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The Twin Effects of Globalization

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Abstract

'Globalized' workers enjoy a riskier, but potentially more rewarding, menu of labor market outcomes. This, so far overlooked, feature of globalization is documented here for a sample of Indian manufacturing firms. Firms subject to external exposure, be they exporting, import-competing or foreign-owned, indeed face higher earnings variability and job insecurity. At the same time, though, the employees of foreign-owned and import-competing firms are more frequently involved in training programs than employees of firms not subject to foreign competition. Similarly, the employees of exporting firms are promoted more frequently than otherwise. The 'bad' and the 'good' labor market effects of globalization are thus twin to each other. Concentrating on just one side of the coin gives a misleading picture of globalization.

1 Introduction

'Globalized' workers enjoy a riskier, but potentially more rewarding, menu of labor market outcomes. This, so far overlooked, feature of globalization is documented here for a sample of Indian manufacturing firms. Firms subject to external exposure, be they exporting, import-competing or foreign-owned, indeed exhibit higher earnings variability and job insecurity. At the same time, though, the employees of foreign-owned and import-competing firms are more frequently involved in training programs than employees of firms not subject to foreign competition. Similarly, the employees of exporting firms are promoted more frequently than otherwise. The 'bad' and the 'good' labor market effects of globalization are thus twin to each other. Concentrating on just one side of the coin gives a misleading picture of globalization.

Critics of globalization have often argued that increased openness undermines labor market institutions, raising job insecurity and the variability of earnings. When barriers to trade and capital fall, firms' demand for labor becomes more elastic and fluctuates more, as closer substitutes for firms' products become available. This is associated to higher earnings variability. As the implicit/explicit insurance granted to workers by formal labor contracts breaks down, risk-averse workers may end up worse off than before the economy was opened up. In rich countries, trade integration has in fact been blamed for (part of) the rise of wage inequality and unemployment in Industrial countries in the 1980s (e.g. see the selective surveys of the main issues in Wood (1994, 1998)).

In principle, the reasons for concern about the effects of globalization are less apparent for poor countries. The Stolper-Samuelson theorem suggests that trade integration should raise real wages in labor abundant countries and therefore wage inequality should go down, not up, when poor economies are opened up. Moreover, 'globalized' workers may benefit from faster growth and the quality upgrading of goods and endowments, induced by scale economies, technology transfers and knowledge spillovers. On the negative side, in addition to higher job insecurity, there may be a trade-off between static and dynamic gains from trade, if the specialization brought about by the opening up occurs in traditional, less growth-promoting, sectors. Finally, if the supply response of domestic producers on the export side lags behind, the static welfare gains may be smaller than expected and imports may boom early on, with unwelcome disruption effects on the domestic market. The potential shortcomings of globalization in the Third World have been most clearly and forcefully expressed in Rodrik (1997), among others.

In this paper we present new evidence on the labor market effects of globalization, with an emphasis on the presence of non-wage benefits such as

training and promotions, something neglected in previous studies. We do so using a newly assembled data set of Indian manufacturing firms in 1997-99.

Before describing the evidence, the main links between globalization, uncertainty and the labor market are illustrated within a simple efficiency-wage model in Section 2. In our model, globalization is a mean-preserving increase in the variability of wages and productivity. The effort-rewarding incentive scheme in the model is associated to more equilibrium effort (training) on the part of the workers, more promotions and hiring of skilled workers on the part of the firm. These implications are then tested in the empirical part of the paper.

India in the late 1990s is an ideal laboratory to look at to learn about these issues. As more extensively described in Section 3, in 1991-92 India undertook major steps towards the reduction of barriers to trade in goods and capital, following a long period of import-substitution policies dating back to the 1950s. Between 1993 and 1997 the average tariff rate halved, the number of 'strategic' industries was drastically cut, and former restrictions on inward foreign investment partly lifted.As a consequence of these reforms, throughout this period of time, imports boomed, while exports continued to grow at a fast pace, but unchanged compared to the recent past. Our newly assembled World Bank data set of Indian manufacturing firms in 1997-99 employed here provides a timely snapshot of opportunities and constraints brought about by trade reform in a large, previously closed, country.

In Section 4, to capture the overall effects of globalization, firms are classified into "exposed" to or "protected" from foreign competition. In turn, the former competes either in the foreign market ("exporters") or in the domestic market ("import competitors"). Some of them may also be (at least partially) "foreign-owned". Hence, firms are classified according to their extent of external exposure in both product and capital markets. Then, in the same Section, several features of the various groups of firms are contrasted through equality-of-group-means tests. Our data expectedly replicate relatively well-known features of globalization episodes. Both exporters and non-exporters subject to foreign competition face higher variability of prices, sales, and profits, as well as, to a lesser extent, of wages and employment than protected firms. The same applies to foreign-owned firms. This stronger exposure to variability comes from a relatively higher incidence of external shocks in 'globalized' firms. The share of skilled workers is also higher both in exporting and foreign-owned firms, while no statistically significant differences emerge instead for absolute and relative wages and employment levels between exporters, import competitors and protected firms (the skill premium is higher in foreign owned than in domestically owned firms, though). Hence our data reconfirm that globalization raises earnings variability over

time and across groups. This is not all, however. Globalization also brings about benefits, whose intensity differs across exporting and import competing firms.Workers employed in exporting firms tend to be more often involved in promotions than other workers. Unusually high involvement in training programs, inside or outside the firm, is instead enjoyed by workers employed in import-competiting and foreign-owned firms. These additional, less investigated but not less important, effects of globalization must be counted on the plus side to achieve a balanced view of what globalization is about.

In Section 5, we check whether the implications of the model in Section 2 and the results from the unconditional means tests in Section 4 survive upon conditioning our variables of interest to some sector and state specific dummies, as well as to other equation-specific conditioning variables, such as productivity growth and tax incentives for training and productivity growth for promotions.Standard multivariate regression analysis as well as non-parametric methods of estimation indicate that the findings in Section 4 usually withstand the inclusion of such controls.

Parametric (OLS, probit) estimates show that variability, training and promotions indeed depend on each firm's foreign exposure status. Workers and firms are exposed by foreign competition to higher uncertainty (in particular over sales, profits and prices). Workers in foreign-owned and import-competing firms benefit from more training. Workers in exporting firms benefit from more promotions.

Our results (particularly those on promotions) are weaker when location dummies are appended, however. This may be due to collinearity between the sector or location dummies and the foreign exposure variables. Foreign exposure is in fact itself likely affected by sector and geographical factors, which makes the linearity assumption involved in parametric estimations possibly unduly restrictive. Non-parametric (matching) estimates indicate that this may indeed be the case. The results from matching corroborate, and even reinforce, our previous findings: variability and training are usually higher in exporting and import-competing firms than in protected firms at conventional significance levels. The results on promotions remain rather weak, instead.

Section 6 concludes.

2 A model of globalisation, uncertainty and the labor market

Here we develop a simple partial equilibrium model where the effects of uncertainty on workers' and firms' behavior are modeled. We can think of "globalisation" as adding to workers' variability of real income and to firms' profits. For example, terms of trade shocks will have a larger impact on real wages, the higher the share of imported goods in the consumption basket. We show that, if workers and firms have limited access to the capital market, the former will invest more in training and productivity in order to protect themseves from real wage uncertainty, and the latter will try to expand output in order to reduce the costs of uncertainty on profits.

The economy is made of two types of agents: an employee (the worker) and an employer (the firm).The employee can work in two positions, high and low, with two wage rates, w , and $w + \Delta > w$, respectively. The wage w is exogenously given and represents the worker' outside option (the marginal utility of leisure). Promotions occur according to an incentive scheme, such that the worker is promoted to the higher position if he/she undergoes training (i.e. exerts costly effort). All income is consumed. Given the worker's optimal supply of effort, the firm chooses how many workers to employ and the best level of the premium Δ. There are two sources of uncertainty. The worker faces shocks to the purchasing power of his/her wage, because of terms of trade shocks. The firm faces profit uncertainty, due to productivity shocks.

2.1 The Worker

The employee faces the wage rates, w , and $w + \Delta$, and an incentive scheme whereby the probability of promotion, p, depends of his willingness to undergo training and exert effort λ, and on a random variable $\varepsilon \sim (0, \sigma_\varepsilon^2)$:

$$p = \lambda + \varepsilon \tag{1}$$

Note that λ also represents the worker average productivity. Training is costly, and the disutility of λ is $C(\lambda) = \frac{\phi}{2}\lambda^2$. The real wage w is subject to (non insurable) aggregate risk, say due to terms of trade shocks, so that real consumer wage rate is $w+v$ (or $w+v+\Delta$) with $v \sim (0, \sigma_v^2)$. Training is chosen before the realization of the shock. With probability p the is promoted and earns $w+v+\Delta$, while with probability $(1-p)$ he is not promoted and earns $w + v$. Therefore expected utility is

$$U = E_v \left(pu(w + v + \Delta) + (1 - p)u(w + v) \right) - \frac{\phi}{2}\lambda^2 \qquad (2)$$

where u is a standard utility function , $u' > 0, u'' < 0$, satisfying the Inada conditions. Taking a second-order Taylor expansion around $v = 0, U$ can be proxied as:

$$U \cong p \left[u(w + \Delta) + \frac{\sigma_v^2}{2} u''(w + \Delta) \right] + (1 - p) \left[u(w) + \frac{\sigma_v^2}{2} u''(w) \right] - \frac{\phi}{2}\lambda^2$$

Since the worker is risk-averse, $u'' < 0$, uncertainty over the real wage reduces welfare. The worker chooses λ in order to maximize the previous expression. The first order condition yields

$$\lambda = \frac{1}{\phi} \left[u(w + \Delta) - u(w) \right] + \frac{\sigma_v^2}{2} \left[u''(w + \Delta) - u''(w) \right] = \Lambda(\Delta; \sigma_v^2) \qquad (3)$$

The optimal level of training (effort) is directly proportional to the utility gain fom higher income, and inversely to the effort marginal cost, ϕ.The effect of wage uncertainty depends on how the attitude towards risk varies with income. If we make the reasonable (and standard) assumption that the individual suffers less from uncertainty when he becomes richer (i.e. we assume decreasing absolute risk-aversion, requiring $u''' > 0$ [1]), then wage uncertainty raises optimal training. The intuition is straightforward: faced with more uncertainty, the worker is willing to increase its effort because when he earns more, he also reduces the costs of uncertainty.

2.2 The Firm

The firm chooses how many workers to employ and the optimal incentive Δ,taking workers' behavior $\Lambda(\Delta; \sigma_v^2)$ into account. The productivity of each worker is stochastic and given by (1). Letting L represent the number of workers, employment in efficiency units is $L(\lambda + \varepsilon)$. Recalling that a fraction λ of employees is paid $w + \Delta$ and a fraction $(1 - \lambda)$ is paid w, the firms profits are

$$\begin{aligned} \pi &= F\left(L(\lambda + \varepsilon)\right) - L\left[\lambda(w + \Delta) + (1 - \lambda)w\right] \\ &= F\left(L(\lambda + \varepsilon)\right) - L\left[w + \lambda\Delta\right] \end{aligned} \qquad (4)$$

[1] Most types of commonly used utiliuty function, including logaritmic, exponential, stone-geary, show decreasing absolute risk aversion

where F denotes a standard production function, $F' > 0, F'' < 0$.Before the realization of the productivity shock the firm chooses Δ and L in order to maximize expected profits. Proceeding as before, these can be approximated by.

$$\begin{aligned} E\pi &\cong F(\lambda L) - [w + \lambda\Delta] L + \frac{\sigma_\varepsilon^2}{2} F''(\lambda L) = \\ &= F(l) - \left[\frac{w}{\lambda} + \Delta\right] l + \frac{\sigma_\varepsilon^2}{2} F''(l) \end{aligned} \tag{5}$$

where $l = \lambda L$ is labor in efficiency units. The firm dislikes uncertainty the more concave the the production function.The Foc for l yields

$$F'(l) + \frac{\sigma_\varepsilon^2}{2} F'''(l) = \frac{w}{\lambda} + \Delta \tag{6}$$

This expression is a demand for labor, where the (risk corrected) marginal product of labor (in efficiency units) is equalized to the average wage (always expressed in efficiency units). Uncertainty raises labor demand if the curvature of the production function falls as l rises ($F''' > 0$), and viceversa. Intuitively, if this happens uncertainty is less costly the higher the firm's revenue[2].This yields

$$l = l(w, \Delta; \sigma_\varepsilon^2) \tag{7}$$

Finally, from the foc for the optimal level of incentive Δ satisfies

$$\eta(\Delta) = \frac{\Delta \Lambda(.)}{w} \tag{8}$$

where $\eta(\Delta) = \Delta\Lambda'(.)/\Lambda$ is the elasticity of effort with respect to the wage differential As in the standard efficiency wage model, the equality between this and the (percentage) wage premium determines Δ. Given this, the training supply schedule (3) detemines optimal training, while employment is given by (7)with the identity $L = l/\lambda$.

From simple comparative statics exercises it is easy to show that:

1.A rise in wage uncertainty (σ_ε^2) raises training (λ) without affecting employment and the wage premium ($if\ u''' > 0$)

2. A rise in productivity uncertainty (σ_v^2) raises employment without affecting training and the wage premium (if $F''' > 0$)

[2] A simple exponential function $F(l) = l^a,\ a < 1$ satisfies this property.

2.3 Testable Implications

If uncertainty is higher the greater the exposure to international competion, we expect

1. more 'effort' (training), but also more promotions in firms that compete internationally

2. larger firms and larger shares of skilled workers in firms that compete internationally

3. similar wage premia

These implications are tested against actual data in the next sections.

3 Why India?

Opening up the economy enhances firms' incentives to sell in the world market and efficiently tackle the threat of foreign competitors in the domestic market. India in the late 1990s is an ideal laboratory to study such effects of globalization on both types of firms. On the one hand, the - still incomplete - trade reform provided exporters with a less distorted environment than in the past. On the other hand, the large size of India's domestic market made the potential disruption potentially suffered by domestic producers a very important policy issue. This Section is a short recollection of the evolution of India's outward orientation policy.[3]

Since independence (1947), India has been characterized by active government intervention aimed at fostering growth by substituting domestic industrial production for imported goods. Over time, the economy became riddled with prohibitively high tariffs and quantitative restrictions on imports and industry-specific licensing requirements for all investment projects beyond a certain threshold. A number of 'strategic' areas was reserved to public sector enterprises, including large human and physical infrastructures. A restrictive attitude towards FDI flows, in particular towards those with little content of technological transfer, developed, in parallel with persisting attempts of promoting the development of local technology and eventually exporting capabilities well beyond traditional products.

In spite of much effort, the perception that India's grand plan of substantially raising manufactured productivity and exports had met with failure was widespread already at the end of the 1970s. Excess protection was recognized as the main culprit of technological obsolescence, low product quality, limited range and high costs, which made Indian goods non-competitive on

[3] This Section draws on World Bank (2000), International Monetary Fund (2001), World Trade Organization (1998), Ministry of Finance of India (1999a,b).

the world markets. Hence, in the 1980s, the Indian Government took the first gradual steps towards both a partial liberalization of imports of capital goods and technology and a gradual exposure of Indian firms to international competition by reducing tariffs and quantitative restrictions on imports. In parallel, FDI flows and foreign licensing collaborations were also encouraged by reducing tax rates on royalties and raising the maximum threshold of foreign equity participation.

While these first reform attempts resulted in some beneficial effects, their overall results fell well short of expectations, particularly when compared to analogous experiments in other Asian Newly Industrializing Countries. As in other previous episodes throughout the world, a new push to reform was triggered by the major balance of payments crisis undergone in 1990-91.

In June 1991, the newly elected Government initiated a major program of economic reform and trade liberalization, with the support of the IMF and the World Bank. Average tariffs were reduced from 71 per cent in 1993 to 35 per cent in 1997, although in several industries (paper and paper products, wood, food, beverages and tobacco) the tariff rates remain high. Considerable steps towards a relaxation of non-tariff barriers were also taken. The Indian licensing process set up under the Eight Five Years Plan established that products had first to be included in the Special Import License (SIL) list, with producers being exposed to limited foreign competition. After this initial period, then, the product could be moved to the list of freely importable goods.

The NIP (New Industrial Policy) reduced the number of industries reserved for public enterprises to eight and limited the application of the Industrial Licensing System to eighteen strategic industries. More liberal legislation concerning inward and outward FDI and joint ventures legislation was also put in place by the NIP. Majoritarian participation of foreign equity was allowed for high priority industries and exporting firms. FDI proposals were also no longer required to be accompanied by technology transfer agreements. A list of priority industries was also provided with automatic approval of majoritarian foreign equity participation.

The first wave of reforms in the 1990s was clearly successful. In 1992-1994, the growth of Indian GDP averaged 7% per year. The annual growth of industrial production averaged 7% in 1992-1997, peaking to 12.8 per cent in 1995-96. The gradual trade liberalization in place provided further impulse to thegroth of exports and imports. Imports grew by +25% per year in 1993-96, a big jump from the 15% rate of the previous five years, while exports grew in line with the previous period (also at a yearly rate of 25%). Finally, private sector investment rose at an annual rate of 16.5% in 1993-96, up by about two percentage point per year from the previous five years.

After the growth peak in 1995-1996, the growth of industrial production declined to 5.6% in 1996-1997. The average growth rate of exports slowed down to 5.3 per cent in 1996-1997 and declined further in 1997-1998 (+1.5%). Meanwhile, India's imports grew by only 6.7 per cent in 1996-1997 and by 4.2 per cent in 1997-1998. As a result, trade deficit substantially widened. This was mostly caused by the East Asian crisis in 1997-98 and the subsequent deceleration in the growth of world trade, as well as of the relatively modest depreciation of the Indian Rupee vis-a-vis the other currencies in the area.

According to the World Bank (see World Bank (2000)), though, the slowdown in Indian industrial growth is partly due to the exhaustion of the benefits of the first stage of reform, and, importantly, to the slowdown (or outright reversal) of the pace of economic reform, as India set up new trade restrictions in 1997-98 and in 1998-99. Among the non-tariff barriers, anti-dumping measures took on an increasingly crucial role: 103 antidumping measures were active in 2000, compared to 64 in 1999 and 49 in 1998. The latest IMF Country Report on India (IMF (2001)) reports that, in 1997-2000, there was nearly no change in the average tariffs rates, although the maximum rate bound was reduced from 45 to 35 per cent.

Our data set, whose main features are described in the next Section, provides a firm-level snapshot of the most recent stage of India's process of economic reform.

4 A first pass at the data

In this section we first present the main features of our data set and then look at how labor market outcomes vary across types of firms. Firms are distinguished according to their degree of foreign exposure.

Our data come from a survey of 895 Indian firms recently collected by the World Bank. It contains information on ownership structure, investment and technology, relations with suppliers and government, location, trade, products and inputs, labor and human resources, assets and liabilities, for the period 1997-1999.Unfortunately, most data of interest for this study, in particular the information on promotions and training, are available for 1999 only. Other variables, such as strict production data on inputs and outputs, are instead available in 1998 and 1997 as well, although only for a smaller sample of firms.

The firms involved in the survey belong to five manufacturing sectors: Garments, Textiles, Drugs and Pharmaceuticals (a branch of Chemicals), Electronic Consumer Goods, and Electrical White Goods (a branch of electrical machinery). The firms are located in the cities of Ahmedabad (State

of Gujarat), Bangalore (Karnataka), Calcutta (West Bengal), Chandigarh (Punjab), Chennai (Tamil Nadu), Cochin (Kerala), Delhi (Haryana), Hyderabad (Andhra Pradesh), Kanpur (Uttar Pradesh), Mumbai and Pune (Maharashtra). The poor central states of Orissa, Madhya Pradesh, and Bihar, as well as Rajasthan and other smaller States, are not represented in our sample.

4.1 Foreign exposure

The first step for assessing the labor market implications of "globalization" is to define how we measure "globalization" for an individual firm in the sample. Globalization exposes firms to foreign competition in the product and capital market. Therefore we use the following two criteria.

As far as the product market is concerned, one would ideally estimate the elasticity of substitution between the firm's product and that of domestic and foreign competitors. In the absence of detailed information on domestic and foreign prices and quantities, however, we proceed as follows. A firm may face foreign competition either on the domestic (if import-competing) or on foreign (if exporting) markets, or both. As far as foreign markets are concerned, we define Exporters (E) all the firms whose revenue share from exports is greater or equal than 30% (and non-exporters the remaining ones).

In order to capture the pressure of international competition for import-competing firms, IC, we classify as import competitors all those firms that declare to face foreign competition in the domestic market (answering "yes" to the question "Are any of the competitors in the domestic market foreign firms ?") and that, at the same time, are non-exporters. As our "control" group, we use the firms who are neither E or IC, so they are "protected" (P) from foreign competition in the goods market, due to either tariff and non-tariff barriers or some other 'natural' barrier. They represent about 35% of the total. As a result of this classification, each firm belongs to one out of three mutually exclusive categories: E, IC, P.[4]. The consequences of competition in the product market are discussed by comparing protected and non protected firms.

In order to capture a firm's integration in the international capital markets, we use the data on the firm capital ownership. We label as 'foreign owned' any firm with a strictly positive share of foreign participation in its capital. Such extensive definition is warranted by the fact that only a small minority of firms in the sample (4%) declare a foreign participation in its

[4]Note once again that firms in group E may or may not sell a part of their product in the domestic market and, in case they do, may or may not face foreign competition also in the domestic market.

capital. The drawback is that this definition does not enable us to descriminate multinational corporations from joint ventures. The activity of the former is often still subject to strict Government regulation. Joint ventures, in contrast, are often crucial vehicles of globalization as well as new modes of production and organization, despite the fact that they typically do not involve massive injection of foreign capital.

A note of caution is warranted here. Some of our variables of interest, in particular training and promotions, are available just for a subset of firms (only some 62% of the total) and for 1999 only. This raises the question of whether the smaller sample - on which we concentrate our attention - distorts the picture that the large sample would have given. We checked that this is not the case by comparing the summary statistics of the few variables for which data are available for both samples. It turns out that they only marginally differ from the summary statistics computed over the full sample. Thus we safely concentrate on the smaller sample in most of the analysis.

4.2 Sectors and localities

Table 1 and **2** present a summary of the distribution of the remaining 555 firms across the various categories of firms distinguished by sector and locality. As expected, product market integration is much deeper than capital market integration. Almost two thirds of the firms in the sample are, one way or another, exposed to foreign competition. 37% of the total are exporters, and 27% are import competitors. Foreign capital, by contrast, has a minor role in the ownership structure of firms: only 4% of the total have foreign partecipation in their capital.

Table 1 shows that the distribution of firms across the E, IC, P categories varies greatly across sectors and localities, revealing an interesting pattern of comparative advantage. Textiles is the only sector with shares of E, IC, P very close to the sample average. In contrast, garments and electrical machinery represent polar cases. About 60% of the firms operating in the former sector are exporters, while most firms in the latter are either protected or import-competitors. Similarly, a majority of firms declares to be exposed to foreign competition in Drugs & Pharmaceuticals. Foreign-owned firms mostly concentrate in Textiles and Drugs & Pharmaceuticals, where they represent respectively 5% and 7.5% of the total number of firms in each sector.

Table 2 cross-tabulates our classification of exposure to foreign competition against the locality dimension. Two thirds of firms agglomerate in larger cities (Delhi, Mumbai, Chennai). Each urban area presents a relatively specialized structure of production. Most firms in Delhi are in P, the

protected manufacturing sector. Those in Mumbai are prevalently IC, i.e. import-competing firms. Roughly two thirds of the firms located in Chennai, as well as in Hyderabad and Cochin, belong to the E class. Bangalore, the preferred location for software industry, is also a 'highly globalized' city, with more than 85% of firms either in the E or the IC groups. Kanpur and Pune are home to mainly protected firms.[5]

Finally, most foreign owned firms are located in Delhi (7% of total firms), but it is in Bangalore, Cochin and Chandigarh where they represent the biggest shares of total firms (respectively 8%, 18% and 18% of the total number of firms). No foreign owned firms are sampled in Ahmedabad and Kanpur.

4.3 Wage and employment levels

Next we compare several labor market features across the various groups of firms. First, we present group-wise summary statistics for the entire sample and for each group of firms, separately. We also test for the equality of group means of E and IC firms, separately, versus P firms, and of foreign owned versus domestically owned firms.

Table 3 reports descriptive statistics on wages and employment. The questionnaire provides information as to employment, hours worked and wage levels for five groups of workers (non-production workers, unskilled production workers, skilled production workers, professionals and managers). We aggregated the first three groups into 'Blue collars', and the last two into 'White collars'. On average, the hourly earnings of white collars are 7.7 times those of blue collars. The average wage gap is larger in exporting firms (8.4 times) than elsewhere (7.1 times, both in IC and P firms). Yet Table 3 clearly shows that wages and employment levels do not significantly differ across groups of E, IC and P firms, since the test for equality of group means is systematically not rejected at the 5% confidence level. In other words, exporting or import-competing firms neither pay 'exploitation' wages to blue collars, nor 'superstar' wages to white collars. There is instead some evidence of foreign-owned firms paying white collars less - in absolute and

[5]The pattern of association between foreign exposure and firms' localization is fully consistent with the findings in Sachs, Bajpai and Ramiah (2002) and Bajpai (2002), where access to the sea is found to be an important determinant of the export status of an Indian firm. The cities of Chennai, Hyderabad, Cochin, Bangalore - all located in Southern states - are close to the sea shores or with easy access to the sea. Delhi and Kanpur are instead in landlocked states. Pune is in a region of Majarashstra rather far from the Ocean. Accordingly, exporting firms are less present in these localities. Calcutta and Mumbai are on the Ocean, but are also huge metropolitan areas, which may explain the large shares enjoyed by protected firms in these cities.

relative terms - than domestically owned firms. We conclude that, at least in our sample, "globalization" is not associated to systematic first-order variation in absolute or relative wage levels.

Table 3 also shows that the average size of firm, measured by total employment, is relatively large (220 workers) in our sample. Hence, in interpreting our results, one should be aware that only a small fraction of small and medium-sized enterprises is represented in our sample. Having said so, however, within our sample, on average, firm size rises when moving from P to IC and to E, but this difference is not statistically significant at conventional levels. Domestically owned firms only are significantly smaller than foreign owned ones.[6]

4.4 Variability

While wage and employment levels tend to be similar across groups, firms with greater foreign exposure faces much "more variability", both across firms and time. Here we look at the variability of prices, wages, employment, profits and sales. We construct the firm's price variables as indices obtained from the individual prices of the three main products sold by each firm in each year. Individual prices are geometrically aggregated using each product's share in sales as a weight. Wages are hourly wages.[7] The average number of hours worked is inferred exploiting information about work shifts, average hours worked a day and number of days of work in a year. Finally, net profits are the before-tax gross operating surpluses net of interest charges, depreciation and other overhead expenses.

Our measure of variability, say of the firm's wage rate, is a mixture of two separate concepts: the first is within-group cross-sectional dispersion ; the second is the time-series deviation of a firm's variable from its own 1997-99 time average. The former measures the effects of idiosyncratic shocks, resulting, in the example, in wage dispersion across firms. This component is usually termed permanent volatility. The latter measures the firm's volatility with respect to its own trend, in the example the instability over time of the firm's wage rate (transitory volatility). Clearly, we are particularly interested in the latter, since our aim here is to test wether international integration makes life "more uncertain" for an individual firm/worker exposed to more competition. Therefore, in order to separate the two components, we apply

[6] Small protected firms also tend to be less capital intensive and less unionized than those exposed foreign competition

[7] These are computed as the ratios between the total wages paid by each firm and the product of the average number of hours worked times the level of employment in each firm.

a standard decomposition method (see Gottschak and Moffitt (1994)).[8]

Table 4 summarizes the results of our decomposition. Each cell of this Table reports the transitory and the permanent variance (both as shares of the total variance) and the coefficients of variation (this latter one referred to the entire sample). For our purposes what matters is the comparison between the first figure in each cell across rows, i.e. across the various types of firms. Exporting (E) firms and, to a less extent, import-competitors (IC) systematically present higher shares of transitory variances than protected (P) firms. This occurs for wages, employment, prices and sales. The difference is instead less marked for net profits.

Table 5 presents further evidence on the coefficients of variation calculated over the period averaged values of each variable[9] for E, IC and P, as well as foreign and domestically owned firms. The highest coefficients of variation are usually observed for foreign-owned firms and, next, for exporters. The lowest coefficient is instead the one recorded for protected (P) firms. The equality-of-means tests confirms that variability of labor and product market variables is substantially larger for exporters than for the protected firms. This same result applies to foreign-owned compared to domestically owned firms. The means computed for IC and P are instead not statistically different from each other.

Altogether, the evidence in **Table 4** and **5** provides elements to believe that "globalization" is, as expected, associated with higher variability.

4.5 Training and promotions

So far, we found evidence that "globalization" is not significantly related to absolute and relative wages and employment, and is instead closely associated to more volatile labor and product market variables. So much for the "bad news" for risk-averse workers and firms. The question here is whether globalization also brings "good news". Next we show that the good news is more training and promotions.

We start from training. In the survey questionnaire, firms are asked questions as to whether the plant runs formal in-house training for its employees in 1999 or whether employees were sent to formal training programs run by other organizations in the same year. In case of affirmative answers, further questions on the specifics (cost, funding, length, type of workers involved,

[8] Let $w_{it} = \mu_i + v_{it}$, represen firm $i^{\theta}s$ wage rate at time t, its permanent (time invariant) and transitory components , respectively. The variance of w_{it} can be written as the sum of $\sigma_{\mu}^2 + \sigma_v^2$.(see Gottschak and Moffitt (1994))

[9] Period averages are computed over 1998 and 1999 for prices, and 1997, 1998 and 1999 for the other variables.

promotions after the end) of the programs are asked. Yet, while the answers to the first basic question (which simply involves a YES or NO) are respectively 549 and 532, sample size shrinks dramatically with the more detailed questions. Hence we only use a few of them in what follows.

Table 6 (column 1-3) presents summary statistics on the percentage of firms declaring to have trained their workers (third column) in 1999. Some (but not all) of these firms also describe whether they run formal in-house programmes or send their workers outside (outside training). It turns out that about 28% of the firms in our sample have a part of their workers engaged in training programs, either outside or inside the firm. This figure is markedly higher for foreign owned firms (77%) than for the other firms in the sample. However, the diffusion of training programs is not confined to the small elite of workers employed in foreign owned firms: the share is 31% among the exporters, 36% among the domestic producers exposed to foreign competition, and falls to only 19% for the group of the protected firms. Both E and IC means are statistically significant from the mean of P firms.[10]

Another useful piece of information is the share of a firm's employees that are involved in training programmes. The fourth column in **Table 6** shows the figures. IC firms are by far the most heavily involved in training. The equality of means test confirms this result, although the difference is significant only at the 7% level of confidence.

Finally, we show that the higher uncertainty faced by workers of exporting firms finds a positive counterpart in potentially more rapid job careers. The fifth column in **Table 6** shows the percentage of a firm employees that were promoted in the firm's ladder in 1999 (the probability of promotion). Here the striking feature is that workers in exporting firms enjoy a probability of being promoted of about 4%, twice as much as the sample average and three times as much as the probability of being promoted in a P firm. In contrast, the probabilities of rpomotion in IC and P firms are not significantly different from each other.

We interpret the evidence in this Section as follows. Globalization makes Indian workers' lives riskier, but at the same time it provides, to some, the incentives (and the means) to face the new challenges: larger investment in training for firms, and more effort for workers, resulting in a larger probability of promotions (at least for exporters).

[10] In multivariate regression, however, this result holds only for the exporting firms, see below.

5 Regression results

In Section 4, evidence on globalization and labor markets in India - based on pair-wise comparisons of unconditional means - has been presented. Here, we check whether and which results are still there when subjected to multivariate regression conditioning. We start from standard parametric techniques (OLS, probit estimates) and then move to non-parametric techniques (matching estimates). Most of the results in Section 4 withstand conditioning, irrespective of the estimation method.

5.1 Parametric estimates

5.1.1 Variability

First, we regress our indicators of variability on firms characteristics, and then we move to training and promotion.

In our first set of OLS regressions (see **Table 7),** the dependent variable is the logarithm of the transitory component of the variance of each variable (computed in the previous section). This is regressed on the dummies for E, IC, foreign ownership and controls for size[11], sector and localities. We omit the dummies for protected and domestically owned firms, so that the "benchmark/control group" relative to which the various coefficients must be interpreted, is domestically owned and protected firms. When appending size, sector and locality dummies, we employ the normalization proposed by Suits (1984) and thus we are effectively taking an 'average' domestically owned and protected firm as a benchmark in each regression.

The most apparent regularity in **Table 7** is that the 'Exporter' dummy is always significant and positive for the transitory variances of prices, sales and profits. It is also positive but less consistently significant for employment. It is never significant for real (product) wages. This is consistent with expectations: faced with external shocks, firms may adjust real wages or employment, sales or profits, but they don't need to adjust both. The size of the statistically significant effects may vary dramatically across specifications, however. To take a specific example, being an exporter raises a firm's transitory variance of sales by 3.8% above that of a protected domestically-owned firms,[12] if no other dummies are appended to the equation. The effect

[11] A firm is defined 'small' if employment is less than 50, 'medium' between 50 and 200 units, and 'large' when employment is more than 200 units. This conforms to international standards of classification.

[12] These figures obtain bearing in mind that, in semi-log equations, the effect of a dummy variable on the dependent variable is not directly given by the estimated coefficient β, but rather by e^{β}-1.

is bigger, though, as other dummies are appended: it becomes +4.5% with size and sector dummies and reaches +31% as locality dummies are included as well. Similar figures obtain for net profits, while the range of variation of the pointwise coefficients is smaller for the equation of the variance of prices. It should be pointed out, however, that, in most cases, locality and sector dummies as a whole did not pass the F-test of joint significance, which suggests that the best specification may be the basic one.

The results for the effects of foreign ownership and import competition are less impressive, instead. The foreign ownership and IC dummies are significant for all variables at the conventional confidence levels, but only in the basic specification. When size, sector and locality dummies are included as regressors, the statistical significance of the foreign ownership and import competition coefficients is often lost. The same conclusions on the joint significance of sector and locality dummies applies here as well, though.

5.1.2 Training

Next we move to training. First, we estimate a probit model, where the probability of being involved in a training programme is the dependent variable. This is regressed on our status dummies, E, IC, etc., as well as on dummies for size, sector, and locality. We also use two continuous controls: firm's productivity growth (proxied as the growth of the ratio between total sales at constant 1998 prices and the total number of employees) and the amount of tax deductions granted to a firm involved in a training program. High-growth firms may be more inclined to pay for their employees' training. Access to public funding and subsidies also may make it more likely for a firm to engage in training programs. In **Table 8** (row 1-5), the marginal effect of each variable is reported.[13]

We start including only our exposure status dummy in the first regression. All estimated coefficients are positive and statistically significant. Taken at face value, this implies that the probability of entering a training program for workers employed in exporting and import-competing firms is about 10% higher than for workers employed in a P firm than in any other domestically owned firm. By the same token, this probability would be higher by 50% in foreign-owned firms. Unfortunately, these results are not very robust to the inclusion of controls. While productivity growth is never significant, firms'access to tax-deductions linked to training programmes is so. When

[13]The reported coefficients are the outcome of the STATA `dprobit` procedure, which directly delivers the probability change originated by an infinitesimal change in each independent continuous variable or, by default, the discrete probability change for dummy variables.

we include this dummy in the regressions, the significance of the E and IC dummies drops dramatically. The significance of foreign ownerwhip is instead not affected. Hence, it looks like that exporters and import competitors are simply more skillful in exploiting the allowances offered by the tax system than protected domestic firms, and this may explain their larger investment in training programmes.

Yet this pessimistic conclusion is partially contradicted by the findings reported in the second part of **Table 8 ,** which usefully complement those in the upper part of the Table. Now the shares of trained workers over employment is regressed on our usual dummies, as well as productivity growth and tax-deductions. These latter variables turn out outright not significant, however, and are therefore dropped from most specifications. The main result here is that IC firms tend to train a larger proportion of their workforce (about 11% more) than domestically owned protected firms, even after controlling for firm size and other controls. This does not extend to exporting firms, nor to foreign-owned.[14]

5.1.3 Promotions

Finally, we look at promotions. We regress the probability of promotion on our status dummies and other controls. The results in **Table 9** say that the promotion rate is 2.7% higher for E-firms than for all other firms, including the foreign owned. These findings survive (see row 2) the inclusion of a control for productivity growth, which is statistically significant with a coefficient of the same size (about 0.02). When we also include a dummy for size, in the third row, this somewhat reduces the point-wise estimate of the coefficient (which falls to .020, from .027), although not its significance. However, when the dummies for the firm location are included (see the last row), the coefficient of the E dummy is no longer significant, as a result of a further decline in the point-wise estimated coefficient and a roughly unchanged standard error of the estimate.

A possible explanation, in the spirit of Besley and Burgess (2002), is that both the probability of promotion and locations capture State-related regulatory and competitive legislation and practices in the labor market, so that, for example, workers may be more easily promoted in less-regulated states, independently of firm export status.

[14] The slight discrepancy of results between the first and the second part of **Table 8** should come as no surprise. The dependent variable here is a continuous variable only available for a small subset of firms (about 90, roughly half as much as the observations employed in the regressions in the first part of **Table 8**).

While this identification problem is common to most cross-country growth regressions literature[15], our data does not allow us to tackle this issue.

5.2 Non-parametric estimates

5.2.1 Why

We have shown that our results on the relation between foreign exposure and a few labor market variables (such as training and promotions) are often robust to the inclusion of controls for size, sector and locality. The loss of significance of foreign exposure in the promotions regressions as sector and location dummies are appended signals that the exposure status itself (described as a set of zero-one variables) may in fact depend on such controls. Would our OLS and probit estimates still be unbiased ? The answer is yes, under two conditions: recursivity and coefficient linearity. Recursivity requires the error term of the relation determining the foreign exposure status be uncorrelated with the error term in the relation determining training and promotions. Within our data set, however, we can do nothing to relax this problem: finding reliable instruments in a quasi-cross-sectional framework such as ours is hard. Linearity is also potentially restrictive. Suppose, as is likely the case, that exporting firms are systematically located in some sectors (e.g. textiles) and localities (e.g. Chennai). This introduces a non-linearity, which, if important, would make OLS estimates severely biased. This problem can be addressed, however. We can in fact check whether our OLS results survive under non-parametric estimates, not involving restrictive functional form assumptions.

Non-parametric methods have been used in the medical sciences at least since the 1970s. Labor economists (see e.g. Heckman, Ichimura and Todd (1997)) have used such tools to evaluate labor market and educational programs. More recently, Persson, Tabellini and Trebbi (2000) and Persson and Tabellini (2002, ch.5) have interestingly expanded the set of applications of such methods to political economics issues (we refer to them for a very useful discussion of the practical implementation details of such methodologies).

5.2.2 How

We calculated the matching estimators for exporting vs. protected firms as well as for import-competing vs. protected firms, excluding import-competing firms in the former case and, by the same token, exporters in the latter case.

[15] Levine and Renelt (1991) discuss the difficulties of disentangling the various dimensions of the policy stance of a country.

We could not run these same exercises for the foreign owned - domestically owned firms dichotomy, for foreign owned firms are too few in our sample.

In our framework, the implementation of such methods boils down to the following main steps. Take exporters and protected firms as an example. First, the propensity score of each firm for each variable of interest must be estimated. This consists in estimating the probability that each firm is an exporter rather than a protected firm, and this is done running probit estimates on a few explanatory variables X. Our set of X just includes sector and location. These are the most safely exogenous determinants of foreign exposure in our sample. The same does not apply, for instance, to firm size and productivity growth, hence we do not use them as controls. This first stage is aimed at reducing the initial multi-dimensional differences across firms to a single number constrained to be between zero and one.

Based on the calculated values for the propensity scores, the overall sample is then split into five groups (or strata). Within each group, the closest twins, i.e. the exporting and protected firms with the most similar propensity scores, are matched and the differences between the value taken by the variable of interest (training, promotion) for the two twins are compared. This is repeated for all the twins in each group (with the non-closest twins excluded from the analysis). Then the average difference within each group and a group-weighted sample average between exporters and protected are calculated and contrasted. Borrowing the expression from medical sciences, this is called the effect of treatment (being an exporter) on the outcome (variability, training, promotions). A 'balancing test' checks that the propensity scores are correctly identified, namely that the means of the explanatory variables of the propensity scores (sector, locality) do not significantly differ across exporting and protected firms in each group. If the balancing property is rejected, then the partition into groups is probably too coarse and should be refined.

Note finally that propensity scores should not be explained 'too well': if the explanatory variables are too successful in predicting the exporter/protected status, then it might be the case that some group is left without either category, which would make matching unfeasible. This is why we only include some of the potential conditioning variables. Sector and location are the most safely exogenous variables in our sample; this is why we included them in the first instance. The same does not apply to size and productivity growth, instead.[16] Adding size controls to sector and locality would not be a good idea,

[16] As mentioned above, we are aware that this does not fully solve our potential endogeneity problem. It may still be the case that some unobserved variables, other than sector and location, drive both foreign exposure and training or promotions.

for propensity scores would just be explained too well in this case, thereby making matching unfeasible. The omission of any other explanatory variable (e.g. access to tax-deductibility in the training equation) does not invalidate our results, as long as the omitted variables affect the two categories of firms equally.

5.2.3 Non-parametric evidence for variability, training and promotions

We calculated separate propensity scores for exporting versus protected firms, as well as for import-competing versus protected firms. In both cases, conventional t-tests for the equality of the propensity scores of exporters and protected firms (respectively, import-competitors and protected) indicate that the balancing property is satisfied in each group. This enables us to move to the second step, namely the matching between the estimated propensity scores and either training or promotions in both cases. This is done through the nearest neighbor matching method briefly described above. Results are presented in **Table 10** for variability, training and promotions. Bootstrapped standard errors are reported.

The effects of treatments on variability of employment, prices, sales and profits are there for both exporters and import competitors, while those on either nominal or real wages are not. This squares well with expectations. Faced with higher output price variability, firms keep real (product) wages relatively constant and this has a counterpart on the quantity side in the enhanced variability of employment, sales, and profits.

The effects of treatments on outcomes are always statistically significant for training. Both exporters and import-competing firms tend to train their workers more often than protected firms. For both groups of firms, training is 10% to 15% bigger than for protected firms and both estimates are significant at conventional levels of confidence (at the 10% level for exporters, at 1% for import competitors). As shown in **Table 10**, matching estimators are seemingly able to capture the effect of foreign exposure in the product market more precisely than probit estimates do in standard parametric regressions. This applies to both import-competing firms and exporters. Relaxing the linearity assumption improves the significance of our results.

Finally, the results for promotions tend instead to replicate very closely those obtained in parametric regressions. Workers in import-competing firms are not promoted more than workers in protected firms, while workers in exporting firms enjoy promotion rates higher by about 1.5%, a figure slightly smaller than in parametric regressions. Yet the much increased standard error of the estimate makes such result not statistically significant.

5.3 Summing up on findings from parametric and non-parametric estimations

Altogether, parametric and non-parametric methods produce remarkably consistent results. In turn, our results are broadly consistent with the empirical implications of our simple model in Section 2. It appears that conditioning uncertainty, training and promotions to a set of dummy and continuous variables helps sharpen our story as follows. Workers and firms are exposed by foreign competition to higher uncertainty (in particular over sales, profits and prices): that's the bad news. There are also good news, however, although they are somehow different for different types of firms. Workers in foreign-owned, import-competing and exporting firms benefit from more training. Workers in exporting firms also benefit from more promotions. The results for exporting firms are less robust to changes of specifications than the results for other groups of firms.

6 Conclusions

In this paper we have reached three main conclusions. First, we find no evidence that the absolute and relative wages differ significantly between globalized and non-globalized fims. Second, we find that all 'globalized' firms are systematically exposed to higher uncertainty (in particular to uncertainty over employment, sales, profits and prices). Third, exposure to foreign competition may also be advantageous. Workers in import-competing and foreign-owned firms mostly benefit from more training programs; workers in exporting firms from being promoted more often. These are the twin effects of globalization in the labor market, at least in the Indian labor market.

This evidence bears at least one possible explanation. If workers have limited access to the capital market, when facing higher real income uncertainty, they will invest more in training, effort and productivity in order raise the probability of a promotion or a wage rise. There may be more. Firms, facing more competition from abroad, may wish to invest more in training and human capital, in order to innovate and differentiate their products, and save profit margins /market shares (this is the Feenstra and Hanson (200?) hypothesis). Yet this alternative explanation does not explain why globalization does not have an effect on the skill premium, something successfully confronted with by our efficiency-wage-based one.

Do our conclusions extend to other countries ? We do not know yet. If they do, however, a tentative policy implication might follow. Rodrik (1998) has shown that globalization is often associated to big government,

essentially because of the losers' demand for protection. Our results can be interpreted as implying that domestic workers and firms are not necessarily powerless. Globalization raises insecurity, but also seem to provide workers with more opportunities. Hence, the design of social assistance programs should complement and not substitute the private sector response, for example giving incentives to private training schemes, thus also helping to avoid moral hazard problems.

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Table 1. *Firm breakdown by foreign exposure and sector*

 # Firms Operating in Each Sector

	Garments	Textiles	Drugs & Pharmaceutic.	Electronic Consumer Goods	Electrical White Goods
All categories (555)	178	179	142	44	32
E (Exporters) (209)	102	63	36	2	6
IC (Import-competitors) (150)	28	36	49	20	17
P (Protected against foreign competition) (196)	48	60	57	22	9
Foreign Owned (22)	3	13	18	2	2
Domestically Owned (511)	240	232	220	62	71

Notes: *Exporters* (E) refer to firms whose (total exports) / (total sales) > 30%. *Foreign Competition* indicates a firm declaring to have foreign competitors in the domestic market.

Table 2. *Firm breakdown by foreign exposure and location*

Firms Operating in Each Locality (States in parentheses)

Location	3 Categories	E	IC	P	Foreign Owned	Domestically Owned
Mumbai (Maharashrtra)	127	32	60	35	14	206
Delhi (Haryana)	141	42	36	63	2	163
Chennai (Tamil Nadu)	109	71	11	27	5	136
Ahmedabad (Gujarat)	22	7	5	10	0	68
Calcutta (West Bengal)	29	5	8	16	3	58
Bangalore (Karnataka)	34	13	15	6	4	45
Hyderabad (Andhra Pradesh)	36	21	6	9	2	50
Kanpur (Uttar Pradesh)	26	4	2	20	0	47
Chandigarh (Punjab)	13	6	4	3	4	20
Pune (Maharashtra)	8	1	2	5	1	18
Cochin (Kerala)	10	7	1	2	3	14
All localities	555	209	150	196	22	511

Table 3. *Employment and wages*

Means for Selected Variables

Sample		W_B	W_W	W_W / W_B	L_B	L_W	L_W / L_B	L_{TOT}
3 Categories	(555)	.038 (239)	.18 (239)	7.7 (239)	191 (239)	32 (239)	.33 (239)	220 (216)
E	(209)	.035 (115)	.19 (115)	8.4 (115)	220 (115)	31 (115)	.34 (115)	293 (103)
IC	(150)	.041 (50)	.15 (50)	7.17 (50)	203 (50)	59 (50)	.35 (50)	276 (43)
P	(196)	.046 (74)	.18 (74)	7.09 (74)	137 (74)	15 (74)	.30 (74)	166 (71)
Foreign Owned	(22)	.03 (11)	.07 (11)	4.09 (11)	386 (22)	66 (11)	.35 (21)	553 (34)
Domestically Owned	(533)	.04 (218)	.19 (218)	8.30 (224)	188 (11)	32 (218)	.32 (455)	165 (466)
P-values for Mean Equality Test: **P *vs.* E**		.73	.96	.62	.20	.16	.44	.30
P-values for Mean Equality Test: **P *vs.* IC**		.88	.71	.96	.36	.11	.49	.22
P-values for Mean Equality Test: **Foreign owned *vs.* Domest. owned**		.44	.01*	.02*	.15	.16	.45	.03*

Notes

The asterisk (*) indicates that the means calculated for the two groups of firms are significantly different, at a 5% confidence level.

W_W = average hourly wages of White Collars (W); W_B = average hourly wages of Blue Collars (B)

Blue Collars (L_B) = Unskilled Production Workers + Skilled Production and Non-Production Workers

White Collars (L_W) = Managers + Professionals.

The means reported above are computed by trimming right-end tails so as to leave out 2% of the cumulative distribution of each variable. By following this method, the following observations have been left out of the sample: $W_B>7$, $W_W>20$, $L_{tot}<5000$.

Table 4: *The transitory and permanent variances of wages, employment, prices, sales and net profits*

Decomposition of Variance for Selected Variables

		Wages			Labor			Price		
Sample		σ_v^2/σ^2	σ_μ^2/σ^2	CV	σ_v^2/σ^2	σ_μ^2/σ^2	CV	σ_v^2/σ^2	σ_μ^2/σ^2	CV
3 Categories	(555)	.07 (400)	.93 (400)	.81 (400)	.006 (527)	.99 (527)	1.7 (527)	.009 (495)	.99 (495)	3.7 (495)
E	(209)	.14 (156)	.86 (156)	.85 (156)	.009 (195)	.99 (195)	1.3 (195)	.01 (186)	.99 (186)	3.7 (186)
IC	(150)	.04 (106)	.96 (106)	.80 (106)	.005 (140)	.99 (140)	1.7 (140)	.01 (133)	.99 (133)	3.2 (133)
P	(196)	.08 (138)	.92 (138)	.72 (138)	.002 (192)	.99 (192)	2.7 (192)	.002 (176)	.99 (176)	4.2 (176)

		Sales			Net Profit		
Sample		σ_v^2/σ^2	σ_μ^2/σ^2	CV	σ_v^2/σ^2	σ_μ^2/σ^2	CV
3 Categories	(555)	.02 (532)	.97 (532)	2.5 (532)	.16 (481)	.84 (481)	2.34 (481)
E	(209)	.03 (201)	.97 (201)	6.8 (201)	.17 (176)	.83 (176)	2.1 (176)
IC	(150)	.02 (137)	.98 (137)	2.15 (137)	.14 (127)	.86 (127)	1.9 (127)
P	(196)	.009 (194)	.99 (194)	3.5 (194)	.17 (178)	.83 (178)	3.2 (178)

Notes: The figures in **Table 4** refer to average values. σ_v^2 is the temporary component of the total variance σ^2, while σ_μ^2 is its permanent component. CV is the coefficient of variation, equal to $\sigma / \overline{X}$, being $\overline{X}$ the mean of the distribution.
The numbers in brackets are the observations employed to compute the variable means.

Table 5: *The transitory variability of prices, wages, employment, sales, net profits*

Coefficients of Variation for Selected Variables

Sample		$\overline{P}_{98\text{–}99}$	$\overline{W}_{97\text{–}98\text{–}99}$	$\overline{L}_{97\text{–}98\text{–}99}$	$\overline{S}_{97\text{–}98\text{–}99}$	$\overline{\Pi}_{97\text{–}98\text{–}99}$
3 Categories	(555)	.12 (514)	.11 (400)	.06 (538)	.14 (531)	.25 (487)
E	(209)	.14 (194)	.13 (150)	.07 (198)	.18 (196)	.33 (182)
IC	(150)	.12 (143)	.09 (112)	.05 (148)	.11 (145)	.27 (131)
P	(196)	.10 (177)	.09 (138)	.05 (192)	.11 (190)	.22 (181)
Foreign Owned	(22)	.20 (18)	.14 (18)	.08 (22)	.18 (22)	.43 (18)
Domestically Owned	(511)	.12 (477)	.10 (366)	.06 (495)	.13 (489)	.25 (454)
P-values for Mean Equality Test: P *vs.* E		.12	.007∗	.009∗	.000∗	.000∗
P-values for Mean Equality Test: P *vs* IC		.42	.49	.72	.53	.03∗
P-values for Mean Equality Test: For.owned *vs.* Dom.owned		.26	.19	.30	.07	.30

Note: the coefficients of variation reported in **Table 5** refer to the transitory component of variability.
(∗)= the means calculated for two groups of firms are significantly different, at a 5% confidence level

$\overline{P}_{98\text{–}99}$ is the average price for the period 1998 – 1999. $\overline{W}_{97\text{–}98\text{–}99}$ is the average wage paid in the period 1997-1998-1999, $\overline{S}_{97\text{–}98\text{–}99}$ indicates the average sales for the period 1997-1998-1999, $\overline{\Pi}_{97\text{–}98\text{–}99}$ indicates the average net profits for the period 1997-1998-1999.

Data computed after 2% trimming of right-end tails. The numbers in brackets are the observations employed to compute the variable means.

Table 6: *Training and promotions*

Means for Selected Variables

Sample		In-house Training (%)	Outside Training (%)	Total Training (%)	Workers trained as a share of total employed	Promotions
3 Categories	(555)	24 (549)	16 (532)	28 (549)	.35 (130)	.020 (359)
E	(209)	26 (207)	20 (199)	31 (207)	.21 (54)	.040 (122)
IC	(150)	34 (150)	18 (148)	36 (150)	.64 (42)	.014 (102)
P	(196)	16 (192)	9 (185)	19 (192)	.23 (34)	.017 (135)
Foreign Owned	(22)	68 (22)	71 (21)	77 (22)	.33 (21)	.020 (19)
Domestically Owned	(511)	22 (506)	14 (490)	26 (506)	.28 (105)	.020 (510)
P-values for Mean Equality Test: P *vs* .E		.015∗	.001∗	.005∗	.65	.01∗
P-values for Mean Equality Test: P *vs* .IC		.0002∗	.012∗	.0007∗	.07	.57
P-values for Mean Equality Test: F. owned *vs* D.owned		.000∗	.000∗	.000∗	.53	.78

Note:

(∗) indicates that means calculated on the 2 groups of firms are significantly different, at a 5% confidence level

% In-house training indicates the percentage of firms that runs formal in-house training programs.

% Outside training is the percentage of firms that takes advantage of formal outside training programs.

% Total training is the percentage of firms that takes advantage of either type of training programs.

Promotions is the percentage of workers that moved to higher working positions during 1999.

Table 7: *Dummy-variable regressions of the transitory component of the variance (in logs)*

Dependent Variable	E dummy	IC dummy	Foreign Ownership dummy	Size+sector dummies	Locality dummy	#. Obs.
$\sigma^2_{T,Prices}$	**2.53***** (.72)	**1.69**** (.79)	**2.84*** (1.59)	No	No	437
	2.27*** (.81)	.28 (.83)	2.03 (1.64)	Yes	No	398
	1.80** (.85)	.66 (.87)	1.31 (1.68)	Yes	Yes	398
$\sigma^2_{T,Rwages}$	-1.29 (.86)	**-1.77*** (.95)	1.97 (1.86)	No	No	290
	-1.04 (.98)	-.91 (.99)	**3.03*** (1.89)	Yes	No	290
	-1.01 (1.01)	-1.02 (1.03)	**4.68**** (1.94)	Yes	Yes	290
$\sigma^2_{T,Empl'nt}$	**1.94***** (.38)	**.80*** (.42)	**2.22***** (.76)	No	No	304
	.51* (.29)	-.19 (.30)	.81 (.54)	Yes	No	303
	.37 (.30)	-.13 (.31)	.65 (.55)	Yes	Yes	303
$\sigma^2_{T,Sales}$	**3.47***** (.42)	**1.83***** (.46)	**3.55***** (.89)	No	No	506
	1.70*** (.37)	**.73**** (.38)	1.01 (.73)	Yes	No	467
	1.56*** (.38)	**.67*** (.39)	.66 (.73)	Yes	Yes	467
$\sigma^2_{T,Profits}$	**3.68***** (.50)	**2.21***** (.54)	**3.08***** (1.07)	No	No	464
	1.60*** (.47)	.70 (.46)	.10 (.89)	Yes	No	431
	1.50*** (.49)	.70 (.48)	-.24 (.90)	Yes	Yes	431

Notes

Benchmark in each regression: average firm in the P (protected) group of firms.

The dependent variable, for each of the 5 equations, is the transitory component of the variances (σ^2_T) of, respectively, Wages, Prices, Employment, Sales, Net Profits.

E, IC and P are dummies for the firm's foreign exposure status (E=exporter; IC=Import-competing firm; P=firm protected from foreign competition).

Size dummies: 'Small' is a dummy taking value=1 if the total number of workers is less than 50. 'Medium' is a dummy taking value=1 if the total number of workers is greater than 50 and smaller than 200. 'Large' is a dummy taking value=1 if the total number of workers is > 200.

Sector dummies: Garments, Textiles, Drugs & Pharmaceutical, Electronic Consumer Goods and Electric White Goods.

'Yes' and 'No' indicate inclusion or exclusion of the appropriate variable from the regression.

Standard errors in parentheses.

* = coefficient significant at the 10% level of significance

** = coefficient significant at the 5% level of significance

*** = coefficient significant at the 1% level of significance

Table 8: *The determinants of training, parametric estimates*

Dependent variable	Estimation methods	E dummy	IC dummy	Foreign Ownership dummy	Tax deductions	Productivity growth	Size dummies	Sector dummies	Locality dummies	Pseudo-R^2 Or Adj. R^2	#. Obs.
Total training	**Probit**	**.127***** (.055)	**.120**** (.062)	**.538***** (.115)	No	No	No	No	No	.059	402
Total training	**Probit**	-.061 (.093)	.103 (.104)	**.471***** (.098)	**.378***** (.113)	.051 (.060)	No	No	No	.048	183
Total training	**Probit**	**-.182*** (.099)	.006 (.112)	**.387**** (.144)	**.326***** (.128)	No	Yes	No	No	.183	183
Total training	**Probit**	.003 (.119)	.011 (.115)	**.378**** (.156)	**.274*** (.147)	No	Yes	Yes	No	.228	183
Total training	**Probit**	.173 (.136)	.121 (.131)	**.418**** (.162)	.297 (.168)	No	Yes	Yes	Yes	.289	175
Trained/ Employed	**OLS**	-.025 (.054)	**.126**** (.061)	.062 (.066)	No	No	No	No	No	.078	90
Trained/ Employed	**OLS**	-.014 (.067)	.117 (.074)	.050 (.074)	-.024 (.076)	.011 (.071)	No	No	No	.009	73
Trained/ Employed	**OLS**	-.020 (.058)	**.128**** (.065)	.059 (.068)	No	No	Yes	No	No	.211	90
Trained/ Employed	**OLS**	-.018 (.056)	**.114*** (.065)	.063 (.068)	No	No	No	Yes	No	.213	90
Trained/ Employed	**OLS**	-.012 (.062)	**.129**** (.064)	.068 (.072)	No	No	No	No	Yes	N.A.	90

Notes

Benchmark in each regression: average firm in the P (protected) group of firms.

Row 1-5: Probit estimates. The coefficients reported there are marginal coefficients obtained from STATA 'dprobit' procedure. Pseudo-R^2 values reported.

Row 6-10: OLS dummy variables estimates. Adjusted R^2 values reported.

Standard errors in parentheses

* = coefficient significant at the 10% level of significance

** = coefficient significant at the 5% level of significance

*** = coefficient significant at the 1% level of significance

Table 9: *The determinants of promotions, parametric estimates*

Dependent variable	Estimation methods	E dummy	IC dummy	Foreign Ownership dummy	Productivity growth	Size dummies	Sector dummies	Locality dummies	Adj. R^2	#. Obs.
Promotions	**OLS**	**.027***** (.010)	-.003 (.010)	.010 (.023)	No	No	No	No	.026	291
Promotions	**OLS**	**.028***** (.010)	-.003 (.010)	.008 (.023)	**.019***** (.008)	No	No	No	.043	291
Promotions	**OLS**	**.021**** (.010)	-.006 (.010)	.003 (.023)	**.020***** (.008)	Yes	No	No	N.A.	291
Promotions	**OLS**	**.020*** (.011)	-.006 (.011)	.006 (.024)	**.020***** (.008)	Yes	Yes	No	N.A.	291
Promotions	**OLS**	.017 (.011)	.007 (.011)	.002 (.023)	**.020***** (.008)	Yes	Yes	Yes	N.A.	291

Notes
Benchmark in each regression: average firm in the P (protected) group of firms.
Dependent variable: Number of workers promoted in 1999 divided by total employees in 1999.
Standard errors in parentheses
* = coefficient significant at the 10% level of significance
** = coefficient significant at the 5% level of significance
*** = coefficient significant at the 1% level of significance

Table 10: ***The determinants of variability, training and promotions: parametric and non-parametric estimates***

	Matching estimates	Parametric estimates
Variability of prices	**(1)**	**(2)**
Exporters	1.11 (.091)	1.80** (.85)
Import-competitors	1.44 (1.08)	.66 (.87)
Variability of real wages		
Exporters	-.65 (.58)	-1.01 (1.01)
Import-competitors	-1.31 (1.04)	-1.02 (1.03)
Variability of employment		
Exporters	2.32*** (.51)	.37 (.30)
Import-competitors	1.40** (.63)	-.13 (.31)
Variability of sales		
Exporters	2.83*** (.41)	1.56*** (.38)
Import-competitors	1.93*** (.62)	.67* (.39)
Variability of net profits		
Exporters	2.34*** (.75)	1.50*** (.49)
Import-competitors	2.15*** (.61)	.70 (.48)
Total training		
Exporters	.106*** (.043)	.173 (.136)
Import-competitors	.095* (.053)	.121 (.131)
Promotions		
Exporters	.015 (.011)	.017 (.011)
Import-competitors	.001 (.005)	.007 (.011)

Notes:

The results in column (1) are from matching estimates with two sets of controls (Sector and locality dummies). Such estimates satisfy the balancing property tests. Bootstrapped standard errors in parentheses.

The results in column (2) are the OLS variability estimates with all dummies of **Table 7**; the probit training estimates from row 5 in **Table 8**; the OLS promotions estimates in row 5 of **Table 9**.