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Poverty, Job Quality and Labor Market Dynamics

Trade Liberalization, Inter-industry Wage Differentials and Job Quality in Egyptian Manufacturing

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Population Council

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Abstract

This paper investigates the impact of trade openness on wage and job quality outcomes in the Egyptian manufacturing sector over a period of rapid trade liberalization. We utilize newly available panel labor market survey data for 1998–2006, merge it (at the two-digit industry level) with trade variables that capture export orientation, import penetration as well as direct policy change relating to reduction of average tariffs, and use the merged data set to estimate a two-stage inter-industry wage and job quality premia model. Our results highlight that institutional factors of job quality (social security, medical insurance, a contract, paid casual leave, paid sick leave, and whether the worker is a member of a trade union) have the strongest correlation with the trade variables and the industry-specific characteristics used in the analysis. Tariff reduction per se, does not seem to have had a significant impact on either wages or job quality over this period. On the other hand, increased export orientation exerts a strong positive impact on wages, but a significant negative impact on all job quality indices in many specifications. Finally, industries with the highest import penetration levels have the lowest job quality, but those that had the largest increase in import penetration actually also saw large improvements in job quality. The above results underscore the clear distinction between wage and job quality outcomes in the Egyptian labor market, and the importance of separating the two when examining the effect of trade policy on labor.

1. Introduction

One of the most distinguishing features of the current phase of global integration is the wide-spread adoption of trade liberalization and openness to foreign markets through high reductions in tariffs and non-tariff barriers in the developing world. A controversy has followed, however, on the potential growth and distributional benefits and perils of such strategies, as predominantly reflected in labor market outcomes. In particular, the impact of trade openness and decline in protection on wage inequality and employment outcomes in countries that engaged in such a course

has been thoroughly studied.[1] By contrast, very few studies attempted to measure the impact of such policies of the quality on new jobs created as a result of openness. Although there is no empirical evidence that supports the correlation between trade openness and changes in job quality, it is claimed that increased foreign competition, mainly in developing countries, leads to an expansion of the informal sector because it is the formal sector that is exposed to more foreign competition compared to the informal sector, and that the formal sector attempts to cut costs by opting for temporary or part-time workers or laying off workers who then opt for informal jobs (Goldberg and Pavcnik (2003)). For example, the study by Currie and Harrison (1997) on Morocco shows that firms started hiring more temporary workers after the completion of a comprehensive trade liberalization program.

This paper will employ a newly available panel labor market survey to investigate the above claim for Egypt over the period of rapid trade liberalization between 1998 and 2006. Egypt's concerted efforts to liberalize a highly restrictive trade regime since the early 1990s, has resulted in substantial reduction in both nominal and effective protection in almost all manufacturing sector industries. Besides representing the first attempt to directly estimate the impact of trade liberalization measures on wage and non-wage outcomes in the Egyptian labor market, our study will go beyond previous literature on this topic in two important ways. First, in order to arrive at adequate measures of trade openness and protection at the industry level we will merge labor market survey data at the two-digit industry level with trade measures that capture export promotion and import penetration, as well as direct policy change relating to reduction of average tariffs. Secondly, we go further than simply equating job equality to degree of formality by employing three comprehensive measures of job quality that combine measures of earnings, nature of the work place, adequacy of working hours, commuting time to work, and job stability, as well as a host of institutional variables that capture non-wage and fringe benefits of a job.

The remainder of the paper is organized as follows. Section 2 presents our conceptual framework and a brief review of the related literature. Section 3 details the empirical methodology for linking trade liberalization measures to wage and quality outcomes. Section 4 describes the data sources and trade

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1 For a comprehensive review of recent empirical findings on trade and wage inequality in develo - ing countries, see Goldberg and Pavcnik (2004) and on trade and employment see Hoekman and Winters (2005).

policy reform in Egypt as well as the issues related to job quality indices used in the study. Section 5 presents the results of first and second stage regression that relate trade policy and openness measures to inter-industry wage and job quality premiums. Finally, Section 6 concludes the paper.

2. Conceptual Framework and Related Literature

Previous literature on the effects of trade reform on labor markets has concentrated on wage and price effects, with only a small number of studies explicitly handling the effect on job quality and informality. Goldberg and Pavcnik (2003) presented a theoretical model that examined the relationship between trade liberalization and informal employment. Their model implies that trade liberalization will lower the optimal number of formal workers hired by a firm and increase that of informal workers. They test this model using data for Brazil and Columbia during periods of widespread liberalization. They found that trade liberalization did not contribute to the expansion of the informal sector in Brazil. Trade liberalization was, however, associated with a small but significant rise in informality in Columbia, although only in the period prior to labor market reforms that made it less costly for firms to fire formal employees. Marjit, Kar, and Beladi (2007) present a theoretical model that incorporates both formal and informal workers in a Hecksher-Ohlin-Samuelson (HOS) framework. They find that a reduction in tariffs in the import-competing sector will raise both employment and wages in the informal sector. Informal wages will also rise in the export sector whose price has increased, but informal employment in that sector will fall even if the sector is labor-intensive. They do not test these results empirically. The only other paper that we are aware of that discusses the quality of jobs following trade reform empirically is Currie and Harrison (1997) who find that trade liberalization in Morocco is associated with an increase in the number of temporary workers hired by firms in the formal sector.

The relationship between trade and wages follows theoretically from the 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-abundant, 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 that 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) were some of first attempts to measure the effect of the expansion of trade in the 1980s on industry wages. These studies 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 in Mexico. 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 suggests 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 90s on wage inequality. They also use 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. Another interesting finding of Attanasio et al. (2004) is related to the increased rate of informal employment in Columbia following trade reforms. This issue ties directly to the job quality issue although the only aspect of job quality that they consider is the informality issue (thereby ignoring the low quality of temporary jobs in the formal sector, for example). They found that reductions in tariffs are associated with an increase in informal employment, although this effect was more pronounced before Columbia implemented labor market reforms that made it less costly to fire workers.

Dutta (2007) performed a similar analysis for wages in India's manufacturing sector following large scale trade reforms in the 1980s and 90s. She 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 the 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 check 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]; and El-Hamidi [2008] to name a few). The obvious drawback with these studies is that

many other policy changes typically accompany trade reform such as 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. Hence, the main contribution of this paper is to use a methodology that directly accounts for worker characteristics by using individual-level data, and to use direct trade liberalization policy measures as embodied in tariffs. We also investigate the effect of liberalization on both wages and job quality, which will provide useful insights into how these two variables may respond differently to different policy measures.

3. Empirical Methodology

Our focus is on the impact of trade liberalization on industry wages and job quality. We employ the inter-industry wage differentials approach to determine whether workers in less heavily protected industries have lower wages or job quality than workers of similar observable characteristics in the more heavily protected industries. Even after accounting for worker-specific characteristics such as education and experience, workers in the same occupations in different industries may still earn different wages. We can utilize these industry wage premia, as they are called, to investigate the effect of reduced protection or increased trade on wages and job quality. We expect these changes to affect worker wages or job quality within a given industry first, because in the short run, workers are immobile—they cannot move between industries—and thus any such industry-specific change will affect working conditions in that industry first, before affecting other economy-wide variables. The effects of liberalization can therefore be identified at the industry level.

Let i=1, 2, 3...I_j index workers in industry j. We regress the log of worker i's wages at time t ($\ln(w_{ijt})$) and the index of their job quality (JQI_{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 variables (P_{jt}) reflecting the degree of protection and international trade at the industry level. We estimate the following equations:

$$\ln(w_{ijt}) = H_{ijt}\beta_{Ht} + P_{jt}\beta_{Pt} + \varepsilon_{ijt} \quad (1)$$

$$JQI_{ijt} = H_{ijt}\beta_{Ht} + P_{jt}\beta_{Pt} + \varepsilon_{ijt} \quad (2)$$

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

The one-step estimator is consistent, but if there are errors shared by all individuals within a given industry, the standard errors will be biased downward. Following Dickens and Katz (1987), a two-step procedure is implemented. In the first stage we regress the log of worker wages (or job quality index) on the vector of worker characteristics H_{ijt}, and a set of industry indicators I_{ijt} reflecting worker *i*'s industry affiliation:

$$\ln(w_{ijt}) = H_{ijt}\beta_{Ht} + I_{ijt}wp_{jt} + \varepsilon_{ijt} \tag{3}$$

The coefficient on the industry dummies wp_{jt} are then regressed in the second stage on industry characteristics including measures of trade and protection. These wage premiums are estimated for J industries, with J-1 dummy variables. The estimated wage premiums are sensitive to the choice of omitted industry dummy. To avoid this problem, Krueger and Summers (1988) suggest a normalization that expresses these industry wage premiums as deviations from the omitted industry premium. Haisken-DeNew and Schmidt (1997) suggest an improvement that renders these differentials completely independent of the omitted industry dummy, by calculating the industry wage premiums as deviations from an employment weighted mean:

$$wp^{*}_{jt} = [I - W]wp_{jt} \tag{4}$$

where wp^{*}_{jt} is a column vector of the normalized wage differentials, I is an identity matrix and W is a matrix of industry employment weights with each element $w_j = n_j \Big/ \sum_{j=1}^{J} n_j$, where n_j is the number of workers in industry *j*. This normalized wage premium can be interpreted as the proportional difference in wages (job quality) for a worker in that industry, relative to an average worker with the same characteristics in the economy as a whole. The adjusted variance-covariance matrix $V(wp^{*}_{jt})$ is computed as suggested by Haisken-DeNew and Schmidt (1997):

$$V(wp^{*}_{jt}) = [I - W][V(wp_{jt})][I - W]' \quad (5)$$

The normalized industry wage premia are then pooled over time (the first-stage regressions were performed separately for each year) and the effect of liberalization is estimated by the following equation:

$$wp^{*}_{jt} = P_{jt}\beta_P + D_{jt}\beta_D + u_{jt} \quad (6)$$

We are primarily interested in the effect of trade policy changes on wages and job quality, the coefficient β_p, where trade policy is measured by tariff levels and changes in tariffs. We also include measures of the degree of export orientation (exports/output) and import penetration (imports/(output +imports-exports)) as controls, and to facilitate the comparison of our results with other studies. Export orientation and import penetration measures are arguably endogenous since they depend on factor costs, and hence we rely on tariffs and changes in tariffs as the main measure of trade policy changes.

The vector D_{jt} consists of a set of industry controls, as well as a dummy variable for year. If political economy factors are important, such that those industries with the least skilled, or lowest-wage workers are the ones that get the highest rates of protection, then tariffs may in fact not be exogenous (Goldberg and Pavcnick 2005). It is thus important to include industry indicators that control for non-observable industry characteristics. We also include controls for a number of industry characteristics available in the data. The percentage of female workers may have an impact on the overall wage level in that industry. This is true to the extent that females are "crowded out" into lower paying or worse quality jobs, and hence we expect the larger the number of females in an industry, the lower the wages or job quality for the industry as a whole (Dutta 2007). The degree of unionization has also often been found to have a positive impact on wages. Dickens (1986) argues that firms may be willing to pay higher wages if there is a viable threat of collective action. Hence we expect wages to be higher in industries where it is easier to form unions (for example, where large plants are prevalent) and thus to have an independent effect on wages of all workers in that industry. The average level of skill in the industry as proxied by education may also have an impact on the industry wage premium, independent of that on the individual wage (Dickens and Katz 1987). The percentage of skilled workers (those with secondary or higher education) and the percent

of blue-collar workers capture this effect. We include industry indicators that capture other industry characteristics for which we do not have data.[2]

Another way to account for this potential simultaneity bias, is to estimate equation (6) in first differences. This is also useful since the relevant policy questions are usually framed in the form of how *changes* in tariff levels affect *changes* in wages or job quality. To this end we also estimate:

$$\Delta wp^{*}_{jt} = \gamma * \Delta t_{jt} + \Delta T'_{jt} \beta'_{T} + \Delta D'_{jt} \beta'_{D} + u'_{jt} \qquad (7)$$

where Δwp^{*}_{jt} is the change in industry wage premium for industry j between 2006 and 1998, Δt_{jt} is the change in tariffs in industry j between 2006 and 1998, $\Delta T'_{jt}$ denotes changes in other trade related variables such as export orientation and import penetration, while $\Delta D'_{jt}$ denotes time-variant changes in industry characteristics, such as feminization(the change in percent female), unionization and skill level (we do not include a year indicator since there is only one *t* to *t-1* period in this data).

Regressions are estimated by Weighted Least Squares (WLS). The dependent variable in the second stage regressions (equation (6)) was estimated from the wage equations in the first stage (equation (3)), and could thus suffer from estimation errors. As long as this measurement error is independent of the other regressors, it does not affect the consistency of the estimates of equation (6), but does introduce some noise in the results. Specifically, the coefficients in the wage-trade regression models might have large variances that could possibly differ across industries depending on the variance of the estimated industry coefficients. We thus estimate equation (6) with WLS, using the inverse of the standard deviations of the estimated wage premiums obtained from the wage equations that were calculated according to the Haisken-DeNew and Schmidt (1997) method. This assigns lower weight to industries with larger variance in industry premiums. Finally, to account for general forms of heteroskedasticity and serial correlation in the error term—in particular intergroup correlation for workers within the same industry—we compute robust (Huber-White) standard errors clustered by industry.

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2 Measures such as the capital output ratio, industry concentration or industry capital accumulation would also have been useful, however we do not have data on them.

4. Trade, Labor Market and Job Quality Data

4.1 Trade Reform in Egypt.

Although Egypt has taken a gradual approach to trade liberalization, the once highly restrictive trade regime has been reversed with the initiation of reforms in 1986 to the beginning of WTO agreements in 1994/5 and the signing of several multi and unilateral trade agreements in the mid-1990s, for example, COMESA, TIFA, and PAFTA. The Egyptian maximum tariff fell from 100% to 70%. It then continued to fall, reaching 40% in 1998. The next two years saw a slight increase to 43% with the most highly protected industries including textiles, clothing, leather products, cars, transportation, furniture, glass and pottery and beverages, while cotton ginning has consistently been negatively protected (Refaat, 2003).

Pledged to be in full compliance with WTO commitments, Egypt has had a policy of removing non-tariff barriers and replacing them with tariffs. In 1998, Egypt reduced the maximum tariff rate for most imports from a high of 50% to 40%. Refaat (2003) calculates the unweighted average tariff rates and the import-weighted average. Both display a significant fall between 1994 and 1998 when the unweighted average fell from 25.9% to 19.9%. After a slight rise up to 21.5% in 2000 it declined back to 20.4% in 2002 showing that trade reform slowed after 2000. Import-weighted averages follow the same trend, but at a lower level, indicating that imports are skewed toward the low-tariff goods. In addition to tariffs, Egyptian customs charges a fee for service and inspection of 1% on all imports plus an additional fee of 2% on goods that are subject to tariffs between 5% and 29% or 3% on goods that are subject to tariffs of 30% or more. During the 1990s Egypt passed legislation protecting its industries. These include only allowing cars to be imported in their year of manufacture, increasing the local component requirement for car assembly to 45% from 40%, and encouraging government bodies to buy domestic products.

Despite concerted efforts to liberalize a highly restrictive trade regime since the early 1990s, Egypt's tariffs remain relatively high, especially when compared to other developing countries with large internal markets and diversified industrial economies. Most manufacturing sectors continue to be highly protected mainly via a high and escalating tariff structure.

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%. Following WTO accession in 1995, Egypt's 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 (WTO 2005).

To further open the Egyptian economy, the new cabinet of 2004 reduced average unweighted tariff rate from 27% to 20% and rationalized the tariff structure. The number of products subject to non-tariff barriers was also substantially reduced. After the 2004 reform it is evident that both nominal and effective protection has declined for almost all manufacturing sectors with most of trade liberalization efforts concentrated in the area of intermediate and capital goods.

Table 1 : Measures of Trade Reform in Egypt 1997-2005

		1997			2005			Change 1997-2005		
ISICR 3		wghtd avg tariff	Import_penet	Export_orient	wghtd avg tariff	Import_penet	Export_orient	tarrif	import penetration	export orientation
15	Food and Beverage Manufacturing	21.89	26.88	3.60	12.62	25.02	11.48	9.26	-1.86	7.88
16	Tobacco Manufacturing	19.92	6.37	0.01	21.72	3.96	0.04	-1.80	-2.41	0.04
17	Textiles Manufacturing	24.03	14.76	32.31	13.87	10.54	19.74	10.16	-4.22	-12.57
18	Garment Manufacturing	39.71	1.73	30.29	37.00	2.76	19.96	2.71	1.03	-10.32
19	Leather Goods Manufacturing	37.15	19.89	32.30	30.76	33.19	26.18	6.39	13.30	-6.12
20	Wood Product Manufacturing (Except Furniture)	11.10	91.76	6.00	5.85	92.40	9.27	5.24	0.64	3.27
21	Paper Manufacturing	16.94	52.98	2.43	5.11	34.63	6.53	11.83	-18.36	4.10
22	Publishing and Printing Manufacturing	8.94	11.82	3.35	7.62	17.15	2.59	1.32	5.33	-0.76
23	Coke and Petroleum Products Manufacturing	16.30	1.86	1.42	2.52	33.03	49.25	13.78	31.17	47.83
24	Chemical Product Manufacturing	11.02	46.47	11.20	9.44	47.41	16.14	1.58	0.95	4.94
25	Rubber Product Manufacturing	26.49	41.29	11.99	11.46	31.44	8.58	15.03	-9.86	-3.41
26	Non-metallic Mineral Manufacturing	19.11	14.89	8.82	15.93	9.45	22.05	3.18	-5.44	13.23
27	Basic Metal Manufacturing	10.64	44.77	15.41	3.03	27.34	15.55	7.61	-17.44	0.14
28	Metallic Product Manufacturing (Except Machinery and Equipment)	23.36	40.60	10.71	13.48	41.16	24.58	9.88	0.55	13.87
29	Machinery and Equipment (Others) Manufacturing	10.48	67.88	1.50	7.81	58.34	4.69	2.67	-9.54	3.19
30	Office Equipment and Computer Manufacturing	4.73	100.11		0.22	95.27	7.53	4.51	-4.83	7.53
31	Electrical Equipment (Others) Manufacturing	18.36	48.06	1.68	8.20	39.28	5.02	10.16	-8.78	3.33
32	Radio, Television and Communication Equipment Manufacturing	8.32	63.70	0.44	1.30	60.87	3.00	7.02	-2.83	2.56
33	Medical Equipment Manufacturing	7.67	85.41	2.78	4.98	81.02	3.48	2.69	-4.39	0.70
34	Motorized Vehicle Manufacturing	39.80	50.54	4.14	23.38	59.43	6.16	16.42	8.88	2.02
35	Other Transport Equipment Manufacturing	12.28	45.80	0.41	13.55	40.12	5.96	-1.27	-5.68	5.54
36	Furniture Manufacturing	20.91	53.25	33.47	20.47	74.99	48.41	0.44	21.74	14.94
	average	18.60	42.31	10.20	12.29	41.76	14.37	6.31	-0.55	4.17

Table 1 shows data on tariff reductions over the period 1997–2005. The average tariff declined was from 18.6% to 12.3% over this period. The biggest declines were in motorized vehicle manufacturing, rubber products and paper manufacturing. On average the import penetration index did not change substantially or declined for other industries over this period; however, it has increased for coke and petroleum products, leather goods, motorized vehicles, and furniture manufacturing.

The most notable is the increase in export promotion index from an average of 10.2 to 14.4 for coke and petroleum, non-metallic minerals, and metallic products. Moreover, export promotion also increased in food and beverage and furniture manufacturing, followed by office equipment and chemical products.

4.2 Labor Market Data

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.[3] 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). The same data set can be utilized in constructing several comprehensive measures of job quality as detailed in the next sub section.

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

4.3 Job Quality Indices

As job quality is a multifaceted concept, a wide range of indicators have been proposed by several studies. In this study we derive a measure of job quality based on indicators from ELMPS. Basing on review of literature,[4] job quality can be measured along four dimensions: 1) Income security, which entails adequate income, access to social security and health care; 2) Employment security, which defines regularity of employment, contract, paid sick leave, and paid annual leave; 3) Voice representation, security measures, membership in trade unions; and 4) Work security, adequate working hours, decent workplace, and reasonable commuting distance to work. Operationalizing the above measurement dimensions to the labor data we have on hand an index of job quality is constructed that in cooperates the following 11 criteria: 1) earnings, 2) nature of workplace, 3) adequate working hours, 4) commuting time to work, 5) has regular job, 6) has social insurance, 7) has health insurance, 8) has a contract, 9) has paid sick leave, 10) has paid annual leave, and 11) member of a trade union. As some of these measures are continuous (e.g. earnings, working hours, commuting time to work) as others are dichotomous, we normalize continuous variables to a scale of 0 to 1 then combine the different measures into a single measure using factor analysis. We let correlation structure among variables produce the factor weights.

Based on the above criteria, three measures of job quality will be used, the institutional job quality measure that only incorporates criteria from 6 to 11, the JQIWW which entails all criteria but is limited to only wage workers and finally the JQWW2 which is also confined to only wage workers and includes all but the earnings criteria thus a non earnings job quality measurement. The advantage of the use of the above job quality measures as dependent variables in the empirical analysis lies in the comprehensiveness of the indices in comparison to previous studies that use a dummy for formality. Our job indices are therefore much more informative about the true quality of work as implied by the decent work literature which goes far beyond formality.

4 For a detailed literature review and the methodology underlying the job quality indices used here see Assad and Roushdy (2008).

5. Results

5.1 Descriptive Statistics and First Stage Regressions

Table 2 presents summary descriptive statistics of variables used in first and second stage regression. 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, whereas all three measures of job quality recorded a marked decline over this period.

Table 2 : Means and Standard Deviation of Variables Used in Regressions

	1998			2006		
VARIABLE	No. Obs.	Mean	Std. Dev.	No. Obs.	Mean	Std. Dev.
LnRHrWag	836	0.25	0.66	1189	0.73	0.78
JQIAllWrkr	1021	0.37	0.77	1533	0.30	0.73
InstFacAll~s	1027	0.08	0.90	1533	-0.05	0.86
JQIWWcom	837	0.28	0.70	1195	0.19	0.64
JQIexwWWcom	842	0.27	0.68	1195	0.21	0.61
pub_gov	1027	0.29	0.45	1533	0.19	0.39
Priv	1027	0.71	0.45	1533	0.81	0.39
Expr	1027	18.14	13.02	1533	16.81	12.16
Exprsq	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
GeneralSec~y	1027	0.01	0.12	1533	0.01	0.10
Vocational~c	1027	0.27	0.44	1533	0.35	0.48
PostSecond~y	1027	0.05	0.21	1533	0.05	0.21
univabove	1027	0.08	0.27	1533	0.12	0.32
Greater Cairo	1027	0.28	0.45	1533	0.26	0.44
Alex	1027	0.12	0.32	1533	0.13	0.33
Rur. Up. Egypt	1027	0.15	0.36	1533	0.16	0.36
Urb. Up. Egypt	1027	0.05	0.22	1533	0.05	0.22

continued ▶

Rur. L. Egypt	1027	0.27	0.44	1533	0.28	0.45
Urb. L. Egypt	1027	0.14	0.34	1533	0.13	0.33
Tariff	21	0.19	0.10	21	0.13	0.09
imp_penet2	21	0.40	0.26	21	0.39	0.25
export_ori~t	21	0.10	0.12	21	0.15	0.14
chng_tariff	--	--	--	21	-0.06	0.05
chng_imp_p~2	--	--	--	21	0.00	0.12
chng_expor~t	--	--	--	21	0.04	0.12
% Female	21	0.11	0.14	21	0.14	0.14
unionized	21	0.25	0.16	21	0.27	0.18
skilled_sec	21	0.51	0.23	21	0.63	0.22
blue_collar	21	0.59	0.20	21	0.56	0.27
chng_female	--	--	--	21	0.03	0.14
chng_union~d	--	--	--	21	0.01	0.13
chng_sk~_sec	--	--	--	21	0.12	0.11
chng_blue_~r	--	--	--	21	-0.03	0.12

Notes:	Definition
% Female	% of female workers by industry
unionized	% of unionized workers by industry
skilled_sec	% of workers with secondary or higher education by industry
blue_collar	% of blue collar workers by industry (defined as crocpc1=6 to 9)
chng_female	change between 2006 and 1998 in % of female workers by industry
chng_union~d	change between 2006 and 1998 in% of unionized workers by industry
chng_sk~_sec	change between 2006 and 1998 in % of workers with secondary or higher education by industry
chng_blue_~r	change between 2006 and 1998 in % of blue collar workers by industry (defined as crocpc1=6 to 9)

As for the explanatory variables, the share of public enterprises in the manufacturing sector in Egypt has declined from 30% to 20%, and this shift coincided with a slight decline in average years of experience (from 18 to 16.8), a more notable increase in the share of workers with a university degree (from 8% to 12%), and a substantial increase in the proportion of workers with a vocational secondary degree (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 and hardly any change in import penetration. 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.

Table 3 presents the first stage regression results for four model of dependent variables (LnRHrWag: log real hourly wages, InstFacAllWrkrs: institutional factors job quality index, All factors job quality index and All factors excluding earnings, yet all employing same regressors reflecting the key human capital model (experience, experience squared, levels of educational attainment, and sex and regional dummies).

Table 3a. First Stage Wage and Job Quality Regressions: 1998

1998	(1)	(2)	(3)	(4)
VARIABLES	LnRHrWag	InstFacAllWrkrs	JQIWWcom	JQIexwWWcom
Female	-0.011	-0.083	-0.213***	-0.209***
	(0.067)	(0.058)	(0.067)	(0.067)
pub_gov	-0.018	0.996***	0.448***	0.469***
	(0.049)	(0.046)	(0.049)	(0.049)
Expr	0.054***	0.030***	0.009	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)
Exprsq	-0.001***	-0.000***	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Read/Write	0.181***	0.269***	0.193***	0.187***
	(0.066)	(0.059)	(0.067)	(0.066)
Primary	0.351***	0.185***	0.217***	0.182***
	(0.064)	(0.058)	(0.065)	(0.064)
Preparatory	0.354***	0.247***	0.348***	0.306***
	(0.081)	(0.074)	(0.081)	(0.080)
GeneralSecondary	0.640***	0.361**	0.305*	0.235
	(0.176)	(0.150)	(0.176)	(0.175)
VocationalSec	0.497***	0.457***	0.324***	0.256***
	(0.063)	(0.058)	(0.063)	(0.062)
PostSecondary	0.533***	0.441***	0.409***	0.314***
	(0.095)	(0.093)	(0.096)	(0.095)
univabove	1.076***	0.649***	0.524***	0.335***

continued ▶

	(0.086)	(0.080)	(0.086)	(0.086)
Alex	0.003	0.041	-0.102	-0.100
	(0.063)	(0.061)	(0.063)	(0.063)
Rur. Up. Egypt	-0.055	-0.230***	-0.285***	-0.273***
	(0.064)	(0.059)	(0.064)	(0.063)
Urb. Up. Egypt	-0.031	-0.186**	-0.268***	-0.250***
	(0.094)	(0.082)	(0.094)	(0.093)
Rur. L. Egypt	-0.140***	-0.182***	-0.214***	-0.198***
	(0.054)	(0.049)	(0.054)	(0.054)
Urb. L. Egypt	-0.062	-0.118**	-0.184***	-0.187***
	(0.064)	(0.057)	(0.064)	(0.064)
Constant	-0.776***	-0.667***	-0.131	0.041
	(0.090)	(0.085)	(0.090)	(0.089)
Observations	836	1027	837	842
R-squared	0.430	0.667	0.490	0.451
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 3b. First Stage Wage and Job Quality Regressions: 2006

2006	(1)	(2)	(3)	(4)
VARIABLES	LnRHrWag	InstFacAllWrkrs	JQIWWcom	JQIexwWWcom
female	-0.166**	-0.169***	-0.212***	-0.176***
	(0.066)	(0.050)	(0.052)	(0.051)
pub_gov	0.130**	0.857***	0.330***	0.340***
	(0.056)	(0.048)	(0.044)	(0.043)
expr	0.043***	0.027***	0.031***	0.025***
	(0.006)	(0.004)	(0.004)	(0.004)
exprsq	-0.000***	-0.000**	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Read/Write	-0.037	0.059	0.095	0.095
	(0.090)	(0.066)	(0.071)	(0.070)
Primary	0.087	0.173***	0.197***	0.192***
	(0.074)	(0.057)	(0.058)	(0.057)
Preparatory	0.157*	0.157**	0.134*	0.106
	(0.090)	(0.071)	(0.071)	(0.070)

continued ▶

GeneralSecondary	0.124	0.234	0.171	0.141
	(0.201)	(0.162)	(0.154)	(0.151)
VocationalSec	0.246***	0.393***	0.314***	0.278***
	(0.065)	(0.051)	(0.051)	(0.050)
PostSecondary	0.355***	0.332***	0.359***	0.294***
	(0.102)	(0.086)	(0.080)	(0.079)
univabove	0.738***	0.616***	0.509***	0.398***
	(0.082)	(0.066)	(0.064)	(0.063)
Alex	-0.055	0.200***	0.049	0.049
	(0.065)	(0.055)	(0.051)	(0.050)
Rur. Up. Egypt	-0.130*	-0.257***	-0.292***	-0.283***
	(0.068)	(0.053)	(0.053)	(0.052)
Urb. Up. Egypt	-0.255**	-0.144*	-0.322***	-0.293***
	(0.105)	(0.078)	(0.082)	(0.081)
Rur. L. Egypt	-0.211***	-0.149***	-0.107**	-0.073*
	(0.055)	(0.045)	(0.043)	(0.042)
Urb. L. Egypt	-0.093	-0.129**	-0.161***	-0.142***
	(0.067)	(0.054)	(0.053)	(0.052)
Constant	0.107	-0.645***	-0.516***	-0.410***
	(0.099)	(0.079)	(0.078)	(0.077)
Observations	1189	1533	1195	1195
R-squared	0.301	0.520	0.365	0.324
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Based on goodness of fit statistics, the human capital model appears to well explain both wage setting and job quality outcomes in the manufacturing sector in Egypt. It is interesting to note that this is particularly the case with the institutional factors job quality index, where as much as 67% of the variations in this variable in 1998 and 52% of the variations in 2006 in this variable are jointly explained by the regressors. As expected, there is a significant negative wage and job quality differential associated with being female in both years, and that differential is largest for the all factors job quality index. Compared to 1998, the female disadvantage in wages worsened and became more significant in 2006, but it actually declined in terms of job quality. There is a large and significant positive premium particularly for institutional factors job quality associated with public sector

employment in Egypt. This premium has, however, declined but not disappeared in 2006. The experience wage and experience job quality 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. The only exception is the significant positive premium in terms of institutional factors job quality due to residence in Alexandria.

5.2 Inter-Industry Wage and Job Quality Premiums

The industry coefficients estimated in the wage and job quality first-stage regressions, normalized as deviations from their employment weighted mean as described in Section 3 are in Tables A1 and A2. The inter-industry wage premiums are large and range from 25% in 1998 for the coke and petroleum products industry to -31% for the paper industry. The range was much wider in 2006, reflecting the increased overall wage inequality, with the highest premium again earned in the coke and petroleum products industry at +60%, and the lowest premium (-20%) in the leather goods industry.

In terms of job quality premiums, the ranges were in fact narrower in 2006, reflecting decreased inequality in these aspects of job quality. In terms of institutional factors, medical equipment manufacturing had the highest premiums (+62%) in 1998, while furniture manufacturing had the lowest. In 2006, the tobacco industry had the highest premiums (51%), while the other transport equipment manufacturing had the lowest (-30%). The ranges and ranking by the other two job quality premiums are very close together, although they differ somewhat from that by institutional factors. In 1998, the highest JQWW and JQWW2 Premiums were in equipment manufacturing and paper manufacturing respectively, while the lowest was in wood product manufacturing. In 2006, the highest premia by both measures was again in the tobacco industry, while the lowest was still in wood product manufacturing.

Figures 1 and 2 plot the normalized wage and job quality premiums by industry for 1998 and 2006, respectively. Clearly, high wage premiums are often associated with low job quality and vice versa. This is true for all three measures of job quality. In fact the premiums based on JQWW and JQWW2 are remarkably similar, which indicates that wages (included

in the JQWW index but not the JQWW2) seem to go hand in hand with other aspects of the "quality" of a given job. Finally, it is also interesting to look at Spearman Rank Correlation for these indices. These are reported in Tables A3 and A4. As expected, there is relatively low correlation in terms of rank between wage premiums and all three job quality indices, especially for 1998. All three job quality indices are of course highly correlated in terms of rank, although JQWW and JQWW2 are almost perfectly correlated, again pointing to the fact that high paying jobs are also those with the best "quality".

5.3 Second Stage Regression Results

5.3.1 The Effect on Wages

In this section we report the main results of the study, that examine the impact of trade liberalization on wages and job quality, based on the estimation of equations (6) and (7). We start by examining the effect on wages in Table 4. Column (1) shows the results of including only tariffs—our main variable of interest—in addition to the variables that capture industry specific characteristics.

Table 4: Effect of trade policy on wage premiums
Dependent Variable: Wage Premium (WP) or Change in Wage Premium, Weighted Least Squares Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	WP	WP	WP	WP	Change in WP	Change in WP
Tariff	-1.290	-0.832	-0.493	-0.248	-1.115	-0.638
	(1.217)	(0.719)	(0.497)	(0.538)	(0.729)	(0.620)
Import penetration		0.082	-0.004	0.228		-0.054
		(0.356)	(0.098)	(0.390)		(0.287)
Export orientation		0.443*	0.348	1.017***		0.528**
		(0.253)	(0.295)	(0.252)		(0.212)
% Female	-0.405			-0.166	-0.412***	
	(0.280)			(0.101)	(0.138)	
Unionization	0.231			0.144	0.246	
	(0.487)			(0.212)	(0.292)	

continued ▶

Skilled: % with secondary + education	0.092			-0.025	-0.028	
	(0.560)			(0.202)	(0.266)	
Blue collar	0.219			-0.176	0.382	
	(0.448)			(0.255)	(0.253)	
Change in export orientation			0.823**			
			(0.367)			
Industry and time indicators	yes	yes	no	no	no	no
WP regressed on changes	no	no	no	yes	no	no
First differences	no	no	no	no	yes	yes
Observations	40	40	21	21	21	21
R-squared	0.898	0.914	0.659	0.687	0.342	0.281

Robust standard errors adjusted for 21 industry clusters in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The effect of tariffs is negative but insignificant. Note that when the standard errors for these regressions were calculated without accounting for intergroup correlation for workers within the same industry by clustering, they were much smaller, and the coefficient on tariff was the same magnitude, negative and significant. This clearly demonstrates the importance of clustering when calculating these standard errors.

In column (2) we include the other trade related variables (import penetration and export orientation). The coefficient on tariff is still negative and insignificant. Interestingly, the coefficient on export orientation is positive and significant, implying that wages in industries that have a higher percentage of their output exported are higher compared to other industries. If we further include the change in export orientation in the regression for 2006 in column (3), the coefficient on that is also large, positive, and significant. This indicates that industries that saw the greatest increase in their exports between 1998 and 2006 also had the highest wages in 2006.

In column (4) we regress wage premiums in 2006 on the changes in all the dependent variables between 1998 and 2006. This again reinforces the earlier conclusion that industries with the largest increase in exports had the highest wages in 2006.

These results are further reinforced when we use the first difference specification in columns (5) and (6). In column (5) we include only change in tariff, in addition to changes in the percent of female workers, unionization, skill level, and percent of blue-collar workers. Again, the change in tariff does not have a significant effect on the change in wage premium. Industries that have witnessed an increased share of female workers over this period on the other hand, seem to have also seen a marked negative effect on their wages. Finally, in column (6), we also include the changes in the other trade variables, and once again, the more export-oriented an industry has become, the larger the increase in its wages over this period.[5]

The main conclusion from this section is that wages do not seem to have been significantly affected by changes in tariffs over this period. These results are similar to what Feliciano (2001) obtained for Mexico over a period of much more dramatic tariff reductions. One reason we may not be seeing large effects of tariffs for Egypt may be that this period did not witness very dramatic decreases in tariffs in many industries. The average tariff only declined from 18% to 12% over the period, while some industries even witnessed increases in tariff levels. On the other hand, industries that have witnessed greater export orientation have been able to pass on part of these profits in the form of higher wages to their workers.

5.3.2 The Effect on Job Quality

We now turn to investigating the relationship between trade liberalization and job quality as measured in a number of different ways. We start with job quality measured in terms of institutional factors only. Recall that this index incorporates only the following aspects of job quality: social security, medical insurance, a contract, paid casual leave, paid sick leave, and whether the worker is a member of a trade union. The results of estimating equations (6) and (7) on the Institutional Factors Job Quality Premium are reported in Table 5. In column (1) we report the results of regressing the Institutional Factors Premium on tariffs in addition to the variables that capture industry specific characteristics. The effect of tariffs is insignificantly different from zero. In column (2), we add the measures

5 When the other time-variant industry controls were included in the regressions in columns (2), (3), and (6) they were all insignificant, and since we have only a limited number of degrees of freedom due to the small sample size, many of the other coefficients were also less precisely estimated. We therefore concentrate on the results reported here to save on space.

of industry import penetration and export orientation, and the coefficient on export orientation is interestingly large, negative, and significant. This is in contrast to the positive effect that increased export orientation seemed to have had on wages in Table 4. The two results together indicate that although jobs in industries that are more oriented toward exporting may be higher paying jobs, these jobs typically do not include important aspects of institutional job quality such as social security, medical insurance, and paid leaves.

Table 5: Effect of Trade Policy on the Institutional Factors Job Quality Premiums
Dependent Variable: Institutional Premium (IP) or Change in Institutional Premium, Weighted Least Squares Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	IP	IP	IP	IP	Change in IP	Change in IP
Tariff	0.512	-0.107	-0.680	-1.388	-0.177	-0.604
	(1.144)	(0.948)	(0.738)	(1.111)	(0.934)	(0.750)
Import penetration		0.649	-0.358	-0.689*		0.927**
		(0.500)	(0.213)	(0.347)		(0.400)
Export orientation		-0.764*	-0.672	-0.068		-0.874***
		(0.407)	(0.568)	(0.455)		(0.268)
% Female	-0.735	-0.855		-0.287	-0.673*	-0.739*
	(0.475)	(0.620)		(0.212)	(0.348)	(0.385)
Unionization	-0.022	0.168		0.437	0.212	0.217
	(0.611)	(0.496)		(0.462)	(0.427)	(0.402)
Skilled: % with secondary + education	0.273	-0.036		0.385	-0.029	-0.397
	(0.503)	(0.597)		(0.384)	(0.368)	(0.441)
Blue collar	-0.252	-0.299		-0.771*	-0.092	-0.103
	(0.609)	(0.511)		(0.416)	(0.478)	(0.392)
Change in export orientation			0.150			
			(0.645)			
Industry and time indicators	yes	yes	no	no	no	no

continued ▶

IP regressed on changes	no	no	no	yes	no	no
First differences	no	no	no	no	yes	yes
Observations	40	40	21	21	21	21
R-squared	0.914	0.943	0.305	0.488	0.281	0.488

In column (3) we keep the three primary trade variables, and add the change in export orientation to the estimation for 2006. The latter does not have a significant effect on the Institutional Factors Premium (it had a strong positive effect on the wage premium). Additionally, the effect of export orientation, though still negative, is now insignificant. Hence, even though the more export oriented an industry is, the lower its institutional aspects of job quality, we cannot say the same about the change in this export orientation between 1998 and 2006.

In column (4), we further investigate this issue by regressing the Institutional Factors Premium levels on the *changes* in all variables between 1998 and 2006. Industries with the highest changes in the degree of import penetration over the period had the lowest levels of Institutional Factors Premiums in 2006. The same applies to those industries with the largest increase in the number of blue collar workers. The coefficient on the changes in tariffs and export orientation are insignificant, however.

In columns (5) and (6) we examine how *changes* in the Institutional Factors Premium were affected by changes in the trade and other industry specific variables. Once again the coefficient on the change in tariffs is negative and insignificant. Interestingly, we again see that industries with the largest increase in the percentage of female workers also went through the largest worsening of the institutional aspects of their job quality. This result echoes what we saw with the changes in wage premiums estimations. Finally, in column (6) we include the other trade variables. The coefficient on changes in import penetration is large, positive, and significant, while that on the change in export orientation is large, negative and significant. These results indicate that even if the Institutional Factors Premium *levels* were negatively affected by increased import penetration, the change in these premiums was positively affected by it. Increased export orientation again had a negative impact on the change in the Institutional Factors Premium.

In Tables 6 and 7 we include other aspects of job quality, specifically whether the job is stable or not, whether the job involves underemployment (less than 40 hours per week) or over-employment (more than 40 hours per week), the commute time, and the work place characteristics.

We also include wages in the index JQWWP, results reported in Table CC, while wages are excluded from the job quality index in Table DD, JQWWP2. Most conclusions using the Institutional Factors Premiums as dependent variable hold for these two more comprehensive indices. We still see an insignificant effect for tariffs. Import penetration levels have a negative impact on job quality premiums in 2006, while the change in import penetration has a positive impact on the change in these premiums. Export orientation levels do not have a significant negative impact on these job quality premiums however, while the change in export orientation still has a negative impact on the changes in these premiums between 1998 and 2006. Finally, percent female and changes in feminization levels have very strong negative impacts on these two job quality premiums.

Table 6: Effect of Trade Policy on the Job Quality Premiums for All Wage Workers
Dependent Variable: Job Quality Wage Workers Premium (JQWWP) or Change in JQWWP, Weighted Least Squares Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	JQWWP	JQWWP	JQWWP	JQWWP	Change in JQWWP	Change in JQWWP
Tariff	0.708	0.510	-0.094	-0.767	0.419	0.270
	(0.903)	(0.734)	(0.554)	(0.487)	(0.659)	(0.548)
Import penetration		0.557	-0.399**	-0.134		0.588*
		(0.346)	(0.187)	(0.276)		(0.301)
Export orientation		-0.283	-0.260	-0.097		-0.341*
		(0.224)	(0.413)	(0.299)		(0.172)
% Female	-0.934**	-0.969**		-0.527**	-0.903***	-0.929***
	(0.355)	(0.439)		(0.234)	(0.191)	(0.213)
Unionization	0.134	0.141		0.422	0.188	0.146
	(0.337)	(0.354)		(0.266)	(0.247)	(0.261)
Skilled: % with secondary + education	-0.232	-0.544		-0.162	-0.273	-0.509
	(0.475)	(0.538)		(0.215)	(0.280)	(0.316)
Blue collar	0.435	0.368		-0.189	0.507	0.475
	(0.474)	(0.450)		(0.300)	(0.364)	(0.330)
Change in export orientation			0.300			

continued ▶

			(0.411)			
Industry and time indicators	yes	yes	no	no	no	no
JQWWP regressed on changes	no	no	no	yes	no	no
First differences	no	no	no	no	yes	yes
Observations	40	40	20	20	21	21
R-squared	0.907	0.920	0.330	0.356	0.492	0.561

Table 7: Effect of Trade Policy on the Job Quality Premiums Excluding Wages for All Wage Workers

Dependent Variable: Job Quality Wage Workers Premium excluding wages (JQWWP2) or Change in JQWWP2, Weighted Least Squares Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	JQWWP2	JQWWP2	JQWWP2	JQWWP2	Change in JQWWP2	Change in JQWWP2
Tariff	0.766	0.510	-0.017	-0.759*	0.480	0.272
	(1.005)	(0.860)	(0.510)	(0.415)	(0.728)	(0.577)
Import penetration		0.595	-0.383*	-0.148		0.716**
		(0.350)	(0.185)	(0.248)		(0.309)
Export orientation		-0.357	-0.314	-0.248		-0.463**
		(0.275)	(0.380)	(0.258)		(0.209)
% Female	-0.881**	-0.928**		-0.545**	-0.863***	-0.899***
	(0.369)	(0.423)		(0.228)	(0.201)	(0.210)
Unionization	0.173	0.202		0.411	0.187	0.146
	(0.367)	(0.354)		(0.243)	(0.255)	(0.244)
Skilled: % with secondary + education	-0.218	-0.542		-0.185	-0.240	-0.527*
	(0.482)	(0.476)		(0.206)	(0.275)	(0.273)
Blue collar	0.439	0.372		-0.146	0.495	0.462
	(0.503)	(0.478)		(0.281)	(0.391)	(0.345)
Change in export orientation			0.192			
			(0.369)			

continued ►

Industry and time indicators	yes	yes	no	no	no	no
JQWWP2 regressed on changes	no	no	no	yes	no	no
First differences	no	no	no	no	yes	yes
Observations	40	40	20	20	21	21
R-squared	0.905	0.920	0.345	0.381	0.465	0.570

6. Conclusion

This paper employs a newly available panel labor market survey to investigate the impact of trade openness on wage and job quality outcomes in Egyptian manufacturing over the period of rapid trade liberalization between 1998 and 2006. Egypt's concerted efforts to liberalize a highly restrictive trade regime since the early 1990s, has resulted in substantial reduction in both nominal and effective protection in almost all manufacturing sector industries. Direct measures of trade openness and protection are employed in the analysis by merging labor market survey data at the two-digit industry level with trade variables that capture export orientation, import penetration as well as the more direct measure of policy changes: changes in tariffs levels. We employ the inter-industry wage differentials approach to determine whether workers in less heavily protected industries have lower wages or job quality than workers of similar observable characteristics in the more heavily protected industries.

Several conclusions can be drawn from this analysis. First, institutional factors of job quality (social security, medical insurance, a contract, paid casual leave, paid sick leave, and whether the worker is a member of a trade union) seem to have the strongest correlation with the trade variables and the industry specific characteristics used in the analysis since adding additional aspects of job quality, including wages and number of hours, does not change the main conclusions. Second, tariffs do not seem to have had a significant impact on either wages or job quality over this period. Third, increased export orientation may have had a positive impact on wages, but has had a significant negative impact on all job quality indices in many specifications. As far as we know, this result is unique to this study since we use both wages and job quality as indicators

of "worker well-being", unlike most other studies in the literature that focus on wages alone, and many find export orientation to positively affect wages, as we do, yet do not complement the picture by exploring the other non-wage aspects of worker well-being, as measured by our job quality indices. Finally, industries with the highest import penetration levels in 2006 also had the lowest job quality, but those that had the largest increase in import penetration actually also saw the largest improvements in job quality. This underlines the clear distinction between wage and job quality outcomes and highlights the importance of studying the impact of liberalization on these two variables separately. These conclusions are in-line with the literature that has found that increased trade liberalization is associated with increased informality, which is one aspect of low job quality, in several developing countries, even as the effect on wages has been ambiguous, depending on the country and period under study.

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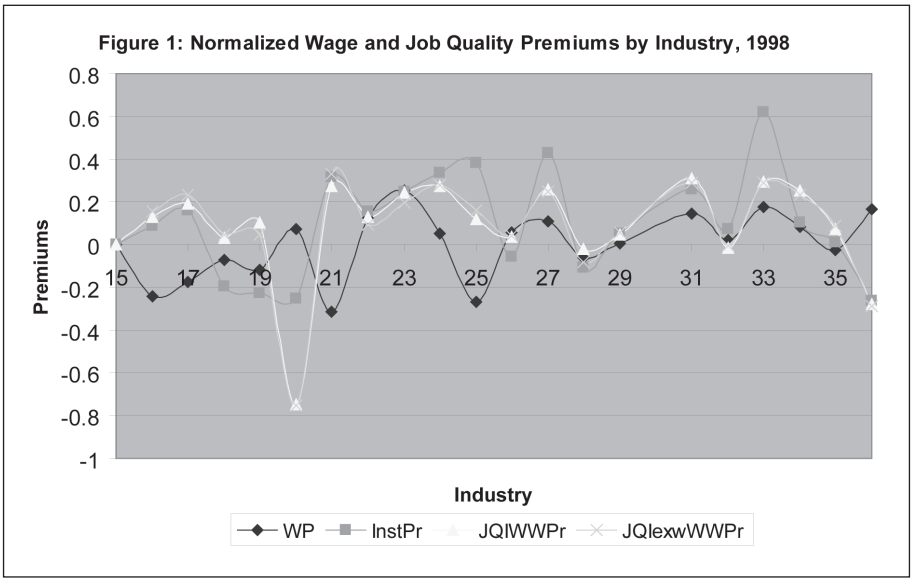

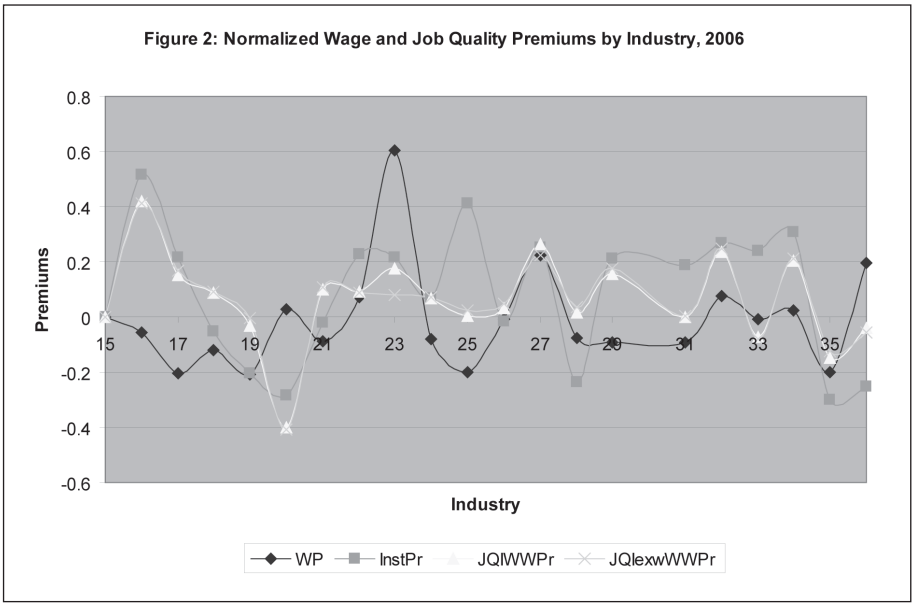

Table A1: Inter-Industry Wage and Job Quality Premiums, 1998

	Wage Premium	Institutional Factors Premium	JQIWW Premium	JQIWW2 Premium
Tobacco Manufacturing	-0.243	0.090	0.129	0.156
Textiles Manufacturing	-0.176	0.163	0.193	0.231
Garment Manufacturing	-0.071	-0.194	0.033	0.048
Leather Goods Manufacturing	-0.117	-0.225	0.104	0.046
Wood Product Manufacturing (except furniture)	0.075	-0.253	-0.746	-0.750
Paper Manufacturing	-0.313	0.317	0.272	0.333
Publishing and Printing Manufacturing	0.124	0.154	0.132	0.091
Coke and Petroleum Products Manufacturing	0.255	0.251	0.242	0.196
Chemical Product Manufacturing	0.053	0.338	0.274	0.278
Rubber Product Manufacturing	-0.265	0.383	0.120	0.162
Non-metallic Mineral Manufacturing	0.057	-0.056	0.038	0.040
Basic Metal Manufacturing	0.108	0.429	0.256	0.246
Metallic Products Manufacturing (except machinery and equipment)	-0.060	-0.106	-0.019	-0.079
Machinery and Equipment (Others) Manufacturing	0.007	0.053	0.049	0.055
Office Equipment, Computer Manufacturing, Electrical Equipment (Others) Manufacturing	0.147	0.258	0.310	0.288
Radio, Television and Communication Equipment Manufacturing	0.020	0.072	-0.017	-0.002

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Medical Equipment Manufacturing	0.175	0.622	0.294	0.290
Motorized Vehicle Manufacturing	0.086	0.103	0.253	0.234
Other Transport Equipment Manufacturing	-0.024	0.009	0.071	0.088
Furniture Manufacturing	0.164	-0.263	-0.277	-0.286

Table A2: Inter-Industry Wage and Job Quality Premiums, 2006

	Wage Premium	Institutional Factors Premium	JQIWW Premium	JQIWW2 Premium
Tobacco Manufacturing	-0.057	0.516	0.420	0.411
Textiles Manufacturing	-0.203	0.215	0.150	0.169
Garment Manufacturing	-0.119	-0.053	0.087	0.091
Leather Goods Manufacturing	-0.209	-0.202	-0.033	-0.005
Wood Product Manufacturing (except furniture)	0.027	-0.282	-0.402	-0.406
Paper Manufacturing	-0.086	-0.018	0.098	0.108
Publishing and Printing Manufacturing	0.070	0.227	0.090	0.088
Coke and Petroleum Products Manufacturing	0.603	0.214	0.177	0.079
Chemical Product Manufacturing	-0.082	0.069	0.067	0.073
Rubber Product Manufacturing	-0.202	0.412	0.006	0.023
Non-metallic Mineral Manufacturing	-0.010	-0.017	0.034	0.048
Basic Metal Manufacturing	0.223	0.254	0.263	0.223
Metallic Products Manufacturing (except machinery and equipment)	-0.076	-0.237	0.017	0.035

continued ►

Machinery and Equipment (Others) Manufacturing	-0.094	0.213	0.157	0.177
Office Equipment, Computer Manufacturing, Electrical Equipment (Others) Manufacturing	-0.093	0.188	-0.001	0.006
Radio, Television and Communication Equipment Manufacturing	0.075	0.266	0.236	0.248
Medical Equipment Manufacturing	-0.006	0.240	-0.072	-0.081
Motorized Vehicle Manufacturing	0.023	0.308	0.206	0.214
Other Transport Equipment Manufacturing	-0.198	-0.301	-0.147	-0.125
Furniture Manufacturing	0.197	-0.252	-0.039	-0.057

Table A3: Spearman Rank Correlation between Wage and Job Quality Premiums, 1998

	Wage Premium	Institutional Factors Premium	JQWW Premium	JQWW2 Premium
Wage Premium	1			
Institutional Factors Premium	0.1053	1		
	(-0.6587)			
JQWW Premium	0.1835	0.8586*	1	
	(-0.4388)	(0)		
JQWW2 Premium	0.0571	0.8887*	0.9699*	1
	(-0.8109)	(0)	(0)	

P-values in parentheses. * indicates significant at the 1% level.

Table A4: Spearman Rank Correlation between Wage and Job Quality Premiums, 2006

	Wage Premium	Institutional Factors Premium	JQWW Premium	JQWW2 Premium
Wage Premium	1			
Institutional Factors Premium	0.2015	1		
	(0.3943)			
JQWW Premium	0.2842	0.6737*	1	
	(0.2246)	(0.0011)		
JQWW2 Premium	0.1699	0.6496*	0.9744*	1
	(0.4738)	(0.0019)	(0)	

P-values in parentheses. * indicates significant at the 1% level.