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The Twin Effects of Globalization[1]

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Abstract

Employees of "globalized" firms face a riskier, but potentially more rewarding, menu of labor market outcomes. We document this neglected trade-off of globalization for a sample of Indian manufacturing firms. On the one hand, the employees of firms subject to foreign competition face a more uncertain stream of earnings and riskier employment prospects. On the other, they enjoy a more rapid career and/or have more opportunities to train and upgrade their skills. The negative uncertainty costs and the positive incentive effects of globalization are thus twin to each other. Concentrating on just one side of the coin gives a misleading picture of globalization.

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1 Introduction

Critics of globalization often argue that openness undermines labor market institutions, raises job insecurity and the variability of earnings. When barriers to good and factor mobility fall, firms can more easily substitute foreign for domestic labor and consumers can more easily substitute foreign for domestic goods. As a result, the firms' demand for labor becomes more elastic, and this causes higher uncertainty in earnings and employment. Hence, in a world where risk-averse workers have only limited access to credit, they may suffer from the breakdown of the implicit/explicit insurance scheme granted by formal labor contracts.

This is only a partial rendition of the effects of globalization on the labor market. In this paper, we argue that employees of "globalized" firms face a riskier but also more rewarding menu of labor market outcomes. We document this trade-off for a sample of Indian manufacturing firms. We find that employees of firms subject to foreign competition indeed face more uncertainty in their earning stream and employment prospects. However, their career is also faster (they are more likely to be promoted) and/or their ability to upgrade their skills is higher (they are more likely to be involved in training programs) than employees of firms shielded from foreign competition. In other words, workers need not suffer passively from higher uncertainty: even when they have limited access to the credit and insurance market, they can (and do) self-insure by exerting more effort and raise their expected income stream. The negative uncertainty costs and the positive incentive effects of globalization are thus twin to each other. Isolating just one side of the coin gives a misleading picture of globalization.

In developed economies, international economic integration has been blamed for the rise of wage inequality and unemployment in the 1980s (e.g. see the selective surveys of the main issues in Wood (1994, 1998)), although the consensus is that only a fraction of the widening of skill premia may be reasonably attributed to globalization. As to developing countries, the reasons for concern about the effects of globalization are even less apparent. The Stolper-Samuelson theorem suggests that wage inequality should fall when countries which are relatively abundant of unskilled labor open to trade. Moreover, most models of imperfect competition suggest that, as market size grows, workers should benefit from higher real wages and better employment opportunities.[1] Supporting the presumption that trade integration brings higher growth via technology transfers, knowledge spillovers and scale

[1]For an example of an imperfect competition model where trade integration raises wage inequality see Manasse and Turrini (2002)

economies, many studies have indeed found a significant empirical relationship between exporting and productivity levels and growth rates. This is the so called "learning-by-exporting effect", first emphasized by Bernard and Jensen (1997, 1999).[2]

The potential shortcomings of globalization in the Third World have been most clearly and forcefully expressed in Rodrik (1997), among others. In addition to the costs of uncertainty, he argues that there may be a potential trade-off between static and dynamic gains from trade: if specialization occurs in traditional, less dynamic, sectors, growth may suffer in the long run. Moreover, if the supply response of domestic exporters occurs with a lag, while imports boom early on, the static gains from trade liberalization may be smaller than expected and domestic production may face serious disruption. Altogether, this is supportive of the view that globalization brings aggregate benefits while causing losers and winners within each country.

This paper presents new evidence on the labor market effects of globalization, based on a newly assembled World Bank data set of Indian manufacturing firms for 1997-99. The paper presents two main substantive novelties with respect to the literature,. First, rather than just focusing exclusively on wages and employment data, we bring into the analysis non-wage benefits such as promotions and training. We find a systematic relation between such labor market outcomes and the degree of firms' exposure to foreign competition. In particular, employees of exporting firms are exposed to higher wage and employment variability, but also enjoy a higher probability of being promoted and trained than the employees of firms not subject to foreign competition. The same applies, although to a lesser extent, to employees of import-competing firms. Second, the robustness of our econometric results is probed by applying standard econometric tools as well as less standard non-parametric (matching) techniques. Our findings hold irrespective of the estimation method.

The structure of the paper is as follows. Section 2 presents a simple model linking wage and employment uncertainty to skill-upgrading and career. In this model, globalization is a mean-preserving increase in the variability of wages and productivity. Due to limited access to the insurance market, risk-averse workers achieve self-insurance by exerting more effort in skill-upgrading activities (training). In equilibrium, more promotions and training activities are thus expected in firms exposed to international competition. Before moving to formally testing the implications of our model, we discuss in Section 3 the reasons that make India in the late 1990s an ideal

[2]See also Epifani (2003) for a recent survey on these and other issues related to the labor market effects of trade liberalization in Developing Countries.

case-study to learn about these issues. Following a long period of import-substitution policies dating back to the 1950s, India undertook major steps towards the reduction of barriers to trade in goods and capital between 1991 and 1997. Our 1997-99 data set of Indian manufacturing firms provides a timely snapshot of opportunities and constraints brought about by trade reforms. The main features of our data set are presented in Section 4. Here we compare the levels and variability of wages, employment, prices, sales, profits, promotions and training for different types of firms. These are classified as "exposed to" or "protected from" foreign competition according to their characteristics in the product and capital market. In Section 5, we test the model's implications and the stylized facts presented in Section 4 by rigorous econometric analysis. After decomposing the variability of labor market outcomes into their cross-sectional (permanent) and time series (transitory) components, such components are regressed on our measure of foreign exposure, while controlling for sector, size and location characteristics. We then estimate a probit model for the likelihood of promotions and training, with productivity growth added to the same set of regressors as above. Finally, we check that our results on the relation between foreign exposure and labor market outcomes still hold when non-parametric (matching) techniques are employed. Section 6 briefly summarizes and discusses the main conclusions.

2 A Simple Model of Uncertainty and the Labor Market

Here we develop a simple equilibrium model where the effects of uncertainty on workers' and firms' behavior are modelled. We can think of "globalization" as adding to workers' variability of real incomes and to firms' variability of 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. Productivity shocks may also be related to international integration in the goods market. We show that, if workers and firms have limited access to the capital market, the former will exert more effort and invest more in skill upgrading (training) in order to protect themselves 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 sectors. A perfectly competitive (informal) sector, say agriculture, employing only unskilled labor, and the manufacturing sector, employing skilled and unskilled labor. The supply of unskilled labor is perfectly elastic and there is perfect mobility across sectors, so that

the real wage rate for unskilled labor is fixed at w, the marginal value of leisure time. Unlike workers employed in agriculture, a worker employed in the manufacturing sector has the option to become skilled. This requires training efforts, and is associated with higher productivity. Given the worker's optimal supply of effort, the firm chooses how many workers to employ and the optimal incentive premium Δ. There are two sources of uncertainty. The worker faces shocks to the purchasing power of his wage, because of terms of trade shocks. The firm faces uncertainty in profits, due to productivity shocks. The timing of events is the following. In stage one, the firm chooses an incentive scheme Δ and employment L, then a productivity shock $\varepsilon \sim (0, \sigma_\varepsilon^2)$ occurs. In stage two, the worker chooses effort λ, and finally a terms of trade shock occurs, $v \sim (0, \sigma_v^2)$. We start from this second stage.

2.1 The Worker

The worker chooses the level of effort in acquiring skills $\lambda \in [0, 1]$, for given wage rates. His effort affects the probability of a promotion, as well as his productivity. If promoted, he earns $w+\Delta+v$, otherwise he earns $w+v$. For simplicity, we assume that the probability of a promotion equals the effort, λ. Training effort is costly, and brings disutility $C(\lambda) = \frac{\phi}{2}\lambda^2$. The decision to exert effort is taken before the realization of the terms-of-trade shock. All income is consumed. Therefore expected utility is

$$U = E_v \left[\lambda u(w + v + \Delta) + (1 - \lambda)u(w + v)\right] - \frac{\phi}{2}\lambda^2 \tag{1}$$

where u is a utility function, $u' > 0, u'' < 0$. Taking a second-order Taylor expansion around $v = 0, U$ can be approximated with:

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

Since the worker is risk-averse, $u'' < 0$,we see from the expression above that uncertainty over the real wage reduces welfare. The first order condition for λ yields the optimal effort level:

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

The first term in the last expression shows that the optimal level of training effort is positively related to the utility gain from higher income, and negatively related to the effort cost, ϕ. The second term shows the effect of

wage uncertainty σ_v^2 on effort. The sign of this effect 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 $u''' > 0$ [3]), then the term in the second square bracket is positive, and wage uncertainty raises optimal training (and the probability of promotion). The intuition is straightforward: faced with more uncertainty, the worker self-insures against unwelcome income fluctuations by raising his training and productivity effort. This raises is expected income stream, and makes him less "vulnerable" to 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 $\lambda + \varepsilon$. 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 expected profits are

$$\begin{aligned} \pi &= E_\varepsilon \left\{ F\left(L(\lambda + \varepsilon)\right) - L[\lambda(w + \Delta) + (1 - \lambda)w)] \right\} \\ &= E_\varepsilon \left\{ F\left(L(\lambda + \varepsilon)\right) - L(w + \lambda\Delta) \right\} \end{aligned} \tag{3}$$

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.

$$\begin{aligned} \pi &\cong F(\lambda L) - [w + \lambda\Delta] L + \frac{\sigma_\varepsilon^2}{2} F''(\lambda L) = \\ &= F(l) - \left[\frac{w}{\lambda} + \Delta \right] l + \frac{\sigma_\varepsilon^2}{2} F''(l) \end{aligned} \tag{4}$$

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

$$F'(l) + \frac{\sigma_\varepsilon^2}{2} F'''(l) = \frac{w}{\lambda} + \Delta \tag{5}$$

This expression equates the (risk corrected) marginal product of labor (in average efficiency units) to the average wage (always expressed in efficiency

[3] Most types of commonly used utility function, including logaritmic, exponential, Stone-Geary, show decreasing absolute risk aversion.

units). From this expression one can derive a labor demand function:

$$l = l(w, \Delta; \sigma_\varepsilon^2) \tag{6}$$

It is easy to show that productivity uncertainty σ_ε^2 raises the demand for labor if the curvature of the production function falls as l rises ($F''' > 0$) Intuitively, the firms cares less about uncertainty the higher its revenue,[4] so that it reacts to more uncertainty by expanding employment.
Finally, the first order condition for the optimal incentive Δ yields

$$\eta(\Delta) = \frac{\Delta \Lambda(\Delta; \sigma_v^2)}{w} \tag{7}$$

where $\eta(\Delta) = \Delta\Lambda'(.)/\Lambda$ is the elasticity of effort with respect to the wage premium. As in the standard efficiency wage model, the equality between this elasticity and the wage premium completely determines Δ. Then, the training supply schedule $\Lambda(\Delta; \sigma_v^2)$ (2) determines optimal training, while employment is determined by (6) through the identity $L = l/N$.
Simple comparative statics show that:
1. A rise in wage uncertainty (σ_v^2) raises training effort (λ) without affecting employment and the wage premium ($if\ u''' > 0$)
2. A rise in productivity uncertainty (σ_ε^2) raises employment without affecting training and the wage premium (if $F''' > 0$)

2.3 Testable Implications

If uncertainty rises with the degree of exposure to international competition, we expect to observe, ceteris paribus
1. more training, more promotions and higher productivity in firms that compete internationally;
2. larger firms and larger shares of skilled workers in firms that compete internationally;
3. similar wage premia across firms.

These implications - with the first being our main focus here - are tested against our data in the next sections.

3 Why India?

India in the late 1990s is an ideal laboratory to study the effects of globalization on firms' behavior. The integration of firms in the world product

[4] A simple Cobb-Douglas function $F(l) = l^a,\ a < 1$ satisfies this property.

and capital markets confronts firms with new major possibilities and threats. Given the size of India's domestic market the potential disruption of domestic producers is a crucial policy issue. This Section is a short recollection of the evolution of India's outward orientation policy.[5]

Since independence (1947), India has been characterized by active government intervention aimed at fostering domestic growth by import substitution. Over the years, the economy became riddled with prohibitive tariffs and import quotas. Industry-specific licensing requirements were imposed on investment projects beyond certain thresholds, and "strategic" sectors were singled out and reserved for public enterprises. Restrictions were put in place on FDI flows, particularly those with little technological content. Production and export subsidies were handed over to firms in order to encourage exports beyond traditional labor intensive products.

In spite of much effort, the results of public intervention were disappointing. At the end of the 1970s excess protection was finally recognized as the main cause of technological backwardness, low product quality and variety, and high costs, all of which made Indian goods non-competitive on the world market. In the early 1980s, the Indian Government took the first gradual steps towards a partial trade and capital market liberalization. Tariffs and import quotas were lifted on capital goods and technological imports. Tax rates on profit expatriation and royalties were cut, and ceilings to foreign shares in domestic companies raised in order to encourage FDI's and foreign licensing collaborations.

While these limited reform attempts had some beneficial effects, these fell largely short of expectations, particularly when compared to similar reforms in other Asian Newly Industrializing Countries. The balance of payments crisis of 1990-91 gave the reform process a new impetus. In June 1991, a newly elected Government initiated a major program of economic reform and trade liberalization, supported by the IMF and the World Bank. The New Industrial Policy (NIP) slashed average tariffs from 71 per cent in 1993 to 35 per cent in 1997, although tariffs remained high in several industries (paper and paper products, wood, food, beverages and tobacco). Considerable steps towards a relaxing non-tariff barriers were also taken. The number of "strategic" sectors reserved to public enterprise was drastically reduced, and the scope for application of the cumbersome licensing system severely limited.

Under the NIP a new legislation was enacted allowing foreign majoritarian participation in domestic shares, at least for "high priority" and export-

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

oriented industries. Technology transfer agreements were also no longer a prerequisite for FDI's permissions.

The first wave of reforms in the 1990s was a success. In 1992-1994, GDP grew at 7% per year on average. Industrial production also grew at 7 percent per year in 1992-1997, peaking to 12.8 per cent in 1995-96. Trade liberalization provided impulse to 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.

The benefits didn't last long, however. After the growth peak in 1995-1996, industrial production, exports and imports decelerated (respectively to 5.6, 6.5 and 6.7%) in the two subsequent years. The South-East Asian crisis in 1997-98 and the subsequent deceleration in the growth of world trade brought the growth of the Indian economy to a grind.

The slowdown in Indian industrial growth was probably aggravated by the reversal of the economic reform process (see World Bank (2000)). Between 1997 and 1999 new trade restrictions were put in place. Non-tariff barriers and anti-dumping measures took on an increasingly crucial role.[6]

Our data set, whose main features are described in Section 4, provides a firm-level snapshot of the critical years, 1997-99, of India's process of economic reform.

4 The Data Set

Next we present the main features of the data set. We highlight the most important differences between firms that are subject to international competition and those who are not. The data set is the result of a survey of 895 Indian firms recently conducted 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. The firms covered by 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).

[6] As an example, one might mention that 103 antidumping measures were still active in 2000, compared to 64 in 1999 and 49 in 1998. 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.

They 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 the sample.

4.1 Defining "globalization"

The first step for assessing the labor market implications of "globalization" is to define what we mean and how we measure "globalization" for an individual firm. 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 to the former, we define as Exporters (E) all the firms whose revenue share from exports is greater or equal than 30% (and non-exporters the remaining ones). Exporters make up 36.7% of the firms in the sample. As to the latter, we classify as Import Competitors, IC, those firms which jointly satisfy two criteria: they declare to face foreign competition in the domestic market (they answer "yes" to the question: "Are any of the competitors in the domestic market foreign firms ?"), and they are not classified as exporters. This definition picks 28% of the firms. Our "control" group is made of the remaining firms (which are neither E or IC). This group is labelled P as "protected" from foreign competition in the goods market, whereas lack of foreign competition may be the result of either political (e.g. tariffs) or natural (e.g. transport costs) barriers to trade. These firms altogether represent about 35.3% of the sample. Each firm belongs to one of the three mutually exclusive categories: E, IC, P.[7]

In order to capture a firm's integration in the international capital markets, we exploit the information concerning the firms' capital ownership. We label as 'Foreign Owned'(FO) 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 capital. The drawback of this definition is that it

[7]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.

cannot discriminate between multinational corporations and 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 in order here. Some of our variables of interest, namely training and promotions, are only available for a subset of firms (62% of the total) and for 1999. The smaller sample - on which we concentrate our attention - may in principle suffer from a selection bias and present a distorted picture of the complete sample. We checked that this is not the case by comparing the summary statistics for a number of variables for which data are available for the entire sample (and its subset). These statistics turn out to be virtually identical.

4.2 Sectors and Locations

Table 1 and 2 present a summary of the distribution of the (smaller sample of) 555 firms according to our classification, and separately reporting the sector (table 1) and location (table 2) by column.

Table 1 shows that, according to our definitions of foreign competition, firms are much more integrated in the product than in the capital market. Almost two thirds of firms in the sample are exposed to product market competition (37% are exporters and 27% are import competitors). Foreign capital, by contrast, plays a minor role in the ownership structure of firms: only 4% of firms have foreign participation in their capital. The distribution of firms across the E, IC, P categories varies greatly across sectors, 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 (FO) 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 location 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. Finally, most FO 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.

Notably, 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.[8]

4.3 Wages and Employment

Next we compare several labor market features across the various groups of firms. The questionnaire provides information concerning employment, hours worked and wages for five categories of workers (non-production workers, unskilled production workers, skilled production workers, professionals and managers). We aggregate the first three groups into 'Blue collars', and the last two into 'White collars'. Table 3 shows the figures for absolute and relative wages and employment. Wages are calculated as hourly nominal earnings in thousands of current rupees. These are computed, for blue and white collars separately, as the ratios between the corresponding yearly wage rate and the total amount of hours worked (the product of the average number of hours times number of employees). The average number of hours worked is inferred from information about work shifts, the average hours worked per day and the number of days of work in a year. On average, the hourly wage of white collars is 7.7 times as large as that of blue collars.

The average wage differential 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 between the E, IC and P firms: the test for equality of group means, at the bottom of the table, is never rejected at the 5% confidence level. In other words, exporting or import-competing firms neither pay below or above average wages to either

[8]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.

blue or white collars. On the contrary, there is some evidence that foreign-owned firms pay white collars somewhat less - in absolute and relative terms - than domestically owned firms.

The average firm size, measured by employment, is relatively large in our sample, 220 workers, see the last column in table 3. Thus small and medium-sized enterprises are presumably under-represented in the sample. Firms do not appear to differ significantly in size between exposed and non-exposed firms, but foreign owned firms appear significantly larger than domestically owned ones.[9]

We conclude that, at least in our sample, "globalization" is not associated to significant differences in absolute or relative wages and firm size, with the notable exception of foreign owned firms.

4.4 Variability

While wage and employment levels tend to be similar across groups, firms with greater foreign exposure face much "more uncertainty" in labor and product market outcomes, both in terms of dispersion across firms and in terms of variability in time. Next we look at the dispersion of wages and employment, as well as of prices, profits and sales. We construct the firm's output price variable as an index obtained from the prices of the three main products sold by each firm in each year. Such product prices are geometrically aggregated, using each product's share in sales as a weight. Net profits are defined as the before-tax operating surpluses net of interest charges, depreciation and other overhead expenses.

In order to isolate the concept of variability which is more likely affected by "globalization", we apply the method suggested by Gottschak and Moffitt (1994). The variance of a variable, say the wage rate, observed over time and for different firms, can be decomposed into two separate elements: the first represents the cross-sectional dispersion at a point in time; the second is the (squared) deviation of the individual variable from its own time average.[10] The former presumably reflects long-run phenomena, resulting, in the example, in wage dispersion across firms. This component is usually termed permanent volatility, σ_μ^2. The latter presumably reflects short-run shocks that raise the variability over time of, say, the wage rate in individual firms. This component is termed transitory volatility, σ_v^2.Since our aim here

[9]Small protected firms also tend to be less capital intensive and less unionized than those exposed foreign competition (the data are not reported here)

[10]Formally, let w_{it}, represent firm i^0s wage rate at time t, μ_i the permanent (time invariant) and v_{it} the transitory components, with $w_{it} = \mu_i + v_{it}$. The variance of w_{it} can be written as the sum of the two variances $\sigma_\mu^2 + \sigma_v^2$.(see Gottschak and Moffitt (1994))

is to test whether international integration makes life "more uncertain" for workers and firms, we focus on the short-run component.

Table 4 summarizes the results of such a decomposition. Each cell shows the transitory variance as a ratio of total variance, σ_v^2/σ^2. Compared to protected (P) firms, Exporters present systematically higher transitory variance ratios. This is clearly the case for wages, employment, prices and sales, while the difference is less marked for net profits. Import competitors present higher transitory variance for employment, prices and sales, but stable wages and profits.[11]

Altogether, Table 4 provides evidence that "globalization" is often associated with uncertainty in labor and product market outcomes, particularly so for exporters.

4.5 Training and Promotions

So far, we found that while "globalization" is not significantly related to firms' absolute and relative wages and employment, it is closely associated to more volatile labor and product market outcomes. 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 rapid careers (promotions) and more skill-upgrading (training). Promotions and training are crucial elements for comparing workers' lifetime earnings in different firms. Despite the fact that wages tend to be equalized across firms, possibly as a result of labor mobility, the present value of a worker's expected income stream may differ dramatically depending on how effectively he can accumulate human capital (training), and, possibly as a result, how fast he moves up the hierarchy ladder (promotions). Our next results are consistent with implication 1 and 3 of our stylized model: globalization brings more uncertainty, but, by doing so, it provides the incentive for higher effort in acquiring skills and therefore brings more promotions.

We start from promotions. The last column in Table 5 shows the percentage of a firm's employees promoted in 1999 (the frequency of promotion) for firms belonging to the different categories. The striking feature is that an employee of an Exporting firm is twice as likely to be promoted in the current year as the average worker (4% and 2%, respectively), and no less than three times as likely as the employee of a protected firm.[12] Given the size of the wage differentials documented earlier, this finding implies that

[11] Lack of data prevents the same calculation for FO and DO firms.

[12] In contrast, the probabilities of promotion in IC and P firms are not significantly different from each other.

an E-firm employee, despite currently earning roughly as much as a P-firm employee, enjoys in expected terms a considerably larger income stream.

The benefits of globalization, however, do not stop here. In the questionnaire, firms are asked to report whether their workers are engaged in formal training schemes (either in-house or external to the firm). To this question 549 firms answer "yes" and 532 "no". Table 5, third column, shows the percentage of firms declaring to have trained their workers in 1999, for the different groups of firms. About 28% of the firms in the sample have part of their work force engaged in training programs. Interestingly, the figure rises considerably among the exporters, 31%, and even more among the import competitors, 36%, while it falls to only 19% for the group of protected firms. Even more strikingly, 77% of foreign owned firms engage in training activities, as opposed to only 19% of domestically owned. The mean equality tests confirm this evidence: the means of the E and IC are statistically different form the mean of P firms, and the same holds for foreign and domestically owned.

A similar picture appears by looking at the shares of firms' employees involved in training programs (second column in Table 5). IC firms are by far the most heavily involved in training. The equality of means test confirms again this result, although the difference is significant only at the 7% level of confidence.

In summary, "globalization" makes life riskier for Indian workers and firms, but at the same time it provides them with the incentives (and the opportunities) to face the new challenges: higher investment in training and, possibly as a result, higher probability of promotions (for exporters).

5 Econometric Analysis

Our aim here is to move beyond the descriptive statistics and unconditional mean tests presented in Section 4, and to submit our preliminary findings to rigorous multivariate econometric analysis. For that purpose we employ a variety of parametric and non-parametric techniques. We start from standard (parametric) econometric analysis. First we estimate a model for the transitory variance of labor and product market outcomes, in order to assess the role of international competition. Second, we use probit analysis to model the probability of promotion and the likelihood of training programs. Finally, we employ non-parametric techniques (matching estimates) to check whether the statistical relationship between international exposure and labor market outcomes survives, once many of the assumptions underlying parametric analysis are relaxed. Overall, our previous findings withstand these

checks.

5.1 Parametric Estimates

5.1.1 Variability

Is globalization associated to higher variability of labor and product market outcomes? Our first set of OLS regressions, described in Table 6, tackles this question. Here the logarithm of the firms' transitory variances is regressed on two sets of dummy variables: one for foreign exposure in the product market (E, IC, P), and in the capital market (FO vs. DO). In order to control for firm's sector, size and location,[13] we also introduce the corresponding dummies in different specifications. For the variables referring to foreign exposure, we choose to omit the dummies for protected and domestically owned firms. For the sector and size controls, we employ the normalization proposed by Suits (1984). This enables us to interpret the regression coefficients as the differential effect of a change in a given explanatory variable with respect to a domestically owned, protected firm of 'average' size and sector.

Table 6 shows the outcome of such regressions for different specifications each adding in turn size, sector and location controls. A few interesting results are worth noticing. First, the 'Exporter' dummy is always significant and positive for the transitory variances of prices, sales, employment and profits. It is also positive but not always significant for wages. At a confidence interval of 10 or 5 percent, its coefficient never falls below 1.5 in every equation. Thus exporters experience a transitory variance of product and labor market outcomes that is at least 3.5% above that of a protected domestically-owned average firm.[14] This coefficient is the lowest bound of the reported coefficients, but also the most reliable one, since the appended controls are all statistically significant according to the standard F-tests of joint significance. Hence, the larger estimates obtained in more parsimonious regressions are biased.

Second, the regressions yield less clear-cut results for both IC and FO dummies. In the basic specification, that does not include additional controls, the coefficient of IC is positive and statistically significant, implying that foreign competition on the domestic markets raises the transitory variability of product and labor market variables. The positive effect, however, often disappears, once additional controls are included in the equations (and found

[13] 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.

[14] In our semi-logarithmic equations, the effect of a dummy variable on the dependent variable is given by e^{β}-1, so that in the example 3.5=exp(1.5)-1.

jointly significant by the F test). When the coefficient of IC survives, as is the case in the sales and wage equations, the inclusion of the second set of controls sharply reduces the size of the pointwise estimates (see for example the equation for $\sigma_{v,Sales}$). The dummy for foreign ownership, FO, although positive and significant in the basic specifications, never survives the inclusion of size, sector and location dummies.

We interpret this evidence as showing that globalization raises product and labor market uncertainty for firms and workers, albeit not equally for all categories of firms. The effect is stronger for exporting firms, and weaker for those which declare to face foreign competitors in the domestic market. Foreign ownership, in contrast, is not significantly associated to transitory shocks: the inclusion of other potential determinants of variability eliminate the statistical significance of this characteristic. While this result may have to do with the limited number of foreign-owned firms in our sample, this conclusion is not implausible if one considers that multinationals and joint ventures may often diversify away the consequences of the transitory shocks through transfer pricing and other financial policies more easily than domestically owned firms.

5.1.2 Training

Does exposure to international competition raise the incentive for firms and workers to engage in training? We model the presence/absence of training as a discrete limited dependent variable, which is assumed to be distributed as a standard normal. In the probit analysis, the unobservable indicator is modeled as a function of foreign exposure, size, sector, and location dummies, as well as a function of a continuous variable, the firm's productivity growth. This variable captures the possibility that fast growing firms may be more inclined to pay for their employees' training. Productivity growth is proxied by the growth rate of sales (at constant 1998 prices) per employee. Table 7 reports the estimates (the marginal effects)[15] of the probit analysis, conducted as usual over a sample trimmed of the 2% largest and smallest observations, so as to reduce the chance of incurring in outliers.

The first specification only includes our foreign exposure dummies for exporting, import-competing and foreign owned firms. The estimated coefficients for exporting firms are always positive and statistically significant. This means that the employees of exporting firms face a 12% higher probabil-

[15]The marginal effects describe the probability change originated by an infinitesimal change in each independent continuous variable (calculated at the mean level of the independent variable) or, for dummy variables, the discrete probability change associated to the 0-1 shift. These coefficients are calculated by means of the STATA dprobit procedure.

ity of being involved in training programs than the employees of an average protected and domestically owned firm. This probability rises to more than 50% for the employees of foreign owned firms. These results are robust to the inclusion of size, sector and location dummies. As shown in the third row of Table 7, the best fitting equation, in terms of pseudo R-squared, is obtained including all controls, except for productivity growth (whose inclusion is absolutely immaterial in all cases). Here the coefficients for E stay unchanged both in significance and size, and the coefficient for FO, albeit smaller, remains statistically different from zero. The coefficient of the IC dummy is instead no longer significant after conditioning on the other dummies.

We interpret these results as evidence that, possibly as the result of the larger uncertainty associated to international competition, employees of exporting and foreign owned firms are more likely to be engaged in training and skill upgrading programs. This result, however, does not extend to domestic import competitors, which presumably cannot afford such programs.

5.1.3 Promotions

Do employees of globalized firms enjoy more rapid careers? To answer this question, we look at promotion rates. We model the occurrence of a promotion as discrete limited dependent variable whose probability distribution is assumed to be a standard normal (i.e. a probit). The binary indicator is again modeled as a function on foreign exposure, size, sector, and location dummies. The results are shown in Table 8. The probability of a promotion within a year is 2.7% higher for E-firms employees than for the other workers.[16] This finding survives the inclusion of a control for productivity growth (see row 2), which is statistically significant with a coefficient of about 0.02, as well as the inclusion of the location dummies, the only statistically significant dummies (see row 3). While the E coefficient slightly falls in magnitude (from .027 to .022) with the inclusion of the location dummies, it is still precisely estimated at conventional confidence levels. In contrast, the coefficients of import competing and foreign owned firms are not statistically significant, with or without additional controls.

5.2 Non-parametric Estimates

The fact that some of our proxies for exposure to international competition in the product and capital market occasionally become insignificant when

[16]Note that, in all regressions, promotions are not measured in percentage points, while the summary statistics on promotions presented in Table 5 (column 3) are in percentage points.

dummies for sector and location are included, suggests the possibility of an endogeneity bias. A particular location/sector may be associated with lower transport cost or higher export subsidy, thus making exports more profitable.

In order for the OLS and probit estimates to be unbiased two conditions must be satisfied: recursivity and linearity in coefficients. Recursivity requires the residuals in the foreign exposure equation be uncorrelated with those of the training and promotion equations. The remedy is instrumental variable, but our data set, with its limited time dimension, does not contain reliable instruments. Linearity is also a potentially restrictive assumption. Suppose for example 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. A possible remedy to both problems is to resort to non-parametric techniques, which do not make specific assumptions about functional form, and also address the problem of simultaneity. 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 applied them to political economics issues (we refer to their papers for a "practical" discussion of such techniques).

5.2.1 Methodology

We implement matching methods in our framework using the procedure developed by Becker and Ichino (2002, freely downloadable at their home pages) as follows. First, we estimate each firm's probability of being an exporter rather than a protected firm (the so called propensity score). This is done running a probit model on our set of explanatory variables X that includes sector and location dummies. This stage allows us to reduce the initial multi-dimensional differences between firms to a single number, say the probability of being an exporter. Based on the calculated propensity scores, we split the sample into five groups (or strata). Within each group, we match the closest twins, i.e. the exporting firms with the most similar propensity scores, and calculate the differences between the respective variable of interest (variability, training, promotion). We repeat this procedure for all the twins in each group (with the non-closest twins excluded from the analysis). Finally, we calculate the average difference within each group, as well as a group-weighted sample-wide average difference between exporters and protected firms. This gives an estimate of the differential effect of export activity with respect to protection on, say, the probability of training. By

selecting the most similar pairs, this technique (called "neighbor matching method") attempts at isolating the average effect of the variable of interest ("the treatment", in the medical jargon, here the measures of foreign exposure) on the endogenous variable ("the treated", here respectively variability, training and promotions).

A 'balancing test' checks that the propensity scores are correctly identified, namely that the means of the explanatory variables (sector, locality) of the exporting and protected firms belonging to each group do not differ significantly. If the test is rejected, then firm pairs differ significantly even within groups, suggesting that partition is probably too coarse and needs to be refined. Finally, note that the explanatory variables should not explain the exporter/protected status "too well". If they do, this may be due to the fact that some groups only contain one category, say exporters, which would make matching unfeasible. In contrast, the omission of potentially relevant explanatory variable does not invalidate our results, as long as the omitted variables affect the two categories of firms equally. For these reasons we opt for a slightly parsimonious specification that only include sector and location dummies. The same procedure is applied for comparing import-competing to protected firms.

5.2.2 Results for Variability, Training and Promotions

We calculate propensity scores for exporting versus protected firms, and for import-competing versus protected firms. The same exercise could not be run for foreign and domestically owned firms, due to limited number of foreign owned firms present in our sample.

The conventional t-statistics 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. As briefly discussed previously, this means that sector and location dummies do a good job in selecting pairs of firms that can be potentially matched. This enables us to move to the second step and proceed with the neighbor matching method. Table 9, first column, shows the average effects of the different "treatments" (E , IC) on goods and labor market outcomes. Looking at the variability results first, the exporter status significantly raises the transitory variability of wages, employment, sales and profits. The import competitor status is associated to larger transitory variability of wages, sales, profits. Compared to parametric estimates, the newly estimated coefficients show the same sign and, when significantly different from zero, similar orders of magnitude.

The average effects of our "treatments" on training and promotions are reported in the bottom part of Table 9. The E status significantly raises the

probability of promotions (by 2.5%), but not that of training. The former result is quite consistent as to size and significance with the result found using parametric estimates, while the latter result is at variance with it. This may have to do with the changing sample size, which shrinks by about one hundred observations in the non-parametric case compared to the parametric case (falling from 402 to 306). The non-parametric estimates also show that the IC status is associated to a positive effect (+12%) on the probability for a firm to engage in a training program. As reported in Table 9, this effect was not precisely estimated in the correspondent parametric case. The matching estimated coefficient of IC in promotions is not statistically different from zero, similarly to the parametric case.
We conclude that matching estimators are quite successful in capturing the effects of foreign exposure on training and promotions. The promotions results are virtually identical to those of the parametric estimation methods. The training results assign either to IC (non-parametric) or E (parametric) the most significant effects.

5.2.3 Brief Summary of the Econometric Results

In summary, our econometric results show that globalization is significantly associated to higher variability of product and labor market outcomes, with exporters suffering from uncertainty more than import competitors (the bad side of international integration). In addition, workers in foreign-owned, import-competing and exporting firms are found to be more likely to be involved in training programs, with employees of exporting firms also enjoying more rapid careers (the good side of globalization).
Altogether, parametric and non-parametric estimation methods tend to produce remarkably consistent results. Hence, our findings do not suffer from the endogeneity bias nor they are particularly sensitive to the assumptions of functional forms, although those for import competitors seem slightly less robust to changes of specifications.

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 firms. However, we find that globalized firms are systematically exposed to higher uncertainty, over employment, sales, profits and prices. Finally, we find that globalization brings benefits in addition to costs. Employees of import-competing, exporting and foreign-owned firms

benefit from more involvement in training programs; employees of exporting firms also benefit from more rapid careers. This evidence survives inclusion of different control variables, as well as different estimation techniques.

These results are consistent with the simple model sketched in Section 2. If workers have limited access to credit markets, when facing higher real income uncertainty they will invest in training, effort and productivity in order self insure and raise the probability of a promotion. Clearly, other plausible explanations may be possible. 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. 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 model.

Clearly, our conclusions apply to a limited sample of Indian firms. Do they extend to other countries? We do not know yet. If they do, however, a tentative policy implication might follow. Our results can be interpreted as saying that domestic workers and firms, when confronted with globalization, are not necessarily powerless, even when their access to the capital market is limited. Globalization raises insecurity, but also seems to provide workers and firms with better incentives and more opportunities. This suggests that Government-funded safety nets programs, often run in parallel to trade liberalization policies (see Rodrik (1998)), should complement, and not substitute private sector response. This may occur, for example, by making income support schemes conditional on firms and workers' revealed willingness to train and adapt themselves to the changing external environment. Future work will shed light on these policy-oriented issues.

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

Number of 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) (196)	48	60	57	22	9
FO (Foreign Owned) (22)	3	13	18	2	2
DO (Domestically Owned) (511)	240	232	220	62	71

Notes: *Exporters* (E) refer to firms whose (total exports) / (total sales) > 30%. *Import Competiors* indicates firms declaring to have foreign competitors in the domestic market. *Protected* refers to firms which are neither E nor IC. *Foreign Owned (FO)* refers to firms with at least 4% of foreign capital. *Domestic Owned* refers to firms which are not FO

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

Firms Operating in Each Locality (States in parentheses)

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

Table 3. *Employment and wages*

Means for Selected Variables

Sample	W_B	W_W	W_W / W_B	L_W / L_B	L_{TOT}
3 Categories (555)	.038 (239)	.18 (239)	7.7 (239)	.33 (239)	220 (216)
E (209)	.035 (115)	.19 (115)	8.4 (115)	.34 (115)	293 (103)
IC (150)	.041 (50)	.15 (50)	7.17 (50)	.35 (50)	276 (43)
P (196)	.046 (74)	.18 (74)	7.09 (74)	.30 (74)	166 (71)
FO (22)	.03 (11)	.07 (11)	4.09 (11)	.35 (21)	553 (34)
DO (533)	.04 (218)	.19 (218)	8.30 (224)	.32 (455)	165 (466)
P-values for Mean Equality Test: **P *vs.* E**	.73	.96	.62	.44	.30
P-values for Mean Equality Test: **P *vs.* IC**	.88	.71	.96	.49	.22
P-values for Mean Equality Test: **FO *vs.* DO**	.44	.01*	.02*	.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). In thousands rupees.

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: $W_B>7$, $W_W>20$, $L>5000$.

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

Variance decomposition for Selected Variables

	Wages	Employment	Prices	Sales	Net Profits
Sample	σ_v^2/σ^2	σ_v^2/σ^2	σ_v^2/σ^2	σ_v^2/σ^2	σ_v^2/σ^2
3 Categories (555)	.07 (400)	.006 (527)	.009 (495)	.02 (532)	.16 (481)
E (209)	.14 (156)	.009 (195)	.01 (186)	.03 (201)	.17 (176)
IC (150)	.04 (106)	.005 (140)	.01 (133)	.02 (137)	.14 (127)
P (196)	.08 (138)	.002 (192)	.002 (176)	.009 (194)	.17 (178)

Notes

The figures in **Table 4** refer to average values. σ_v^2 is the temporary component of the total variance σ^2. "Prices" refers to the average prices for the period 1998-99. "Wages" refers to the average nominal wage paid in the period 1997-99. "Sales" refers to the average sales for the period 1997-99. "Profits" refers to the average net profits for the period 1997-99.

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

Table 5: *Training and promotions*

Means for Selected Variables

Sample	Training (% points)	Trainees/Employees (% points)	Promotions (% points)
3 Categories (555)	28 (549)	35 (130)	2.0 (359)
E (209)	31 (207)	21 (54)	4.0 (122)
IC (150)	36 (150)	64 (42)	1.4 (102)
P (196)	19 (192)	23 (34)	1.7 (135)
Foreign owned (22)	77 (22)	33 (21)	2.0 (19)
Domestically owned (511)	26 (506)	28 (105)	2.0 (510)
P-values for mean equality tests			
P vs. E	.005 *	.65	.01 *
P vs. IC	.0007 *	.07	.57
Foreign vs. domestically owned	.0001 *	.53	.78

Notes

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

% Total training is the percentage of firms that takes advantage of in-house or external training programs.

Trainees/Employees is the ratio between the number of employees involved in a training program in a given firm and its total number of employees.

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

Table 6: *Dummy-variable regressions of the transitory components of the variances (in logs)*

Dependent Variable	E dummy	IC dummy	FO dummy	Size + sector dummies	Locality dummy	Number of Obs.
$\sigma^2_{v,}$ **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
$\sigma^2_{v,}$**Wages**	**.63*** (.37)	**1.03***** (.41)	**1.31*** (.73)	No	No	326
	.31 (.40)	**.82**** (.42)	1.09 (.75)	Yes	No	326
	.50 (.38)	**.74*** (.42)	.80 (.75)	No	Yes	326
$\sigma^2_{v,}$ **Empl'nt**	**1.94***** (.38)	**.80*** (.42)	**2.22***** (.76)	No	No	304
	.66*** (.27)	-.13 (.39)	.73 (.53)	Yes	No	303
	.50* (.28)	-.12 (.30)	.61 (.54)	Yes	Yes	303
σ^2_{v} **,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
$\sigma^2_{v,}$ **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

The dependent variable, for each of the five equations, is the transitory component of the variances (σ^2_v) of, respectively, prices, nominal wages, employment, sales, net profits.

E, IC and P are dummies for the firm's foreign exposure status (E=exporter; IC=Import-competing firm; P=protected firm). Benchmark in each regression: the average firm in the P group of firms.

Size: three 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.

Sectors: five dummies for 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. Size and sector dummies are left out of the third wage regression, for statistically not significant. In the other regressions they always turn out significant and are thus kept in.

Standard errors in parentheses.

*, **,*** = coefficients significant at the 10%, 5%, 1% level of significance, respectively

Table 7: *The determinants of training, parametric estimates*

Dependent variable	Estimation methods	E dummy	IC dummy	FO dummy	Productivity growth	Size dummies	Sector dummies	Locality dummies	Pseudo-R^2 Or Adj. R^2	Number Obs.
Training	**Probit**	**.127***** (.055)	**.120**** (.062)	**.539***** (.115)	No	No	No	No	.059	402
Training	**Probit**	**.130***** (.056)	**.123**** (.062)	**.537***** (.115)	.026 (.038)	No	No	No	.060	402
Training	**Probit**	**.131**** (.067)	.073 (.069)	**.377**** (.174)	No	Yes	Yes	Yes	.289	402

Notes

Benchmark in each regression: average firm in the P (protected, or not subject to foreign competition) group of firms.

Dependent variable: share of firms that takes advantage of in-house or external training programs.

Row 1-3: Probit estimates. The coefficients reported there are marginal coefficients obtained from STATA 'dprobit' procedure. Pseudo-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 8: *The determinants of promotions: parametric estimates*

Dependent variable		Estimation methods	E Dummy	IC dummy	FO dummy	Productivity growth	Size dummies	Sector dummies	Locality dummies	Adj. R^2	Number. Obs.
Promotions	**(1)**	**OLS**	**.027***** (.010)	-.003 (.010)	.010 (.023)	No	No	No	No	.026	304
Promotions	**(2)**	**OLS**	**.028***** (.010)	-.003 (.010)	.008 (.023)	**.019***** (.008)	No	No	No	.043	304
Promotions	**(3)**	**OLS**	**.022**** (.010)	.009 (.011)	.005 (.022)	**.019***** (.007)	No	No	Yes	.151	304

Notes
Benchmark in each regression: average firm in the P group of firms.
Dependent variable: Number of workers promoted in 1999 divided by total employees in 1999.
The estimates in row (3) are obtained leaving out size and sector dummies. Their exclusion is motivated their lack of statistical significance as obtains from a standard F-test.

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 variability, training and promotions: parametric and non-parametric estimates***

	Matching estimates	**# matched pairs**	**Parametric estimates**	**Number obs**
	(1)		**(2)**	
Variability of prices				
Exporters	-.03 (.67)	174	1.80** (.85)	398
Import-competitors	.73 (.85)	125	.66 (.87)	
Variability of wages				
Exporters	.99*** (.37)	128	.50 (.38)	326
Import-competitors	1.08** (.44)	92	.71 (.42)	
Variability of employment				
Exporters	1.64*** (.33)	134	.50* (.28)	303
Import-competitors	.62 (.46)	83	-.11 (.30)	
Variability of sales				
Exporters	2.18*** (.38)	197	1.56*** (.38)	467
Import-competitors	1.79*** (.53)	142	.67* (.39)	
Variability of net profits				
Exporters	1.92*** (.49)	176	1.50*** (.49)	431
Import-competitors	1.80*** (.60)	135	.70 (.48)	
Training				
Exporters	.050 (.051)	153	.130** (.067)	402
Import-competitors	.119** (.056)	117	.073 (.069)	
Promotions				
Exporters	.025*** (.009)	153	.022** (.010)	304
Import-competitors	.002 (.005)	117	.009 (.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. Standard errors are reported in parentheses.

The results in column (2) are the best-fitting OLS estimates from the variability regressions in **Table 6**. The probit training estimates are from row 5 in **Table 7**. The OLS promotions estimates are from row 5 in **Table 8**.