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Said, Mona and Elshennawy, Abeer

Amerian University in Cairo, Department of Economics

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Abeer Elshennawy

Assistant Professor of Economics, The American University in Cairo
AUC Avenue, P.O. Box 74, New Cairo 11835, Egypt
E-mail: ashenawy@aucegypt.edu
Te: +20.2.2615.1000; Fax: +20.2.27957565

Mona Said

Assistant Professor of Economics, The American University in Cairo
E-mail: mona_said@aucegypt.edu

Abstract

This paper explores the impact of trade liberalization on manufacturing employment and wages over a period 1993-2006, a period coinciding with significant reduction in trade barriers and rising unemployment. Despite increasing import penetration, the paper shows that employment has increased across all manufacturing industries. Data from Egypt's labor market survey confirm that layoffs as a result of trade liberalization is not among the factors responsible for unemployment. On the other hand, regression analysis shows that the reduction in tariffs and increasing export orientation has been associated with an increase in wages in manufacturing industries though the role of export orientation in influencing poor wages has not been significant. Meanwhile, quantile regressions reveal that the impact of both the reduction in tariffs and increase in export orientation has not been uniform across the different quantiles of the wage distribution. The paper further points out to the possibility that further reduction of trade barriers might lead to high adjustment costs in terms of long spells of unemployment or lower pay on grounds of old age and low educational attainment of Egypt's work force. Adjustment policies in the form of direct job search assistance as country experience illustrates is considered to be the most appropriate form of adjustment assistance.

Keywords: Trade liberalization, employment, wages, adjustment costs, adjustment assistance.
Jel Classification Codes: F13, F14,F16, J31

I. Introduction

Expectations of increased pressure on the labor market following trade liberalization has been historically one of the main reasons underlying resistance by both policy makers and the public alike to trade liberalization in Egypt. This is presumably the very same reason Egypt chose to follow a gradual approach to trade liberalization regardless of whether liberalization took place unilaterally as the country became a signatory to the GATT and a member of WTO or within the framework of the preferential trade agreements between Egypt and the EU. Efforts to liberalize trade have so far cumulated in the removal all quantitative barriers to trade which have been removed by the early

nineties and subsequently replaced by tariffs at one stage followed by a reduction of tariffs at a later stage. However, while today the average tariff rate stands at 6% down from a peak of 25% in the nineties, some sectors continue to enjoy high levels of protection the so called "trade sensitive industries".

On the firm level, the main objective of gradual reduction of tariffs - in general - is to provide *potentially* efficient firms with breathing space to adjust to free trade in an orderly manner that results in minimal disruption to output, employment etc. In other words with minimum adjustment costs. It is important to recognize that workers *too* will have to adjust to trade liberalization sometimes by changing employers, sectors or occupations for which they may need to acquire new skills through retraining for example. In this process, they may suffer from long spells of unemployment or experience falling wages once re-employed. In other words workers too can incur adjustment costs much of which – it is often argued - can be avoided through gradual reduction of trade barriers.

Between 1990 and 2007, imports of many items have steadily increased following the reduction in trade barriers. To mention some figures, imports of articles of rubber increased by 63%, wood manufactures by 248%, paper and paperboard by 62%, Glassware by 664% and pottery by 6994%. On the other hand imports of textile articles declined by 60% and that of iron and steel products by 79%. Although Egypt is still way too far from a full fledged trade reform, assessing the impact of trade liberalization on employment and wages in the manufacturing sector is still a worthwhile exercise in light of the fact that such liberalization efforts have *coincided* with rising rates of unemployment over the last two decades. This constitutes the first task of current paper. The second task is identify the most important factors that are likely to impede adjustment to further liberalization on the workers side and thus result in high adjustment costs. Finally, the third task is to examine adjustment policies implemented worldwide in order to shed some light on the appropriate adjustment policies that can reduce adjustment costs on the workers side.

The rest of this paper will be organized as follows: section two , surveys the theoretical and empirical literature on the impact of trade liberalization on employment and wages. The main features of Egypt's trade regime will be outlined in section three. Section four presents the methodology and the main results for the impact of trade liberalization on employment. Section five presents methodology and main results on the impact of trade liberalization on wages. Section Six identifies the prerequisites for successful adjustment to trade liberalization on the workers side along with the some of the adjustment assistant policies implemented worldwide. Section Seven concludes.

II.   Trade Liberalization, Employment and Wages: Theory and Empirical Evidence

Trade Liberalization and Employment

It is widely believed that trade liberalization will ultimately affect the distribution of employment across sectors along with the relative rewards to different types of labor rather than aggregate employment. Neoclassical economists argue that macroeconomic variables and labor market institutions - rather than trade policy - affect *long run* unemployment. While there are a number of models that conclude that in theory, trade liberalization can lead to unemployment in the long run, such findings are not backed by any empirical evidence. (Bernard and Winters, 2005). However, the situation is quiet different in the short run.

Along with macroeconomic variables and labor institutions, Structuralists assert that trade policy can affect aggregate employment in the short run. This line of reasoning rests on one important assumption: the absence of instantaneous adjustment to trade liberalization. It is reasonable to expect that trade liberalization will lead to contraction of some sectors and expansion of others. The problem, however, stems from the fact that the process of expansion can proceed at a slower rate compared to contraction along the transition leading to unemployment (Bernard and Winters, 2005). As is evident

so far, the contribution of theory to the question of trade liberalization and employment is rather modest as it is largely considered an empirical question.(Davidson et al, 1999)

The empirical literature on trade liberalization does not provide compelling evidence supporting the contention that trade liberalization is associated with high levels of unemployment or falling real wages in developed countries. Two main reasons were found to be responsible for such results. The first stems from the absence of strong specialization in production unlike the case with developing countries. (OECD, 2005). Secondly, it is also often argued that trade between OECD countries and developing countries is too small to have an effect on employment or wages in the former countries. (Francois, 2004). However, most of the econometric studies addressing this issue suffer from endogeneity bias and the estimates are not robust to variations in model specification or data source. Meanwhile a more recent, study conducted by the (OECD 2005) found that trade liberalization has been associated with falling employment over the period 1970-2000 for international competition industries in the majority OECD countries. In general, and compared to the nineties, recent research reveal that trade influences labor outcomes partially due to the increase in trade in intermediate goods as well as trade in services. (Bernard and Winters, 2005).

In light of the above shortcomings, many consider research pertaining to developing countries – compared to that pertaining to developed countries- as more informative and its results more robust. This is basically due to the fact that most of these countries have greatly reformed their trade regimes making it easier to trace the source of the shock in time which in turn makes it easier to trace the effect of trade liberalization on employment. (Bernard and Winters, 2005).

A World Bank study by Michaely et al 1991, revealed that transitional unemployment following trade liberalization is quite small in a number of developing countries. A survey of more than 50 studies addressing problems of adjustment to free trade concur with this result. In fact some of these studies show that manufacturing employment increased within one year of the implementation of trade liberalization in some developing countries. Low adjustment costs are attributed to several reasons. *First*, adjustment costs are of short term nature and fall to zero once workers are reemployed. *Second*, estimates of the duration of unemployment were found to be low. *Third*, normal turnover in many industries appeared to exceed dislocation resulting from trade liberalization. This implies that adjustment through shedding labor can take place with no forced unemployment. *Fourth*, to a great extent the process of resource allocation following liberalization takes place through inter industry shift which in turn reduced dislocation of factors of production. Finally in the case of developing countries comparative advantage lies in labor intensive industries so trade liberalization would be expected to increase employment and not vice versa. (Matusz and Tarr, 1999)

On the other hand, one main reason that can lead to high adjustment costs in developing countries compared to developed countries is inflexible labor markets in the former. However, the fact that a higher percentage of the labor force is employed in the agricultural sector and in the informal labor market both of which are very flexible suggests that adjustment costs can be still low. Apart from such concerns, in general evidence from country experience show that for each dollar of adjustment costs corresponds to several dollars worth of efficiency gains from trade liberalization. Adjustment costs are highest following liberalization but disappears after a period lasting from 1-5 years. (Matusz and Tarr, 1999)

Trade Liberalization and Wages

The relationship between trade and wages follows theoretically from the Hecksher-Ohlin-Samuelson (HOS) framework. According to HOS, trade will affect the relative payments to factors of production by changing relative prices of commodities. A reduction in tariffs for example would lower a commodity's relative price, which would lower the demand for factors of production used in that sector. If the sector happens to be labor intensive, then the decline in prices will disproportionately lower the demand for labor and hence lower their wages. Hence, trade liberalization would lead to increasing inequality between factors of production. However, this model does not predict that trade

will alter industry specific returns since it assumes perfectly competitive markets with perfect factor mobility across uses. These assumptions do not seem to be valid for many developing countries where markets are characterized by wide spread imperfections and factors of production are extremely immobile. The short run Immobile Factors model or the medium-run Ricardo-Viner model that assume constrained factor mobility across sectors are arguably more suited to the situation in developing countries with extreme labor and product market rigidities such as Egypt.

The immobile-factors model assumes that all factors are completely immobile in the short run. It predicts that tariff reductions and increased trade will lead to a decline in the earnings of factors in the import-competing sectors and an increase in earnings in the export sector. Similarly, workers in sectors that experience a larger decline in tariffs, and hence a larger decline in the price of their output, will face a decline in their wages relative to the economy-wide average while those in sectors with smaller tariff reduction will face a relative welfare gain . The Ricardo-Viner model (sometimes referred to as the Specific Factors Model) is a middle-ground which allows one factor to be mobile across sectors while the other one is sector-specific. In this case the factor specific to the import competing industry will lose from lower tariffs, that specific to the export-competing industry will gain from freer trade, while the effect on the real wages of labor (the mobile factor) will be *ambiguous* depending on the consumer's preferences for the two goods. The real wage will rise in terms of the imported good which is now cheaper but will fall in terms of the exportable good which is now more expensive.

Several studies have attempted to test the relationship between trade reform, employment and relative wages for both developing and advanced economies. For the United States, Revenga (1992), Katz and Freeman (1992) and Gaston and Trefler (1994) point to a negative relation between tariff protection and industry wages or wage premia.

For developing countries, Hanson and Harrison (1999) used firm panel data to investigate whether the rising skilled-unskilled wage gap in Mexico in the 1980s could be explained by trade reforms. They did not find a significant correlation between producer price changes and relative white collar employment. However, they found that reductions in tariffs were much lower in skill intensive sectors, which were originally less protected than the low-skill sectors. This in turn meant that reductions in prices in the low-skilled sectors were larger, which would explain the increase in wage differentials. In another paper, Harrison and Hanson (1999) found no significant relation between the ratio of white-collar to blue-collar workers' average annual wages and the level and change of industry tariffs and import licenses in the manufacturing sector between 1984 and 1990. Revenga (1997), using the same firm panel data for Mexico found that tariff reductions were associated with a decline in both employment and wages. Currie and Harrison (1997) investigated the impact of trade reform on wages and employment in Morocco during the 1980s. They found no significant effect of tariff reduction on employment or wages in private sector firms. Government-owned enterprises on the other hand responded to tariff reductions by raising employment, and lowering wages.

All of these studies relied on data that did not include information on worker characteristics. This does not allow for separating the effect of the reduction in trade barriers on wages, from that on returns to education. Feliciano (2001) is one of the first studies that used individual-level data to study the impact of trade reform on wages. She follows a two-step procedure, first estimating the wage equation for each individual-industry observation, as a function of individual characteristics such as years of schooling, experience, marital status, gender, enterprise (public/private) and industry. Next, she estimated the relationship between this calculated industry wage differential and measures of industry protection levels (tariffs and license coverage, as well as trade openness, producer prices and import penetration). Her results indicate that reductions in tariffs, changes in producer prices and import penetration did not have a significant effect on industry wage differentials. She found that the reduction in import licenses decreased relative wages of workers in reformed manufacturing industries by 2%. Her results also indicate no significant effect of trade reform on employment or hours of work. Her evidence also suggest that trade reform was associated with greater wage dispersion and a decrease in the relative wages of skilled workers.

Attanasio, Goldberg and Pavcnik (2004) investigated the effects of tariff reductions in Columbia in the 1980s and 1990s on wage inequality. They also use a two stage estimation techniques similar to that of Feliciano, to calculate the effect of tariff reductions on industry wage premiums. Their results indicate a positive and significant effect of both tariff levels and first differences in tariffs on industry wage premiums. These results also point to an economically significant effect with a 50% reduction in tariffs being associated with 6% decrease in the industry wage premium in that sector. They also find that the sectors that experienced the highest reduction in tariff protection and hence in industry wage premiums were also the same sectors with the highest share of unskilled workers and the lowest wages.

Dutta (2007) performed a similar analysis for wages in India's manufacturing sector following large scale trade reforms in the 1980s and 1990s. He calculated industry wage premiums after accounting for observable worker characteristics and potential selection bias, as the difference between the wage received by the average worker in a given industry and that received by the average worker in the economy. She then uses these wage premiums to determine the effect of trade reform. She finds a positive and significant effect of tariffs on wage premia, and of changes in tariffs on changes in wage premia. This provides evidence that wages declined significantly following the reduction in protection levels in the affected industries. Acosta and Gasparini (2007) investigate the effects of capital accumulation and trade liberalization on rising wage inequality in Argentina during the 1990s. They find that capital accumulation effect on rising inequality was larger than the trade liberalization effect as measured by import penetration. However, they do not use a direct measure of trade liberalization as embodied in tariff rates. Import penetration rates and other trade flow measures are arguably endogenous since they depend on factor costs, and hence most studies cited above rely on tariffs and changes in tariffs as the main measure of trade policy changes while import and export measures are used in robustness checks regressions with tariffs.

Other studies have relied on comparing the degree of wage inequality and employment effects on various groups of workers using a "before-after" approach, not controlling specifically for the effect of trade reform (Robertson (1997), Green, Dickerson and Arbache (2001), El-Hamidi (2008) to name a few). The obvious drawback with these studies is that many other policy changes typically accompany trade reform such public sector downsizing, privatization, structural adjustment, etc., and unless direct measures of trade reform are included in the analysis clear cut conclusions about the effects of *trade reform* per se, cannot be made with any degree of confidence.

It is clear from the above discussion that while theory asserts that trade liberalization will undoubtly lead to higher wages for the abundant factor, that is unskilled labor in the case of developing countries, the empirical evidences is not entirely supportive of this hypothesis. Empirically, thus the impact of trade liberalization on wages is a controversial issue. Investigating this issue in the case of developing country that underwent significant trade reforms like Egypt is not only important from a policy perspective but can be extremely helpful so long as it provides more evidence that is consistent or inconsistent with what the theoretical as well as the empirical literature documents. Before exploring the effect of trade liberalization on employment and wages, a brief note on Egypt's trade reform is warranted and will be taken next.

III. Egypt's Trade Regime

As mentioned before, and as early as the 90's Egypt has in general followed a gradual approach to trade liberalization replacing non tariff barriers – like quotas- with tariff barriers. Following WTO accession in 1995., Egypt commitments have been more or less to bind tariff rates at levels that in many cases have exceeded existing levels. While 98% of Egypt's tariff lines are bound, the average bound *rate* fell from 45% in 1998 to 38.6% in 2005. The average bound rate on agricultural products stands at 92.2% in contrast to 29% for non agricultural products. Between 1998 and 2005 the simple average tariff rate for manufacturing fell from 27.6% to 21.1% while that for agricultural products

increased from 64.9% to 66.4%, but trade liberalization efforts have been concentrated in the area of intermediate and capital goods. It is needless to mention that this normally serves to increase the effective rates of protection enjoyed by some manufacturing industries which thus continues to be highly protected mainly via a high and escalating tariff structure. (WTO, 2005). As mentioned in the introduction, the average tariff rate recently fell to 6%.

In 2004, all customs service fees and charges on imports where abolished but a general sales tax ranging from 5%-45% was levied on both domestically produced as well as imported goods. A number of free trade agreements have been concluded between Egypt and some of its trade partners in Africa (COMESA), Europe (EU agreement), Middle East (GAFTA, AGADIR), United States (QIZ), but most of these agreements have either not been implemented yet, or are to be phased gradually over the coming 15 years or are subject to *rules of origin* which to a great extent can compensate for falling tariff rates so that industries previously protected through quotas or tariffs continue to enjoy protection. (WTO, 2005)

Although these liberalization efforts seem modest, it is nonetheless interesting to explore their impact especially in light of their effect on import penetration as well as on export orientation in some industries as will be demonstrated in the upcoming sections.

IV. Methodology: Linking Trade Liberalization to Unemployment

Two broad approaches to study the impact of trade liberalization on employment or unemployment can be identified in the literature. The first is estimating using econometric techniques the relationship between employment and trade liberalization. As mentioned this approach is subject to endogeniety problems. A more recent approach as outlined by Kletzer 2001, examines micro evidence on the characteristics of displaced workers and their post-displacement outcomes - rather than changes in net employment and wages - to examine the impact of import competition. According to this approach, manufacturing industries are classified as to the degree of import competition they face. Instead of trying to separate the effect of imports from other variables that are likely to affect employment like technology, outsourcing, capital deepening etc, the study assumes that all industries are affected in the same manner by these factors and so one can infer the effect of trade from differences in employment outcomes between the sample of import competing versus non import competing displaced workers. However, in the case of Egypt, it is infeasible to follow this approach given lack of data on displaced workers.

A study by OECD 2005 follows a similar approach as that of Kletzer 2001 where changes in employment between high, medium and low competition industries are taken as indicators of job loss or gain due to import competition. Industries are classified as facing high, medium or low competition from imports by calculating net import penetration ratios according to the formula below

ICNET= % Δ [(M$_i$ –X$_i$)/(P$_i$ + M$_i$ - X$_i$)]

Where M is imports, X is exports and P is domestic production of industry i. Industries in the top quartile are considered high international competition industries, those in second and third quartiles are considered medium international competition industries while those in the low quartile are considered low international competition industries. If high competition industries face a decline in employment more than the three other groups then this is an indication of job loss due to imports.

Between 1993 and 2006, data for the Egyptian economy reveal that high competition industries – in the formal sector - did not experience a decline in employment. In fact almost all manufacturing industries experienced increasing employment over this period. (See table one below)

Table 1: Percentage Change in Import Penetration Ratios and Employment between 1993-2006 In Establishments of More Than 10 Employees

Manufacturing Industry	%change in import	% change in employment
	1993-2006	1993-2006
MANUFACTURE OF TEXTILES	302.70	-0.39
MANUFACTURE OF COKE, REFINED PETROL	100.06	9.99
PUBLISHING, PRINTING AND REPRODUCTI	98.33	3.84
MANUFACTURE OF MOTOR VEHICLES, TRAI	75.45	-0.95
MANUFACTURE OF WOOD AND OF PRODUCTS	43.21	9.79
MANUFACTURE OF TOBACCO PRODUCTS	38.88	1.16
MANUFACTURE OF ELECTRICAL MACHINERY	8.90	0.14
MANUFACTURE OF CHEMICALS AND CHEMIC	-6.15	3.83
MANUFACTURE OF MEDICAL, PRECISION A	-16.25	8.88
MANUFACTURE OF MACHINERY AND EQUIPM	-24.17	5.08
MANUFACTURE OF FOOD PRODUCTS AND BE	-24.75	0.68
MANUFACTURE OF RADIO, TELEVISION AN	-29.23	0.14
MANUFACTURE OF OTHER TRANSPORT EQUI	-40.77	-0.95
MANUFACTURE OF RUBBER AND PLASTICS	-53.80	2.54
MANUFACTURE OF FABRICATED METAL PRO	-54.59	4.42
MANUFACTURE OF PAPER AND PAPER PROD	-59.56	2.33
MANUFACTURE OF WEARING APPAREL; DRE	-94.35	51.49
MANUFACTURE OF BASIC METALS	-97.49	1.06
TANNING AND DRESSING OF LEATHER; MA	-105.35	4.29
MANUFACTURE OF FURNITURE; MANUFACTU	-257.38	12.61
MANUFACTURE OF OTHER NON-METALLIC M	-354.52	2.09

Source: Import penetration ratios: author calculation
Employment: CAPMAS

Egypt's labor market survey can provide further insights as to whether trade liberalization has had a negative impact on manufacturing employment. Among the reasons for being unemployed, being laid off in general seems not to be among the main factors contributing to unemployment. The same observation holds for all three rounds of the labor market survey (1988, 1998, 2006). Moreover, and according Assaad 2007, the bulk of the unemployed in Egypt are first time job seekers provide further support for the contention that trade liberalization has not been a major factor contributing to unemployment in Egypt.

V. The Impact of Trade Liberalization on Wages: Data and Methodology

The purpose of this section of our work is to investigate the effect of trade reform on incomes of of the groups of workers in Egypt that are most likely to be directly affected by those measures, namely skilled and unskilled wage workers working in manufacturing industry over the period of rapid trade liberalization between 1998 and 2006. The availability of trade openness and protection measures at the two-digit industry levels, together with a rich panel labor market data set, allows us to accomplish this task for the manufacturing sector in Egypt. It also allows us to examine the interaction between various industry characteristics (including trade openness) and individual characteristics (such as education and labor market experience) in influencing incomes of the poor and low waged workers over a period of rapid trade liberalization. In contrast to time series analysis, this approach allows us to control for various individual level characteristics such as experience, education and region etc, when we test for the impact of trade reform on wages.

Data and Descriptive Statistics

The empirical analysis is based on the recent Egypt Labor Market Panel Survey (ELMPS 06), a follow-up survey to the Egypt Labor Market Survey of 1998 (ELMS 98) that was carried out by the Economic Research Forum (ERF) in cooperation with CAPMAS.[1] ELMS 1998 was carried out on a nationally representative sample of 4,816 households. The ELMPS 2006 sample consists of a total of 8,349 households. The data provide information on monthly earnings, worker characteristics such as age, education, gender, marital status, occupation, industry, and sector of employment, as well as region of residence. The working sample is restricted to manufacturing sector workers, between the ages of 15 and 65, who report positive monthly earnings. Hourly real wages are calculated as the sum of wages earned in the reference month from primary jobs, adjusted for average number of work days per month and average hours per day. For comparability purposes, wages of 1998 are inflated to 2006 Egyptian pounds using the consumer price index (inflation factor is 1.43 from 1998 to 2006).

Moreover, to measure household income poverty for the ELMS 98 and ELMPS 06 household samples, two additional datasets are used in this study: the 1999/2000 Household Income and Expenditure Consumption Survey (HIECS 99) and the 2004/2005 Household Income and Expenditure Consumption Survey (HIECS 04). Both datasets were collected by CAPMAS. The HIECSs are household budget surveys that contain information of consumption expenditures on more than 550 items of goods and services. These budget surveys are generally considered the major source of information on household income and expenditure in Egypt. We use the methodology laid out in Assaad and Roushdy (2006)which consists of combining information from the HIECSs and LMSs to estimate the poverty status of households in the labor market surveys.

To identify poor earners, a low earning line is computed using the official national poverty lines listed in Table 2 below [2]. First, the individual regional specific poverty lines are converted to real terms using the consumer price index (taking 2006 as the base year). Second, the per-capita region-specific poverty lines are scaled up by the regional median ratio of household members to working-age employed household members to account for the fact that each worker's earnings are used to support not only him/herself but also other non-working members of their household. For the sake of comparability and to abstract from changes in dependency ratios that may have occurred during the 1998-2006 period, the 2006 low earning line is used to identify low earners in both the ELMS 1998 and ELMPS 06 samples. The monthly per-capita regional specific poverty lines and the corresponding low earning lines are shown in Table 3.

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[1] For more details, see Barsoum, G., 2006. *Egypt Labor Market Panel Survey 2006, Final Report.* The Population Council, Cairo, Egypt.

[2] The per capita region-specific poverty lines for Egypt were estimated by El-Laithy and Lokshin (2002) using the data from the 1999/2000 HIECS

Table 2: Estimated per-capita region-specific poverty lines (L.E. per year) for 1999/2000 and 2004/2005.

Region	Lower poverty line (LE. Per capita per year)		Governorates
	1999/2000	2004/2005	
Metropolitan	1,109	1,453	Cairo, Alexandria, Port Said, Suez
Lower Egypt Urban	1,015	1,430	Damiette, Dakhalia, Sharkia, Kalyoubia, Kafr
Lower Egypt Rural	978	1,429	El-Shaikh, Gharbia, Menoufia, Behera, Ismaila
Upper Egypt Urban	1,031	1,416	Giza, Beni-Suef, Fayoum, Menia, Assyout,
Upper Egypt Rural	964	1,408	Suhag, Quena, Aswan

Source: Asaad and Roushdy (2006)

Table 3: Real monthly per-capita region-specific poverty lines and real monthly region-specific low earning line by region (in 2006 L.E.)

Region	Real monthly per-capita region-specific poverty lines 2004/2005	Real monthly region-specific low earning lines 2006
Metropolitan	125	376
Lower Egypt Urban	123	370
Lower Egypt Rural	123	411
Upper Egypt Urban	122	366
Upper Egypt Rural	121	364
Total Egypt	123	368

Source: Asaad and Roushdy (2006)

Table 4 presents summary descriptive statistics of variables used in regressions. As noted in the introduction, the sample of estimation is limited to wage workers currently employed in the manufacturing sector. All figures are properly weighted to reflect the population distribution. A comparison of 1998 and 2006 figures reveals that on average, real hourly wages increased,.

Table 4: Means and Standard Deviation of Variables Used in Regressions (definition of variable between parenthesis)

Variable	1998			2006		
	No. Obs.	Mean	Std. Dev.	No. Obs.	Mean	Std. Dev.
LnRHr Wag (log real hourly wage)	836	0.25	0.66	1189	0.73	0.78
Percent female	1027	0.11	0.14	1533	0.14	0.14
pub_gov (share of public enterprise & gov in manufacturing)	1027	0.29	0.45	1533	0.19	0.39
Priv (share of private enterprise in manufacturing)	1027	0.71	0.45	1533	0.81	0.39
Expr (years of experience)	1027	18.14	13.02	1533	16.81	12.16
Exprsq (years of experience squared)	1027	498.40	585.24	1533	430.22	542.66
Illiterate	1027	0.20	0.40	1533	0.18	0.38
Read/Write	1027	0.15	0.35	1533	0.08	0.28
Primary	1027	0.17	0.37	1533	0.14	0.35
Preparatory	1027	0.08	0.27	1533	0.07	0.26
GeneralSecondary	1027	0.01	0.12	1533	0.01	0.10
Vocational Secondary	1027	0.27	0.44	1533	0.35	0.48
PostSecondary	1027	0.05	0.21	1533	0.05	0.21
Univabove (university and above)	1027	0.08	0.27	1533	0.12	0.32

Greater Cairo	1027	0.28	0.45	1533	0.26	0.44
Alex (Alexandria)	1027	0.12	0.32	1533	0.13	0.33
Rur. Up. Egypt (Rural Upper Egypt)	1027	0.15	0.36	1533	0.16	0.36
Urb. Up. Egypt (Urban Upper Egypt)	1027	0.05	0.22	1533	0.05	0.22
Rur. L. Egypt (Rural Lower Egypt)	1027	0.27	0.44	1533	0.28	0.45
Urb. L. Egypt (Urban Lower Egypt)	1027	0.14	0.34	1533	0.13	0.33
Tariff	1027	0.19	0.10	1533	0.13	0.09
imp_penet2 (import penetration)	1027	0.40	0.26	1533	0.39	0.25
export_ori~t (export orientation	1027	0.10	0.12	1533	0.15	0.14
chng_tariff (change in tariffs)	--	--	--	1533	-0.06	0.05
chng_imp_p~2 (change in import penetration)	--	--	--	1533	0.00	0.12
chng_expor~t (change in export orientation)	--	--	--	1533	0.04	0.12

As for the explanatory variables, the share of public enterprises in the manufacturing sector in Egypt (pub_gov) has declined from 30% to 20%, and this shift coincided with a slight decline in average years of experience (Expr) from 18 to 16.8, a more notable reduction in the share of workers with a university degree (Univabove) from 8% to 12%, and a substantial increase in the proportion of workers with a vocational secondary degree (Vocational Secondary) from 26.5% to 35%. Figures in both years reflect a high concentration of manufacturing activity in greater Cairo and rural lower Egypt, together accounting for over 50% of employment in the sector.

As for trade related and other industry variables, the average figures indicate a 6% decline in average tariffs, a 15% increase in export orientation (export_ori~t) measured as the ratio of exports to GDP and hardly any change in import penetration measured as imports as a ratio of domestic supply (domestic output plus imports minus exports) . Manufacturing industries also on average become more feminized, unionized and staffed by an increasing portion of white collar and more skilled (secondary degrees and above) workers.

Empirical Methodology and Results

We use the inter-industry wage differentials approach to determine whether workers in less heavily protected industries have lower wages than workers of similar observable characteristics in the more heavily protected industries. Let $i=1,2,3…I_j$ index workers in industry j. We regress the log of worker i's wages at time t ($\ln(w_{ijt})$) on a vector of worker characteristics H_{ijt} (age, age squared, gender, education indicators, sector indicators, and region of residence) and a set of industry indicators (P_{ijt}) reflecting the degree of international trade and protection. We estimate the following equation:

$$\ln(w_{ijt}) = H_{ijt}\beta_H + P_{ijt}\beta_P + \varepsilon_{ijt} \tag{1}$$

for $i=1,…I_J; j=1,…,J$ and $t=$ 1998 or 2006.

We estimate the above equation for all waged workers in the manufacturing sector as well as for workers classified as low waged and poor.

We also employ Quantile regression methods to gain more insight in the wage distribution by percentile of wages, and hence distinguish between higher paying and lower paying jobs in the manufacturing sector. This allows us to examine the differential impact of trade reforms across five quantiles (10th, 25th, 50th, 75th and 90th) of the earning distribution.

Quantile regression methods are used to facilitate the estimation of several alternative quantiles of the wage distribution. This provides a more detailed account of the conditional (log) wage distribution. Quantile methods are also preferred over, or along side, least square estimation due to the higher degree of robustness in estimation and reduced sensitivity to outlying observations (Koenker and Bassett, 1978) and for detecting and correcting (in combination with bootstrap methods) for heteroscedasticity (Deaton, 1997).

The Quantile regression method can be written in equation form as the qth quantile of the conditional log distribution of wages as a linear function of the regression variable, X:

Quantile $_{qs}$ (lnw|x) = X β_q (s=g,p,r) (2)

The model can be estimated by finding the vector (β_q) that minimizes the following expression,

$$\sum_{r<0} q \mid \ln w - x'\beta_q \mid + \sum_{r>0} (1-q) \mid \ln w - x\beta_q \mid$$

Where r is the residual , $r_i = \ln w - x' \beta_q$ [3]

Table 5 below presents the regression results for all workers in the manufacturing sector in Egypt. In this as well as all of the following regressions, the log hourly wage equations are estimated for three models: 1998 levels, 2006 levels of trade variables, and 2006 changes in trade variables. Based on goodness of fit statistics, the human capital model appears to well explain both wage setting in the manufacturing sector in Egypt. As expected, there is a significant negative wage differential associated with being female in both years. Compared to 1998, the female disadvantage in wages worsened and became more significant in 2006. There is a positive and significant wage differential in 2006 in the public sector. The experience wage profiles follow the expected inverted U-shape implied by human capital theory. There are also increasing returns to education, and they particularly jump at the university or above levels. Finally, there are mostly negative and significant differentials due to residence outside of greater Cairo.

As for trade variables, level of tariff protection is significantly negatively related to wages in both 1998 and 2006. Export orientation as well as the change in export orientation are both significant and positively related to wages in 2006. In other words, for all manufacturing, trade liberalization in form of lower tariffs and trade openness in terms of export orientation (but not import penetration which is insignificant) appear to exert a positive influence on wages for the average worker in the manufacturing sector in Egypt.

Table 5: Ordinary Least Square Estimates of log hourly Wages, 1998 and 2006: All Manufacturing Workers

VARIABLES	(1)	(2)	(3)
	1998:level	2006:level	2006:change
Tariff	-0.839***	-0.858***	-0.429
	(0.310)	(0.259)	(0.360)
Chngtariff			0.260
			(0.522)
Imp_penet2	-0.039	0.017	-0.069
	(0.090)	(0.094)	(0.109)
chngimp_penet2			0.640*
			(0.357)
Exp_orient	0.058	0.913***	0.089
	(0.172)	(0.162)	(0.268)
chngexp_orient			0.707***
			(0.254)
Female	-0.042	-0.149**	-0.152**
	(0.063)	(0.064)	(0.064)

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[3] The above minimisation problem can be easily accomplished by linear programming techniques. Standard errors are calculated from the analytic variance-covariance matrix proposed by Koenker and Bassett, 1978, or in case of suspected heteroscedasticity , bootstrap methods are used (see Deaton, 97, p.84-85 and Stata Corporation, 1997, 94-104).

Expr	0.051***	0.043***	0.043***
	(0.005)	(0.006)	(0.006)
Exprsq	-0.001***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
ReadWrite	0.191***	-0.034	-0.018
	(0.067)	(0.090)	(0.089)
Primary	0.356***	0.088	0.095
	(0.065)	(0.074)	(0.074)
Preparatory	0.345***	0.151*	0.166*
	(0.080)	(0.090)	(0.090)
GeneralSecondary	0.610***	0.106	0.100
	(0.176)	(0.201)	(0.200)
VocationalSec	0.474***	0.256***	0.255***
	(0.062)	(0.065)	(0.064)
PostSecondary	0.506***	0.391***	0.369***
	(0.094)	(0.101)	(0.100)
Univabove	1.072***	0.774***	0.757***
	(0.085)	(0.081)	(0.080)
Alex	-0.026	-0.054	-0.059
	(0.062)	(0.065)	(0.064)
Ruegypt	-0.107*	-0.130**	-0.126*
	(0.061)	(0.066)	(0.066)
Uuegypt	-0.047	-0.231**	-0.249**
	(0.093)	(0.104)	(0.103)
Rlegypt	-0.175***	-0.214***	-0.207***
	(0.052)	(0.053)	(0.053)
Ulegypt	-0.119*	-0.128*	-0.104
	(0.062)	(0.067)	(0.067)
Pub_gov	-0.043	0.137***	
	(0.045)	(0.052)	
Constant	-0.425***	0.039	0.290*
	(0.112)	(0.109)	(0.171)
Observations	835	1189	1189
R-squared	0.402	0.280	0.291

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 below shows that the same results are more or less maintained when we limit the regression to only the group of low waged workers. In fact the negative impact of tariff protection in 1998 and 2006, and the positive impact of the change in export orientation in 2006 is much more pronounced for the group of low waged workers. It is also interesting to note that almost none of the human capital variables , including gender, experience and level of education are significant for this group of workers, especially in 2006. Experience and Vocational education had a positive significant effect in 1998, but lost their significance in 2006.

Table 6: Ordinary Least Square Estimates of log hourly Wages, 1998 and 2006: Low-Waged Manufacturing Workers

VARIABLES	(1) 1998:level	(2) 2006:level	(3) 2006:change
Tariff	-91.668**	-62.777**	-2.923
	(43.013)	(31.391)	(40.623)
Chngtariff			-33.666
			(62.915)
Imp_penet2	3.524	2.783	2.851
	(11.714)	(10.885)	(12.727)
chngimp_penet2			-2.393
			(43.633)
Exp_orient	-20.620	25.050	-14.570
	(21.347)	(20.964)	(31.024)
chngexp_orient			77.253***
			(28.111)
Pub_gov	-0.002	0.106	0.131*
	(0.060)	(0.067)	(0.067)
Female	-0.038	-0.077	-0.065
	(0.075)	(0.062)	(0.062)
Expr	0.033***	0.007	0.007
	(0.007)	(0.007)	(0.007)
Exprsq	-0.001***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
ReadWrite	0.065	-0.203**	-0.192**
	(0.075)	(0.096)	(0.096)
Primary	0.178**	-0.003	-0.006
	(0.076)	(0.082)	(0.081)
Preparatory	0.203**	-0.087	-0.067
	(0.098)	(0.111)	(0.110)
GeneralSecondary	0.292	0.143	0.094
	(0.227)	(0.291)	(0.292)
VocationalSec	0.259***	0.003	0.010
	(0.071)	(0.070)	(0.070)
PostSecondary	0.126	0.033	0.024
	(0.119)	(0.145)	(0.145)
Univabove	0.258	-0.068	-0.086
	(0.198)	(0.111)	(0.111)
Alex	-0.006	0.001	-0.004
	(0.091)	(0.085)	(0.085)
Ruegypt	-0.052	0.092	0.084
	(0.082)	(0.085)	(0.085)
Uuegypt	-0.082	0.043	0.024
	(0.124)	(0.115)	(0.114)
Rlegypt	-0.070	0.143**	0.134**
	(0.069)	(0.064)	(0.065)
Ulegypt	0.009	0.070	0.089
	(0.086)	(0.083)	(0.084)
Constant	-0.380***	0.044	-0.031
	(0.144)	(0.119)	(0.155)
Observations	366	483	483
R-squared	0.198	0.092	0.109

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

If we limit the regression to only the poor in the manufacturing sector as in Table 7 below, then we still get a negative impact of tariff on wages in 1998, but the results are not maintained in 2006. Export orientation is no longer significant. This could be explained by the fact that export orientation has become increasing demanding in terms of minimum skill requirements that poor workers currently lack. In fact a survey of a number of Ready made garments firms conducted in by Elshennawy in 2002 revealed that workers must demonstrate knowledge of English to be able to work for firms that act as subcontractors to major designers abroad since the sketches of designs come in English. Finally, it interesting to note that there is a large and significant negative wage differential for the group of poor female workers in the manufacturing sector in Egypt

Table 7:   Ordinary Least Square Estimates of log hourly Wages, 1998 and 2006: Poor Workers

VARIABLES	(1) 1998:level	(2) 2006:level	(3) 2006:change
Tariff	-299.689**	-55.386	28.830
	(137.092)	(69.175)	(90.478)
Chngtariff			13.777
			(151.983)
Imp_penet2	8.574	-10.105	13.261
	(37.813)	(24.439)	(30.149)
chngimp_penet2			-146.488
			(99.307)
Exp_orient	15.442	55.766	74.861
	(57.257)	(51.969)	(66.938)
chngexp_orient			84.411
			(58.162)
Pub_gov	-0.105	0.108	0.179
	(0.169)	(0.140)	(0.156)
Female	0.321	-0.461***	-0.444***
	(0.256)	(0.152)	(0.152)
Expr	0.073***	0.022*	0.024*
	(0.023)	(0.013)	(0.013)
Exprsq	-0.001***	-0.000	-0.000
	(0.001)	(0.000)	(0.000)
ReadWrite	0.198	-0.176	-0.166
	(0.160)	(0.147)	(0.147)
Primary	0.240	-0.014	0.000
	(0.178)	(0.133)	(0.133)
Preparatory	0.577*	0.179	0.165
	(0.334)	(0.179)	(0.180)
GeneralSecondary	0.310	0.000	0.000
	(0.997)	(0.000)	(0.000)
VocationalSec	0.238	-0.107	-0.076
	(0.198)	(0.129)	(0.131)
PostSecondary	0.000	0.426	0.426
	(0.000)	(0.345)	(0.366)
Univabove	0.000	0.507	0.558
	(0.000)	(0.855)	(0.856)
Alex	-0.092	-0.026	-0.020
	(0.395)	(0.256)	(0.259)
Ruegypt	-0.151	0.025	-0.032
	(0.347)	(0.149)	(0.152)
Uuegypt	-0.134	-0.081	-0.135
	(0.375)	(0.172)	(0.178)
Rlegypt	-0.506	-0.122	-0.152
	(0.363)	(0.167)	(0.172)

Ulegypt	0.195	-0.151	-0.142
	(0.448)	(0.215)	(0.214)
Constant	-0.067	0.253	0.001
	(0.579)	(0.230)	(0.343)
Observations	84	137	137
R-squared	0.490	0.337	0.359

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Quantile Regression Estimates of log hourly Wages, 1998: All Manufacturing Workers

VARIABLES	(1) 10th	(2) 25th	(3) 50th	(4) 75th	(5) 90th
Tariff	-122.744**	-153.648***	-82.220***	-42.140	-159.774***
	(53.011)	(45.432)	(29.301)	(49.373)	(47.396)
Imp_penet2	-17.294	-7.516	9.380	12.916	-22.843*
	(11.313)	(14.965)	(11.207)	(10.860)	(13.429)
Exp_orient	-2.728	28.468	16.661	31.141*	45.421
	(33.720)	(17.907)	(19.649)	(17.721)	(30.490)
pub_gov	-0.039	-0.000	0.001	-0.013	-0.178***
	(0.050)	(0.055)	(0.088)	(0.078)	(0.068)
Female	-0.098	-0.128	-0.083	-0.020	0.006
	(0.128)	(0.109)	(0.091)	(0.098)	(0.129)
Expr	0.064***	0.051***	0.045***	0.044***	0.047***
	(0.010)	(0.010)	(0.010)	(0.006)	(0.008)
Exprsq	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ReadWrite	0.012	0.108	0.219	0.228**	0.155**
	(0.107)	(0.126)	(0.142)	(0.105)	(0.077)
Primary	0.235*	0.247**	0.267***	0.234***	0.206*
	(0.141)	(0.123)	(0.089)	(0.079)	(0.107)
Preparatory	0.297*	0.260**	0.304***	0.210	0.246
	(0.164)	(0.126)	(0.089)	(0.139)	(0.154)
GeneralSecondary	0.759***	0.482***	0.463**	0.368	0.642
	(0.127)	(0.125)	(0.188)	(0.241)	(0.598)
VocationalSec	0.432***	0.357***	0.445***	0.420***	0.503***
	(0.101)	(0.124)	(0.103)	(0.092)	(0.073)
PostSecondary	0.135	0.342	0.445***	0.514***	0.534***
	(0.122)	(0.212)	(0.162)	(0.146)	(0.186)
Univabove	0.911***	0.886***	0.931***	1.027***	1.123***
	(0.147)	(0.118)	(0.108)	(0.121)	(0.176)
Alex	-0.187**	-0.066	0.018	0.094	0.160
	(0.093)	(0.086)	(0.074)	(0.095)	(0.147)
Ruegypt	-0.135*	-0.151*	-0.048	-0.021	-0.083
	(0.079)	(0.089)	(0.120)	(0.060)	(0.124)
Uuegypt	-0.191*	-0.078	0.061	-0.060	0.023
	(0.115)	(0.082)	(0.114)	(0.095)	(0.139)
Rlegypt	-0.337***	-0.185*	-0.095	0.043	0.121
	(0.083)	(0.100)	(0.069)	(0.082)	(0.132)
Ulegypt	-0.116	-0.052	-0.074	-0.119*	-0.065
	(0.101)	(0.057)	(0.062)	(0.065)	(0.121)
Constant	-0.867***	-0.497***	-0.418***	-0.235	0.355
	(0.162)	(0.111)	(0.120)	(0.145)	(0.218)
Observations	835	835	835	835	835

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Quantile Regression Estimates of log hourly Wages, 2006 (levels of trade variables): All Manufacturing Workers

VARIABLES	(1) 10th	(2) 25th	(3) 50th	(4) 75th	(5) 90th
Tariff	-14.204	-2.249	-46.111*	-103.583***	-147.710***
	(47.323)	(18.427)	(26.195)	(24.884)	(49.027)
Imp_penet2	6.034	13.277	19.595*	7.728	-0.384
	(15.108)	(13.043)	(10.290)	(12.663)	(13.031)
Exp_orient	57.999**	70.728***	82.442***	116.075***	127.736***
	(23.899)	(15.997)	(14.034)	(18.714)	(25.675)
pub_gov	0.153**	0.166***	0.094	0.137***	0.062
	(0.070)	(0.062)	(0.059)	(0.053)	(0.145)
Female	-0.350***	-0.357***	-0.324***	-0.180*	0.043
	(0.097)	(0.062)	(0.065)	(0.104)	(0.444)
Expr	0.043***	0.047***	0.045***	0.045***	0.047***
	(0.009)	(0.007)	(0.005)	(0.006)	(0.010)
Exprsq	-0.000**	-0.001***	-0.001***	-0.001***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ReadWrite	-0.071	0.008	0.003	0.004	-0.079
	(0.198)	(0.129)	(0.075)	(0.082)	(0.249)
Primary	-0.022	0.009	0.051	0.088	0.032
	(0.113)	(0.072)	(0.060)	(0.071)	(0.127)
Preparatory	0.057	0.051	0.072	0.111	0.132
	(0.115)	(0.107)	(0.108)	(0.106)	(0.195)
GeneralSecondary	-0.119	0.159	0.276**	0.075	0.445
	(0.313)	(0.236)	(0.127)	(0.459)	(0.288)
VocationalSec	0.257***	0.200***	0.222***	0.227***	0.348***
	(0.088)	(0.062)	(0.063)	(0.072)	(0.126)
PostSecondary	0.497***	0.324***	0.391***	0.446***	0.451***
	(0.191)	(0.077)	(0.087)	(0.125)	(0.145)
Univabove	0.593***	0.707***	0.717***	0.847***	1.159***
	(0.119)	(0.082)	(0.078)	(0.128)	(0.253)
Alex	-0.090	0.046	0.054	0.034	-0.094
	(0.081)	(0.067)	(0.062)	(0.067)	(0.147)
Ruegypt	-0.262*	-0.133*	-0.015	0.042	-0.164
	(0.155)	(0.078)	(0.080)	(0.066)	(0.123)
Uuegypt	-0.352***	-0.132**	-0.144**	-0.162***	-0.408***
	(0.131)	(0.059)	(0.073)	(0.047)	(0.117)
Rlegypt	-0.179***	-0.166***	-0.145***	-0.174***	-0.307**
	(0.069)	(0.040)	(0.054)	(0.048)	(0.139)
Ulegypt	-0.211***	-0.140**	-0.123*	-0.116*	-0.218
	(0.069)	(0.062)	(0.067)	(0.063)	(0.156)
Constant	-0.584***	-0.442***	-0.113	0.263**	0.641***
	(0.159)	(0.108)	(0.092)	(0.115)	(0.244)
Observations	1189	1189	1189	1189	1189

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Quantile Regression Estimates of log hourly Wages, 2006 (change in trade variables): All Manufacturing Workers

VARIABLES	(1) 10th	(2) 25th	(3) 50th	(4) 75th	(5) 90th
Tariff	46.957	36.874	24.722	-62.957	-153.894*
	(49.968)	(36.199)	(54.949)	(50.832)	(84.335)
Chngtariff	43.148	-8.873	-18.098	20.329	58.261
	(77.281)	(56.164)	(49.635)	(77.819)	(172.671)
Imp_penet2	7.641	13.961	24.140*	4.323	-20.183
	(16.126)	(17.956)	(13.640)	(14.610)	(26.393)
Chngimp_penet2	-18.793	-4.565	-49.571	57.667	143.135
	(42.514)	(54.241)	(46.114)	(55.246)	(111.244)
Exp_orient	25.846	47.607	75.372***	44.733	22.491
	(38.157)	(31.344)	(18.179)	(30.236)	(60.689)
Chngexp_orient	64.094	44.009*	75.836**	65.067*	35.128
	(45.269)	(25.777)	(33.285)	(35.323)	(54.884)
pub_gov	0.161***	0.169**	0.141***	0.169***	0.035
	(0.059)	(0.081)	(0.041)	(0.057)	(0.129)
Female	-0.342***	-0.323***	-0.356***	-0.160	-0.023
	(0.120)	(0.069)	(0.044)	(0.125)	(0.394)
Expr	0.046***	0.049***	0.047***	0.047***	0.042***
	(0.010)	(0.006)	(0.005)	(0.006)	(0.012)
Exprsq	-0.001**	-0.001***	-0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ReadWrite	-0.182	0.036	-0.041	0.012	-0.025
	(0.135)	(0.099)	(0.058)	(0.074)	(0.174)
Primary	-0.073	0.000	0.021	0.084	0.179*
	(0.095)	(0.077)	(0.070)	(0.064)	(0.094)
Preparatory	0.002	0.043	0.033	0.097	0.154
	(0.106)	(0.096)	(0.083)	(0.099)	(0.184)
GeneralSecondary	-0.248	0.162	0.243	0.078	0.339
	(0.299)	(0.211)	(0.221)	(0.259)	(0.248)
VocationalSec	0.154**	0.225***	0.199***	0.221***	0.346***
	(0.074)	(0.064)	(0.047)	(0.057)	(0.131)
PostSecondary	0.397***	0.315***	0.394***	0.392***	0.469**
	(0.108)	(0.094)	(0.086)	(0.104)	(0.186)
Univabove	0.513***	0.699***	0.699***	0.796***	1.059***
	(0.096)	(0.097)	(0.067)	(0.089)	(0.226)
Alex	-0.035	0.046	0.029	0.023	-0.181
	(0.090)	(0.075)	(0.058)	(0.067)	(0.136)
Ruegypt	-0.228	-0.142**	-0.026	0.046	-0.157*
	(0.140)	(0.071)	(0.131)	(0.068)	(0.086)
Uuegypt	-0.416***	-0.138*	-0.146**	-0.186***	-0.449**
	(0.138)	(0.082)	(0.064)	(0.068)	(0.190)
Rlegypt	-0.184***	-0.157***	-0.167***	-0.186***	-0.305***
	(0.059)	(0.061)	(0.063)	(0.061)	(0.087)
Ulegypt	-0.155	-0.145***	-0.130**	-0.116*	-0.187*
	(0.096)	(0.056)	(0.052)	(0.065)	(0.103)
Constant	-0.578**	-0.515***	-0.245	0.321*	0.981**
	(0.226)	(0.141)	(0.167)	(0.171)	(0.459)
Observations	1189	1189	1189	1189	1189

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, Tables 8-10 above report estimates of the above models using quantile regression methods for 5 quantiles of the earning distribution: (10th, 25th, 50th, 75th and 90th). The results confirm

again that tariff protection is consistently negative for all quantiles, and the impact is largest for the lowest and highest quantiles in 1998 (10th, 25th and 90th), and for the highest quantiles in 2006 (75th and 90th). The positive impact of increased export orientation on wages is only prevalent for the 50th percentile of the earnings distribution and is not at higher or lower quantiles. This result is inconsistent with what theory predicts. However, this is not surprising if one considers wage earners lying in the higher quintiles to be skilled - mainly white collar - while export oriented industry are intensive in unskilled labor. As to the lower quantiles, this is again consistent with the explanation given before for minimum skill requirements. Hence we found a significant effect In OLS results.

To sum up, analysis conducted above shows that trade liberalization in the form of lower tariffs and more export orientation has in general lead to higher wages in the manufacturing sector in Egypt, but when it comes to export orientation such results do not hold for poor workers. In general, quantile regression results reveal that the effect of trade liberalization or export orientation is not even among the different quantiles of the earning distribution.

VI. Prerequisites for Successful Adjustment

It was shown above that trade liberalization was accompanied by an increase in import penetration ratios -despite high tariff rates and the added protection provided through rules of origin- and yet this has not resulted in declining employment. In fact, and as mentioned above employment in manufacturing has been increasing between 1993 and 2006. While these results seem comforting, it is important to recognize though that tariffs continue to be high for some industries and that the bulk of trade liberalization efforts have been concentrated in the area of intermediate and capital goods so that one cannot postulate with certainty that further liberalization - in the area of final goods -might not be accompanied by high adjustment costs. It is thus crucial at this stage to examine certain features of labor markets as well as some of the characteristics of the labor force that can help in predicting high adjustment costs. The best way to proceed is to examine the prerequisites for successful adjustment.

Expansion of intraindustry trade as opposed to interindustry trade results in less adjustment costs. This can be explained by the fact that the former is usually associated with industry rationalization while the latter is associated with contraction of some industries. (Matuz, 1996). Well functioning labor markets is important in reducing adjustment costs since this facilitates the movement of workers from declining to expanding activities Labor mobility as facilitated by labor market institutions is thus the key issue. Many factors can reduce labor mobility between sectors and industries. These include heterogeneous skills, asymmetric information, geographic mismatch and weak job search. (OECD, 2005).

Such factors can contribute to high adjustment costs as reflected in long spells of unemployment and lower pay – compared initial jobs. Long spells of unemployment and lower pay compared to initial jobs implies that the labor market is not matching workers released from activities adversely affected by competition from imports to employers that can better make use of their skills efficiently. Market failure arising due to information imperfections like the lack of knowledge of new jobs available constitutes an important factor in this regard. Such imperfections can lead to inefficiencies as displaced workers take jobs that are not best suited to their productive potential. (OECD, 2005)

There are three indicators of labor mobility: the incidence of long term employment, average job tenure, and internal migration (OECD, 2005). Given the short time spent on the job as evident from Egypt's labor market survey along with the predominance of temporary employment in the private sector, one can safely assert that both long term employment and high job tenure are not very significant which in turn implies that labor mobility is high.

A number of other factors can discourage *voluntary* adjustment on behalf of employees. Employment protection legislation like high severance pay can impede voluntary job change on behalf of high tenured workers. Also, if wages are closely tied to the number of years on the job, this can

discourage older workers and long tenured workers from leaving their current job. (OECD, 2005). In the case of Egypt, one can expect that these factors would play a crucial role in impeding adjustment to free trade in the public sector. However, given the large size of the informal sector and reliance on temporary employment in general in the private sector such factors are not likely to play an important role in constraining adjustment specially as the public sector continue to shrink as a result of privatization.

Examining workers characteristics is vital because certain worker characteristics can provide reasonable ground for expecting high adjustment costs and is even more vital when it comes to the design of the appropriate adjustment policy. Among the most important characteristics are: age, job tenure, educational attainment and gender. Empirical evidence shows that workers who are old, having low educational attainment, with high job tenure and female are more likely to experience high adjustment costs – low reemployment rates and earning loss- once displaced. Job tenure is usually used as a measure of firm and job specific skills. Higher tenure indicates that firm or job specific skills is important. The higher the tenure the more earnings loss when a displaced worker becomes reemployed . Long job tenure also leads to rusty job search skills. Workers who were previously employed full time are more likely to be reemployed because of strong labor attachment compared to part time workers. Married women face difficulty being reemployed since relocation becomes costly and difficult. (Kletzer, 2001)

With regards to Egypt's labor force, in 2006, 76% of workers were male and 28% were over 45 years old. Egypt's labor market survey provides evidence that workers in general do not seem to have spent a long time on their current job. This is true for the two rounds 1998 and 2006. For example, of those that started working in 2006, 10.94% have started their job in 2005. As to educational attainment, in 2006, 23.71% of male workers are illiterate, 8.34% can read and write and 11.86% have primary education. For Females the figures are 39.83%, 2.92% and 5.04% respectively. Such figures reflect low educational attainment whether among males or females. On ground of the age structure and educational attainment of workers it seems plausible to expect that workers might face high adjustment costs in the wake of trade liberalization.

A final word with regards to adjustment polices remains. Country experience shows that in the case of old workers with low educational attainment, tailored job search assistant – i.e. helping displaced workers find a new job especially in the same industry since this has reduced earning loss substantially - is the right form of adjustment assistance and can eventually reduce the need for retraining which is particularly difficult in the case of old and less educated workers. (Kletzer, 2001)

A number of other adjustment assistance policies that were implemented in OECD countries include unemployment benefits, severance pay and wage insurance. Unemployment benefits are superior to severance pay because they can better reflect adjustment costs either in form of the length of unemployment or the size reduction of earnings while being jobless. On the other hand, wage insurance is better than unemployment benefits because the latter does not provide compensation for lost earnings once reemployed at a lower wage and encourage adjustment. Wage insurance has been introduced in France, Germany and the United States. (OECD 2005)

VII. Conclusion

The impact of trade liberalization on manufacturing employment differed between developed and developing countries. A recent study by the OECD 2005 revealed that manufacturing employment declined in a number of OECD countries following trade liberalization. A survey of the empirical literature addressing the same question for developing countries conclude that liberalization has resulted in an increase in employment. This paper provides further evidence in support of these findings in the case of Egypt. Almost all manufacturing industries in Egypt experienced increasing employment over the period 1993-2006, a period coinciding with significant reduction in trade barriers. While these results should be interpreted with caution given the fact that the bulk of

liberalization efforts have been concentrated in the area of intermediate and capital goods, they are nonetheless illustrative in light of increasing import penetration documented in this paper. On the other hand, the role of cheaper intermediate and capital goods in improving competitiveness and facilitating expansion of import competing and export oriented industries - and thus expansion in employment - cannot be understated.

It is important to note that sometimes the adjustment costs that workers have to bear in the wake of trade liberalization is manifested in lower pay rather than long spells of unemployment. However, the reduction in trade barriers, the increase in export orientation and the subsequent expansion in employment was associated with increasing wages for workers in the manufacturing sector although this has not been quiet true for poor wage workers. This latter result constitute a significant departure from what is predicted by theory.

Finally, although so far trade liberalization has not been accompanied by adjustment costs either in form of unemployment or lower wages, it was shown else where that job quality deteriorated especially as measured by informality, lack of permanent contacts and absence of national insurance coverage increased across jobs etc. (Said and Alazzawi, 2009), that is adjustment costs took a different form than simply long spells of unemployment or lower wages. Also, certain workers characteristics like old age and low educational attainments - as inferred from Egypt's labor market survey – provides grounds to anticipate high adjustment costs on behalf of workers as liberalization efforts intensify in the future.

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