-29	69.02	66.08
30-49	29.63	39.37
50-64	17.12	25.2
Education		
Illiterate/ReadWrite	55.25	67.26
Less Than intermediate	51.58	53.54
Intermediate	31.37	44.05
Above intermediate	14.56	26.24
Marital Status		
Married	26.35	38.13
Non Married	66.67	65.4
Household Position		
Head	24.74	33.94
Non-head	60.83	63.91
Region		
Gr. Cairo	23.53	34.95
Alx. Sz C.	19.2	24.85
Urb. Lwr.	46.85	52.08
Urb. Upp.	51.61	59.26
Rur. Lwr.	65.63	65.61
Rur. Upp.	62.07	68.18
Urban	33.71	40.63
Rural	64.52	66.56
Number of Workers		
0-4	74.88	73.32
5-9	76.09	73.4
10-29	51.02	60.61
30-49	26.09	33.33
50+	27.16	23.75
DK/miss	6.9	8.29
Employment Status		
Wage Worker	38.17	43.35
Employer	28.81	50.94
Self-Employed	76.27	84.13
Unpaid Family Worker	80	100
Proportion of Informal	42.95	49.37
Total	731	927

Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Table 4: Transition Probabilities between Formal and Informal Jobs in the Manufacturing Sector

1998	2006		Total
	Informal	Formal	
All Sectors			
Informal	74.59	25.41	100
Formal	10.28	89.72	100
Transition Within the Manufacturing Sector			
Informal	78.49	21.51	100
Formal	9.24	90.76	100

Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Table 5: Transitions Pattern to the Manufacturing Sector from 1998 to 2006

	Informal	Formal	Total
Informal Manuf.	146.00	40.00	186
	78.49	21.51	100
Formal Manuf.	23	226	249
	9.24	90.76	100
Informal Not Manuf.	35.00	31.00	66
	53.03	46.97	100
Formal Not Manuf.	8	38	46
	17.39	82.61	100
Not Working	237	132	369
	64.23	35.77	100
Total	449	467	916
	49.02	50.98	100

Note: Upper numbers show the number of workers in each category. Lower number show the share of workers moving from one status to the other.

Source: Constructed by the authors using the ELMS98 and the ELMPS06.

Table 6: Tariff Rate by Sector: 1995-2009

		1995	1998	2002	2004	2009
Total	Applied simple	24.3	19.65	47.92	20.29	12.56
	Applied weighted	16.65	14.17	23.69	13.1	7.98
	MFN simple	34.65	25.23	61.76	19.94	17.21
	MFN weighted	16.65	14.17	23.69	13.1	8.67
	Applied simple	25.88	23.3	19.06	88.27	37.53
Primary	Applied weighted	7.65	8.86	9.33	18.07	6.18
	MFN simple	52.88	34.79	18.56	41.61	41.05
	MFN weighted	7.65	8.86	9.33	18.07	7.22
	Applied simple	24.02	19.15	50.58	12.96	9.3
	Applied weighted	22.2	17.53	30.71	11.41	9.12
Manufacturing	MFN simple	28.92	22.1	72.79	13.53	9.95
	MFN weighted	22.2	17.53	30.71	11.41	9.63

Source: World Development Indicators.

Table 7: Imports Penetration Rate and Exports Performance at the Sectoral Level (2006-2011)

Year	2006	2007	2008	2009	2010	2011
<i>Agricultural products (%)</i>						
Import Penet.	23.70	27.70	35.10	29.00	30.40	34.50
Export. Perf.	6.70	8.30	14.10	16.80	15.90	15.00
<i>Fuels and mining products (%)</i>						
Import Penet.	30.00	28.30	42.90	23.20	27.00	32.60
Export. Perf.	44.90	41.60	49.40	28.90	26.50	29.50
<i>Manufactures (%)</i>						
Import Penet.	28.90	30.20%	50.30%	46.50%	44.40	45.30
Export. Perf.	11.60	10.20%	25.70%	22.70%	21.60	25.70
<i>Service (%)</i>						
Import Penet.	49.30	49.80	50.90	34.50	31.10	25.60
Export. Perf.	58.70	58.90	60.20	45.70	43.60	32.70

Notes: (i.) Trade data from the World Trade Organization. (ii.) Production data from the Egyptian national accounts. (iii.) Exports performance is defined as the ratio of exports to production. (vi.) Imports penetration rate is defined as the ratio of imports to domestic absorption being the sum of production and imports minus exports.

Source: World Development Indicators (2011).

Table 8: First Stage Results – Pooled Regressions

	1998	2006
	Informal	Informal
Female	0.404*** (0.138)	0.542 (0.342)
Married	-0.317 (0.225)	0.0331 (0.149)
Age	-0.130*** (0.0349)	-0.0346 (0.0389)
Age Sq.	0.00126*** (0.000384)	4.04e-05 (0.000436)
Less Interm.	-0.278** (0.120)	-0.464*** (0.0911)
Intermediate	-0.730*** (0.173)	-0.875*** (0.108)
Above Interm.	-0.740*** (0.198)	-1.001*** (0.153)
Alex.	-0.385** (0.186)	-0.429*** (0.150)
Urban Lower	0.176 (0.208)	0.112 (0.180)
Rural Lower	0.458*** (0.165)	0.303*** (0.103)
Urban Upper	0.683*** (0.164)	0.0983 (0.181)
Rural Upper	0.704** (0.277)	0.546*** (0.201)
HH Head	-0.216 (0.168)	-0.449** (0.195)
HH Size	-0.0168 (0.0288)	-0.0195 (0.0182)
Share of OLF dep. (0-14)	-0.0968 (0.324)	-0.0439 (0.295)
Share of OLF dep. (15-64)	-0.359 (0.237)	-0.354 (0.295)
Share of OLF dep. (65+)	-0.990* (0.555)	0.0464 (0.611)
Constant	3.122*** (0.698)	2.013*** (0.727)
Industry dummies	YES	YES
Observations	1014	1687

Notes: (i.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels. (ii) Robust standard errors between brackets.

Table 9: Two-Step Analysis Results - Weighted Regression of Industry Informality Differentials

	1998		2006		Pooled	
	WLS	VWLS	WLS	VWLS	WLS	VWLS
Tariff	0.0147 (0.0134)	0.0198*** (0.000978)	0.0102 (0.0128)	0.0301*** (0.00124)	0.0434* (0.0218)	0.0395*** (0.00352)
2006 dummy					0.399** (0.169)	0.190*** (0.0287)
Industry dummies	No	No	No	No	Yes	Yes
Constant	-0.785*** (0.240)	-0.507*** (0.0203)	-0.308 (0.195)	-0.767*** (0.0185)	-1.035* (0.570)	-1.019*** (0.0792)
Observations	22	22	22	22	44	44
R-squared	0.057		0.031		0.859	
Chi squared		409.3		589.5		5571

Notes: (i.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.