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WAGES AND INTERNATIONAL TRADE

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ABSTRACT

Wages and International Trade*

In this Paper, I present direct micro-econometric evidence of the relation between individual wages of French workers and the import behaviour of their employing firms. First, a model shows that the impact of firms' imports on workers' wages not only comes from movements in the quasi-rent induced by competitive pressures, but also from alterations of workers' and firms' threat points in the bargaining process induced by trade. To estimate this model, I use a unique matched employer-employee data source that contains information on firms' inputs, including imports by type of product and by country of origin, as well as individual characteristics of a representative sample of workers employed at those firms. Because the quasi-rent ? a firm-level variable ? and seniority ? a person-level variable directly affected by import competition – are endogenous in the wage equation, I use export prices of US firms to various destinations as instruments. To summarize my results, I find a bargaining power below 0.20. I also show that workers' wages deteriorate through competitive pressures. Two effects are at play. In industries where firms actively import finished goods, workers' wage is decreased. But, firms own imports of the same goods 'protect' its workers through a hold-up effect. The total effect is negative for most workers. Highly-educated workers appear to benefit from trade, in stark contrast with less educated workers. Also, very experienced workers, when still employed in manufacturing firms, appear to benefit from the hold-up effect but to be most affected by the firm's competitor's imports.

JEL Classification: F30, F40 and J30
Keywords: bargaining, competition, imports, international trade and wages

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1. Introduction

The impact of international trade on wages is a hotly debated topic. In the United States, the simultaneous increase over the 80s and the beginning of the 90s of manufacturing goods imports and of wage inequality, mostly affecting the low-skilled workers, has generated a huge literature. In Europe, the simultaneous increase of trade and of unemployment, affecting also the low-skilled, has similarly attracted a lot of attention. The literature has been academic (see Johnson and Stafford, 1999 for a recent assessment. See also Katz and Autor, 1999 for a review of the changes of earnings inequality, more particularly in the US). But the media have also expressed this popular feeling that low-skilled manufacturing jobs were indeed disappearing from OECD countries because of global competition from low-wage countries. The question that was posed is well summarized by Richard Freeman: "The new debate focuses on one issue: whether in a global economy the wages or employment of low-skill workers in advanced countries have been (or will be) determined by the global supply of less-skilled labor, rather than by domestic labor market conditions. Put crudely, to what extent has, or will, the pay of low-skilled Americans or French or Germans be set in Beijing, Delhi or Djakkarta rather than in New-York, Paris or Frankfurt ?" (Freeman, 1995, page 16).

A clear answer to Richard Freeman's question would contribute to two strands of the literature. First, as pointed out above, it would inform the wage inequality debate.[1] Second, because product market competition is a potential underlying mechanism causing some of the changes affecting the labor market, an answer would also contribute to the literature that examines the relationship between wages and profits.[2]

[1] On one side, Lawrence (1994), Lawrence and Slaughter (1993), Krugman (1995) have argued that recent changes cannot be accounted for by increased trade with low-wage countries. On the other, Wood (1995) has accused trade of being responsible for the deteriorated position of unskilled workers while Leamer (1994) and (1996), and Freeman (1995) appear to stand in the middle. Unfortunately, evidence are not compelling and mostly rely on import penetrations measured at the aggregate or at the sectoral level (see for instance Revenga, 1992, see however Bernard and Jensen, 1997 or the book edited by Robert Feenstra, 2000).

[2] Abowd and Lemieux (1993) examine the relation between product market competition and wages in a bargaining framework whereas Blanchflower, Oswald and Sanfey (1996) look at the more general relation between profits and wages. Goldberg and Tracy (2001) as well as Bertrand (1999) focus on recent changes induced by increased import competition induced by movements in exchange rates. Unfortunately, these last authors used industry-level measures of imports because of the lack of firm-level data.

In this article, I provide an attempt to understand how wages of workers employed in manufacturing industries are affected by the sourcing strategies of their employing firm, by the sourcing strategies of the firm's direct competitors, and by the sourcing strategies of those wholesale and retail trade firms that import finished goods similar to those produced by the workers' employing firm.

I start by proposing a bargaining model that shows that import can affect wages beyond changes in the quasi-rent induced by product market competition. The routes are multiple. First, imports can affect the firm's and the workers' threat points. For instance, imports of intermediates may provide workers with hold-up opportunities when the firm has to purchase these intermediates in advance. By contrast, imports of finished goods by the firm itself or by competitors may weaken the employees' bargaining position if these imports result in a decrease of workers' outside offers. Second, imports of finished goods are potential substitutes for labor, particularly low-skill production workers. Hence, some employees may lose their jobs when negative shocks affect import costs.

Then, I implement the resulting set of equations using firm-level sources matched with worker-level sources that also contain a firm identifier. On the firm-side, the Customs administrative data set constitutes the basic component of my analysis file. All firms importing goods have to fill such an administrative form. I have access to these files for the period 1986-1992. They provide data on levels of imports by countries of origin and by product at the firm-level. The firms can be followed through time. This first firm-level data set can be matched with the so-called BAL-SUSE data set, a dynamically, i.e. unbalanced, file of approximately 1 million French firms in each year of the period 1984-1992. This allows me to construct import competition measures in each industry. On the individual-side, I use the DADS-EDP (Echantillon Démographique Permanent) which gives detailed individual information on a sample of workers (1/200) as well as their employing firm. This common identifier allows us to match the two sides of the market. Because of the various constraints, I restrict attention to the period 1986-1992 for workers employed in a manufacturing firm (approximately 120,000 observations). To compute some of the model parameters, I use the full DADS dataset for the period 1976-1996.

Even though the data sources are particularly rich, the econometric analysis is not straighforward. Of course, I have to address problems previously faced by the literature. First, as forcefully shown by Abowd and Lemieux (1993), the firm's quasi-rent in the wage equation is potentially correlated with the unobserved heterogeneity component of the same equation, creating potential endogeneity

biases. Second, as suggested in Bertrand (1999) and as my above discussion shows, import decisions may also be endogenous. In addition, I have to address problems that have not been faced by the literature. The most important comes from job losses induced by import competition. Since my sample is restricted to manufacturing workers, some of whom may lose their job during the sample period, seniority is potentially endogenous (see Goldberg and Tracy, 2001). For instance, firms may have kept and still keep their best workers or, alternatively, the best workers may well have left or still leave manufacturing firms for service firms. I therefore need to treat this "selection" issue directly. Inspiring from Abowd and Lemieux (1993), Abowd and Allain (1996), and Bertrand (1999), I use export prices of US manufacturing firms to various destinations measured in 1980 US dollars to instrument quasi-rent measures as well as import decisions of French manufacturing firms. In addition, since seniority is also directly affected by competitive pressures, I use the same price indices as instruments. All statistical tests support the validity of these instruments.

My results show that product market competition affects wages not only through movements in the quasi-rent but also through the direct effect of imports of French firms. On top of giving a new measure of workers' bargaining power (below 0.20), I show that the direct effect of imports on wages is negative for most workers. This effect is the sum of a positive hold-up effect – workers capture part of the investment made by the importing firm - and a negative competition effect that deteriorates workers' threat point in the bargaining process when many of the firm's competitors import. Imports from the trade industry has no effect. Important though is to remember that the empirical analysis is restricted to those workers that are not displaced from manufacturing firms. I try to correct for this selection. In particular, my results show that OLS returns to seniority are upward biased because manufacturing firms keep their best workers. In addition, I show that the most experienced workers benefit most from hold-ups but are also more subject to the negative effects of competitors imports, in particular through selection effects. Finally, the origin of imports has no strong direct impact on wages: competition from low-wage countries mostly shows up in employment effects (see also Biscourp and Kramarz, 2002 and 2003).

The paper is organized as follows. In the Section 2, I present the theoretical role of imports in the bargaining process. Then, I discuss the empirical implementation of my model. In Section 4, estimation results are presented. A brief conclusion ends the paper.

2. The Role of Imports in Bargaining

As was forcefully shown by Abowd and Lemieux (1993), product market competition and wage bargaining are intimately related through the financial situation of the firm. A natural route for imports to affect bargaining is therefore through changes in the quasi-rent induced by increased pressure of foreign competitors as well as home competitors outsourcing part of their production. But, I believe that there are **additional** routes for imports to affect bargaining on top of this ability to pay. In the remainder of this section, I discuss these other roles of imports in the bargaining process that takes place between a union and a firm using a classic bargaining model, called the strongly efficient bargaining model by Brown and Ashenfelter (1986).

2.1. Imports, bargaining, and hold-up

Firms may use imports into their production process. These imports enter as intermediates in this process and may act as substitutes for part of the labor input (see Biscourp and Kramarz, 2002 for a theoretical model detailing the exact mechanism) as well as other inputs (not modelled here). In order to import such intermediates from a foreign country, firms have to specify the attributes of the good, the quantities to be produced,... to the foreign producer. This process takes time. For instance, in the clothing industry, this specification and production process adds between 6 months and one year to the length of a fully local production process (Clémentine Nguyen, personal conversation). Therefore, firms which buy inputs from abroad or delocalize part of their production have to announce the amount of imports in advance compared to a situation with no imports. Then, firms bargain over wages and employment with a union. Finally, they produce. This sequence is modelled as game that unrolls as follows:

- at $t = 0$, the firm purchases imported intermediates,
- at $t = 1$, the bargaining takes place. If bargaining succeeds the firm profit π is:

$$\pi = pf(I, l) - wl - p_I(I)$$

where $f(.)$ denotes the firm's production function, I denotes firm's imports, w denotes worker's wage, l denotes the firm's employment, and p and $p_I(.)$ denote respectively the price of output and the cost of imports. But, if

bargaining does not succeed, as usual in this literature, production using the firm's workers is stopped but the firm can still employ temporary workers and generate profit $\pi_0(I)$.

As is standard, we use backward induction to solve for the component of the game of interest to us, namely the wage function. Hence, we examine the bargaining game. Following Abowd and Lemieux (1993) or Blanchflower, Oswald, and Sanfey (1996), the program to be solved is the following:

$$\max_{w,l}(1-\theta)\ln[\pi-\pi_0(I)]+\theta\ln(w-w_0)l$$

where π_0 and w_0 are called respectively the firm and worker threat points, i.e. the profits and wages as long as bargaining continues (see Malcomson, 1997 for a discussion of this modelling strategy). Blanchflower et al. (1996) explains that w_0 is the wage available from temporary work in the event of a breakdown in bargaining. The marginal product of labor is given by

$$pf_l'(I,l)=w_0$$

and bargaining is called "strongly efficient". And, the resulting wage is given by

$$w=w_0+\frac{\theta}{1-\theta}\frac{\pi-\pi_0(I)}{l}$$

or, equivalently,

$$w=w_0+\theta\frac{\pi^0-\pi_0(I)}{l} \tag{2.1}$$

where π^0 denotes the profit when the wage is evaluated at w_0:

$$\pi^0=pf(I,l)-w_0l-p_I(I)$$

From equation (2.1), we see that bargained wages will increase in firms' imports. Using Malcomson's words (Malcomson, 1997), these imports, when made in advance, provide the workers with hold-up opportunities.

Firms choose employment efficiently and the marginal product of labor equals w_0. Finally, the optimal level of imports is computed.

2.2. Imports and workers' threat point

During the bargaining, the worker has potential access to other jobs if the firm stopped its production. Such temporary work is either in the same industry as that of the worker's employing firm or in another industry. Therefore, w_0 comprises two components. The first is the unconditional opportunity cost of time. The second is an industry-specific component that depends on the availability of labor in the industry. Indeed, assuming that negotiations are not conducted simultaneously in firms of a given industry, labor use will decrease because of the substitution effects between labor and imports in industries where imports are largely utilized. In addition, when many firms import finished goods through trade firms, this effect should be magnified. Hence, the second component of w_0 should be a decreasing function of industries imports $\overline{I}$ (as well as imports of finished goods, produced by foreign firms of that industry, imported by firms from the trade or the manufacturing sectors). In what follows, we denote this second component $w_0(\overline{I})$ whereas the first component is denoted w^a. Equation (2.1) rewrites as

$$w = w_0 + \theta \frac{\pi^a - \pi_0(I)}{l} - \theta w_0(\overline{I}) \tag{2.2}$$

where π^a is the quasi-rent evaluated at worker's alternative wage, w^a:

$$\pi^a = pf(I, l) - w^a l - p_I(I)$$

3. Empirical Implementation

3.1. Measurement of the variables in the estimating equation

To estimate a version of equation (2.2), several measurement problems have to be solved. I examine them sequentially.

3.1.1. Measuring workers' wages as well as workers' employing firm imports and other economic outcomes

The estimating equation relates a worker's wage to her employing firm's imports, quasi-rent, ... Obviously, individual-level data sources and firm-level data sources must be simultaneously accessible. And the individual-level source must contain the employer's identifier. Indeed, I use data from 5 different ongoing administrative data sources or statistical surveys that allow me to match workers and their firms. These surveys were conducted by the Institut National de la Statistique

et des Etudes Economiques (INSEE, the French national statistical agency), by the Ministry of Labor, or by the Customs. The first of these data sources is an administrative file based on mandatory declarations of all trade movements. Only trade of goods are registered for all years between (and including) 1986 and 1992. The second source is the BAL-SUSE file which includes all firms that are subject to the declaration of the fiscal report called the Bénéfices Industriels et Commerciaux (BIC). All sectors, except the public sector, are covered. Data are available for the period 1984-1992. Our third source is the DADS (Déclarations Annuelles de Données Sociales), which is an administrative file based on mandatory reports of employees' earnings by French employers to the Fiscal administration. Hence, it matches information on workers and on their employing firm. This dataset is longitudinal and covers the period 1976-1996 for all workers employed in the private and semi-public sector and born in October of an even year. Finally, for all workers born in the first four days of October of an even year, information from the EDP (Echantillon Démographique Permanent) is also available. The EDP comprises various Censuses and demographic information. These sources are presented in more detail in Appendix B.

3.1.2. Measuring workers' opportunity wage and firms' quasi-rent

To measure each worker's opportunity wage, I use the following strategy. Consider the following basic statistical model

$$\ln w_{it}(x_{it}, \alpha_i, \psi_{\mathrm{J}(i,t)}, \varepsilon_{it}) = x_{it}\beta + \alpha_i + \psi_{\mathrm{J}(i,t)} + \varepsilon_{it} \tag{3.1}$$

in which w_{it} is the measured annualized earnings for the individual $i = 1, \ldots, N$ at date $t = 1, \ldots T$; x_{it} is a vector of P time-varying exogenous characteristics of individual i; α_i is a pure person effect; $\psi_{\mathrm{J}(i,t)}$ is a pure firm effect for the firm at which worker i is employed at date t (denoted by $\mathrm{J}(i,t)$), and ε_{it} is a statistical residual. Assume that a simple random sample of N individuals is observed for T years. Identification and estimation of this type of equations is discussed at length in Abowd, Kramarz, and Margolis (1999) as well as in Abowd, Creecy, and Kramarz (2002). In the latter, the full least-squares solution is implemented. These papers show that estimation of the person and firm-effects require very large data sets and a sufficient number of years for the person-effects to be precisely estimated. So, I estimate the previous equation using the full DADS data set (13 millions observations for the period 1976-1996). The external (opportunity) wage rate for person i is the expected value of her wage conditional

on her characteristics and identity, i.e. not knowing the employer's identity. Since the pure firm effect $\psi_{\mathrm{J}(i,t)}$ has mean 0, the above equation gives a measure of this external (opportunity) wage rate, denoted $\ln w_{it}^a$:

$$\ln w_{it}^a(x_{it}, \alpha_i) = E\left(w_{it} \,|x_{it}, i\,\right) = x_{it}\beta + \alpha_i \tag{3.2}$$

This is the first component of w_0.

The second component, related to the declining employment opportunities in the worker's industry due to import substitution to the labor input, is captured by using various statistics on imports of the firm's competitors as well as imports of the wholesale or retail trade industry. These statistics are constructed from the detailed-level Customs data set. It uses information on the specific good that is imported as well as the 4-digit industry code of the importing firm. In particular, because all goods that are imported in France are registered in this data source, trade firms (wholesale or retail) are accounted for. More precisely, for each firm, I compute a ratio of imports of intermediates over local purchases and a ratio of imports of finished goods (i.e. with the same industry classification as the importing firm's) over total production. Then, I compute the 90th, the 95th, and the 99th percentiles of those distributions **for each** industry. I also compute total imports of intermediates and total imports of finished goods for each manufacturing industry. Finally, I compute total imports of each good by trade firms (using the industry classification of the importing firm). Hence, any particular imported good that might affect directly a firm's competitive environment is accounted for. However, because of the lack of adequate data, I cannot keep track of the behavior of those firm's suppliers that do not belong to the firm's industry.

To measure firm's quasi-rent, I use the following strategy. First, remember that $\pi^a = pf(I,l) - w^a l - p_I(I)$. Assuming for simplicity that all workers have the same alternative wage w^a, we see that using equation (3.1) that

$$\pi^a = pf(I,l) - E[\frac{w}{\exp\psi \times \exp\varepsilon} l] - p_I(I)$$

where E denotes the expectation taken in the firm of the relevant random variable. Now, note first that the firm effect is constant in the firm. Then, assuming that ε is normal with mean 0, and variance σ_ε^2, we have $E[\exp\varepsilon] = \exp\frac{\sigma_\varepsilon^2}{2} \approx 1$, since σ_ε^2 is small (0.04, see Abowd, Creecy, and Kramarz, 2002) and is independent of the person observed or unobserved characteristics. These two facts taken together imply that the equation rewrites as:

$$\pi^a = pf(I,l) - \frac{wl}{\exp\psi} - p_I(I) \tag{3.3}$$

Hence, the Marshallian quasi-rent is equal to total value-added from which total labor costs are substracted and to which the costs due to the pure firm-effects are added. All these elements are measured directly.

3.2. The resulting estimating equation

The above discussion has consequences for the specification of the estimating equation. Let us recall that we start from (2.2):

$$w = w_0 + \theta\frac{\pi^a - \pi_0(I)}{l} - \theta w_0(\overline{I})$$

Appendix A explains how to go from this aggregate equation to a person-level specification that includes person-level characteristics as well as firm-level characteristics. Using previous relations, and introducing the relevant indices, we have

$$w_{it}(x_{it}) = \exp(x_{it}\beta+\alpha_i)+\theta_j(x_{it})\frac{\pi^a_{jt}}{l_j(x_{it})}-\theta_j(x_{it})\frac{\pi_{jt0}(I_{jt})}{l_j(x_{it})}+(1-\theta_j(x_{it}))w_{it0}(\overline{I_{jt}})+\xi_{it} \tag{3.4}$$

where i denotes the worker, t denotes time, and j denotes the firmat which i is employed at date t. Furthermore, α_i is estimated using equation (3.1), π^a_{jt} is directly measured using equation (3.3), where $\theta_j(x_{it})$ is the bargaining power of worker i with characteristics x_{it} employed in firm j, and where $l_j(x_{it})$ denotes the firm's labor demand for workers with characteristics x_{it}. Since $\frac{\pi_{jt0}(I_{jt})}{l_j(x_{it})}$ and $w_{it0}(\overline{I_{jt}})$ are not observed, I replace them with functions of the firm's imports and of imports of the firm's competitors, respectively. A final note is in order. This equation is expressed in level and will be estimated in level in contrast to most of the literature (not to say all, a recent exception being Margolis and Salvanes, 2002).

A brief discussion of the compatibility of equation (3.4) expressed in level with equation (3.1) expressed in logarithms is in order. Starting from equation (3.1), then taking its exponent and rewriting it using a Taylor expansion yields the following:

$$
\begin{aligned}
w_{it}(x_{it}, \alpha_i, \psi_{\mathrm{J}(i,t)}, \varepsilon_{it}) &\simeq \exp(x_{it}\beta + \alpha_i)(1 + \psi_{\mathrm{J}(i,t)} + \frac{{\psi_{\mathrm{J}(i,t)}}^2}{2})(1 + \varepsilon_{it} + \frac{{\varepsilon_{it}}^2}{2}) \\
&\simeq \exp(x_{it}\beta + \alpha_i) + \exp(x_{it}\beta + \alpha_i) \times [\psi_{\mathrm{J}(i,t)} + \frac{{\psi_{\mathrm{J}(i,t)}}^2}{2} \\
&\quad + \varepsilon_{it} \times \psi_{\mathrm{J}(i,t)} + \varepsilon_{it} \times \frac{{\psi_{\mathrm{J}(i,t)}}^2}{2}] \\
&\simeq \exp(x_{it}\beta + \alpha_i) + f(x_{it}, i, \mathrm{J}(i,t), \varepsilon_{it})
\end{aligned}
$$

Therefore, we see that these equations are indeed compatible.

3.3. Endogeneity and other potential econometric problems

Apart from measurement problems, discussed in the previous subsection, multiple potential econometric problems may affect results from estimating equation (2.2). We know from Abowd and Lemieux (1993) that

- when the splitting parameter θ varies by firm, and when this parameter is correlated with the size of the quasi-rent, estimates of θ will be biased upward (downward) if this correlation is positive (resp. negative);
- when the quasi-rent is measured with error;
- when the contract is not strongly efficient, wages, quasi-rent, and employment are determined jointly. This standard endogeneity bias make OLS estimates inconsistent. Abowd and Lemieux (1993) as well as Abowd and Kramarz (1993) show that proper estimates of (3.4), using instrumental variables, yield a lower bound for the bargaining parameter when the contract is not strongly efficient (see the discussion in Abowd and Lemieux from page 988 to page 990).

In all cases, in order to identify the bargaining parameter θ, movements reflecting changes in product market competition should translate into movements of the quasi-rent. To understand the issue, consider simplified versions of the first-order conditions with no imports:

$$
\begin{aligned}
pf'(l) &= w^a \\
w &= w^a + \frac{\theta}{l}\pi^a
\end{aligned}
$$

Now, in contrast to Abowd and Lemieux (1993), assume that markets for goods are not fully competitive and that $p = D^{-1/c}$ where D denotes demand and η is the elasticity. Assume in addition that $f(l) = A_1 l^{\alpha}$, i.e. the production function is Cobb-Douglas. Then, the revenue function $R = pf(l) = Al^{\frac{\alpha}{\mu}}$ where $\mu = \frac{\eta}{\eta - 1}$. Therefore,

$$pf'(l) = \frac{\alpha}{\mu}\frac{R}{l} = w^a$$

The wage equation becomes:

$$w = w^a + \frac{\theta}{l}\pi^a = (1-\theta)w^a + \frac{R}{l}\theta$$

and, from the first-order condition

$$\frac{R}{l} = \frac{\mu}{\alpha}w^a$$

From these last two equations, it is easy to see that in the case of perfect competition ($\mu = 1$) movements in competitive pressures do not help identify the bargaining parameter θ. It is also clear that movements in α induced for instance by technical changes, innovation,... are useful (see Van Reenen, 1996 for this approach of the problem). However, if $\mu \neq 1$, and more importantly varies with competitive pressure, it becomes possible to identify θ. Furthermore, from this simple model, we see how endogeneity and measurement error in the opportunity wage affect estimates.

Rewrite w^a as $w^a = \widetilde{w}^a + e^w$ in which the real opportunity wage is approximated because of aggregation problems, measurement error, unobserved components inducing unobserved heterogeneity. Then, the above equations rewrite as

$$\begin{aligned} w &= (1-\theta_j)\widetilde{w}^a + \frac{R_{jt}}{L_{jt}}\theta_j + e^w(1-\theta_j) \\ \frac{R}{l} &= \frac{\mu}{\alpha}\widetilde{w}^a + \frac{\mu}{\alpha}e^w \end{aligned}$$

From these equations, endogeneity problems are very clear. The revenue per worker or the quasi-rent per worker is correlated with the residuals e^w. But, note also that a strategy where I get a direct estimate of the worker's opportunity wage w^a eliminates all such problems **if** this alternative wage is well-measured, i.e. $e^w \simeq 0$. This is never the case when one works with firm-level data. But, the use of individual level data sources makes this solution possible. If the measure of the workers' opportunity wage is precise enough, the quasi-rent would not be endogenous in a **person-level** wage equation.

A final problem is worth mentioning. The equation is estimated using person-level observations. But, since we follow the worker in the firm and from firm to firm, we can measure precisely seniority in the firm. And, as pointed out in Goldberg and Tracy (2001), the impact of competition may well fall on workers through increased mobility. Hence, seniority is potentially endogenous in the above equation. And, indeed, a large part of the effects of increased competition due to globalization of the product markets are likely to be channeled through this variable (see the discussions in Farber, 1999, on instability in the United States). And, even when seniority were not included in the wage regression, movements in and out of manufacturing firms during the sample period might be related to import competition.

The above discussion shows that an empirical strategy has to be found. I follow the literature in using instrumental variables. These instruments should be correlated with the quasi-rent, seniority, and other endogenous variables. In line with Abowd and Lemieux (1993), Abowd and Allain (1996), and Bertrand (1999), I must find measures of exogenous demand shocks affecting product market competition.

3.4. Instruments: Export Prices of US Firms to Measure French Demand Shocks

Valid instruments must reflect changes in product market conditions inducing movements in the quasi-rent through μ but they must be uncorrelated with the error terms in the wage equation. In particular, such instruments should not be correlated with e^w.

If Y denotes the vector of such variables, I can write this vector as a function of basic exogenous factors, z, that represent product market conditions together with other control variables that enter into the determination of the quasi-rent, production, employment, investment, and imports. I know that product market conditions enter these variables determination in particular through my price function p. Therefore, I am looking for variables that I denote z such that

$$Y = \phi z + \upsilon \tag{3.5}$$

where υ is an orthogonal component that can be measurement error or a component specific to the firm or the worker-firm match that does not affect individual wages. These instruments should reflect shocks affecting the French

industries. These shocks should be external to the French economy, in particular they should be orthogonal to actions taken by French firms or workers.

Based on the preceding ideas, and inspired by Abowd and Allain (1996), I use international market prices labelled in US Dollars to instrument these firm- or person-level variables. More precisely I use industry-specific export prices of United-States manufacturing firms expressed in US Dollars for various destinations. Such variables are attractive for three reasons. Because they are export prices, they are determined on the world market and therefore beyond reach of French producers. In addition, because they are export prices as set by US firms, the argument above can only be reinforced, in particular if there is imperfect competition in France that could invalidate export prices of French firms as instruments. Furthermore, as these price indices are in fact unitary values indices computed in US dollars, they reflect exogenous variations in the exchange rate of the US dollar vis à vis different destination countries. These exchange rates vary quite widely. However, their effects on the real economy are extremely difficult to detect. Therefore, I have tried to avoid conversions between US dollars and French Francs. Hence, I use on one side economic variables expressed in French Francs and, on the other side, instruments expressed in US dollars, US export price indices. Hence, the variation in my two series will reflect conversions but informative, and exogenous, changes in prices. Abowd and Lemieux (1993) have used ideas related to this procedure when studying Canadian firms, Abowd and Allain (1996) used this exact idea when instrumenting French firms quasi-rents, and Bertrand (1999) used a related strategy when instrumenting industry-level import penetration ratios by source-weighted industry exchange rates. Here, the procedure is extended in four directions. First, I apply this instrumentation idea to all firm-level variables, in particular quasi-rents and imports. Second, I use detailed export prices, expressed in dollar terms, for four different destinations that result from the equilibrium induced by US manufacturing firms when exporting to different regions of the world. Third, I instrument seniority since individual's mobility is potentially affected by the firm's exposure to competition.

I now present evidence that these export prices represent pure demand shocks. To do this, I exactly follow Abowd and Lemieux (1993) in estimating a supply equation. Hence, I regress the sales of French firms on industry-level ouput prices and industry-level wages. First, I estimate the relation between firm-level sales (deflated by industry-level output prices) and industry-level value-added prices, industry-level wages and time indicators in the cross-section dimension. Then, I control for firm fixed effects. Finally, I instrument value-added prices using

lagged US export prices (from 1981 to 1986, when my estimation period is 1986 to 1992). The results are presented in Table A.1. In column 1, the relation between industry-level prices is estimated by OLS. The least squares estimate is negative reflecting the fact that, in the cross-section, supply shocks dominate demand shocks. However, when firm fixed effects are introduced the coefficient becomes positive and is marginally significant (column 2). Finally, when value-added prices are instrumented by US export prices the relation becomes strongly positive (column 3).[3] The elasticity is equal to 0.458, slightly above the one estimated by Abowd and Lemieux for Canada whereas the impact of wage on sales is very comparable to theirs. One can conclude from this exercise that past variations in US export prices reflect demand shocks affecting French firms. These prices allow me to estimate valid supply equations: when prices go up, production increases. Hence, there are good economic reasons to believe that such instruments are well-suited to the present needs of my statistical analysis. More evidence is presented below.

3.5. Firm's quasi-rent and worker's seniority are endogenous in the worker's wage equation

Table 1 presents the OLS results for equation (3.4). In the Table, I use two measures of the quasi-rent. In the first one presented in column (1), I apply the formula given in the theory section. The second measure, presented in column (2), subtracts from the formula a measure of the real opportunity cost of capital of 3% per annum (as in Abowd and Allain, 1996). Results using the two measures of quasi-rent are almost identical. They show that the bargaining power is roughly equal to 0.17, below estimates obtained using firm-level data sources. They also tend to support the idea that workers still employed in the manufacturing industries benefit from their employing firm's imports, through a hold-up effect. Import competition effects though are absent from these estimates (except for the imports of intermediates from the industry's competitors). In addition, returns to seniority are small and negative at the start of the spell (wages are expressed in 1,000 French Francs).

However, as discussed above, these OLS estimates are likely to be affected by endogeneity biases. Therefore, I tested endogeneity for the main variables of my wage model: firm-level quasi-rent, firm-level imports of goods (as a fraction of production), firm-level imports of intermediates (as a ratio of local purchases), the

[3] The estimation is done in first difference as in Abowd and Lemieux (1993).

competitors import behavior (the 99th percentile of the distribution of imports of goods as a fraction of production in the same 4-digits sector and the 99th percentile of the distribution of imports of intermediates as a fraction of local purchases in the same 4-digits sector), worker's seniority, and seniority-square. The test strategy that I used is very simple. I regress each potentially endogenous variable on the set of instruments (lagged export price indices of US firms to 4 destinations by 3 digit industries) and the wage equation exogenous variable. I recuperate the residuals of these regressions and augment the wage equation with these residuals. The exogeneity test amounts to the nullity of the coefficient of the residual in this last equation for the variable of interest. I used the two measures of the quasi-rent and the results point to similar conclusions. All variables **but** quasi-rent and seniority are exogenous in this person-level wage equation.[4]

Several points are in order. Remember first that we control for the person-specific unobserved heterogeneity using the estimated person effect. More precisely, all the above estimates as well as those that follow will include an estimated person effect that results from estimating (3.1) using OLS in which log-earnings are regressed on a quartic in experience, a time-varying indicator for living in the Paris Region, an indicator for working full-time, these three variables being fully interacted with sex indicators, and, more importantly here, a person fixed effect and a firm fixed effect. The full least squares solution for equation (3.1) is obtained using the full sample of more than 13 millions observations and a conjugate gradient algorithm.[5] These last two effects are then used in the restricted sample. This estimated person effect is then directly used in estimation whereas the firm effect is used to compute the quasi-rent using equation (3.3). More precisely, each regression includes the following variables: experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate, 3-digit industry indicators, the estimated person-effect, and a full interaction of the estimated person-effect with all previous variables (except seniority and the industry indicators). Most of these variables are not available in the full DADS sample but only in the match between DADS and EDP.

Note again that the analysis sample is restricted for 4 reasons: a) only those workers that are present both in the DADS and in the EDP are included; b) I

[4] I also estimated wage equations with competitors behavior treated as endogenous variables with no impact on my results. All these results are available from the author.

[5] See Abowd, Creecy, and Kramarz (2002).

want to control for the (many more) variables present in the DADS-EDP match (that are not present in the DADS itself, as explained just above); c) the observation period is restricted to 1986 to 1992, the only years for which I also observe the import behavior of firms; d) I restrict to manufacturing workers since, again, imports are restricted to imports of goods, not services, even though I observe and use imports of such goods coming other sectors such as the retail or wholesale trade industries. Of course, I could directly include person- and firm-fixed effects in equation (3.4). However, the relatively small number of observations per person and per firm would be a very serious problem affecting all other coefficients. Therefore, I chose to use in equation (3.4) these effects as estimated from (3.1). Coefficients presented in all Tables are therefore estimated in the panel dimension since I control for the unobserved, **but measured**, heterogeneity on the worker side as well as measured heterogeneity on the firm side.[6]

Since quasi-rent and seniority are the only variables that must be instrumented when estimating the wage equation, it is useful to examine the instrumenting equations for these two variables. As explained previously, I instrument seniority with lagged export prices of US firms to 4 destinations: OECD countries, eastern European countries, oil producers, developing countries by manufacturing industry (by 3-digit industry). For instance, to instrument seniority in 1987, I use prices from 1985 and 1986. Note that I do not use all prices, but only those that passed the various exogeneity tests that I conducted.[7] Even though the detailed estimates are available from the author, since these regressions contain many regressors, I summarized the results in Tables A.2 and A.3 (in Appendix A). First, consider Table A.2 which presents results for the quasi-rent. Because export prices should be set on the global market, export prices for US firms should be correlated with export prices for French firms. Abowd and Allain (1996) provide such evidence but the correlation is not perfect, though. If it were, most coefficients should be positive in this regression: an increase in price for American firms means better profit conditions for French firms. As can be seen in Table A.2, this is not always so. When export prices of US firms to OECD countries increase, quasi-rent in French firms indeed increase; French firms apparently benefit from these higher prices. At the opposite, when export prices to Eastern European countries in-

[6] I will discuss results that include a person fixed effect (unobserved) when presenting the robustness of my estimates.

[7] This explains why the years used in Table 2 (and following) differ from those of Table 1: prices between 1981 and 1984 were not informative to instrument seniority and firm-level variables.

crease, quasi-rent of French firms decrease; a potential proof of increased import competition. More clearly, an increase in export prices to oil-producing countries is likely to reflect an increase in oil prices, directly affecting (negatively) profits in France. Now, consider Table A.3 which presents results for seniority. Increased competition should translate into decreased seniority, and conversely. And seniority increases when export prices of US firms to OECD countries increase, as observed for quasi-rent. However, for most destinations and dates, coefficients are positive. Hence, an increase in the price of exports of US firms to such destinations tend to increase seniority. These results are therefore not entirely consistent with those observed for the quasi-rent; as previously mentioned, estimates surely reflect various phenomena with no unique interpretation. At this stage, the large number of coefficients that are significantly different from zero is a very good indication of the usefulness of these instruments. The F-statistics for the nullity of these instruments is reported in Table 2. The Sargan statistics (distributed as a chi-square with appropriate degrees of freedom) that tests the statistical validity of the instruments is reported in each table.

4. Estimation Results

4.1. $\theta \simeq 0.20$

Table 2 presents the estimates of the bargaining equation (3.4) where quasi-rent and seniority are both instrumented. As before, there are two columns, using my two measures of the quasi-rent. For each estimate, I provide two sets of standard errors. Robust standard errors are given between parentheses. Standard errors that account for clustering at the 3-digit industry level are given between brackets. Quasi-rent, seniority and its square are instrumented using my measures of product market conditions - export prices (industry-level unitary values measured in US dollars of American firms) - and the other control variables. One potential concern is the weak instruments bias (see Bound, Jaeger, and Baker, 1995 and Staiger and Stock, 1997). Hence, I also present the F-statistics that tests the nullity of the instruments in the first-stage regression. These values are large and should therefore not be affected by the weak instruments problem. The bargaining coefficient obtained from IV estimates is quite similar to that obtained using OLS. However, the seniority coefficients change dramatically when going from OLS estimates to IV estimates. To understand these results, remember that the equation is estimated in levels, as it should be, given the structural model. Hence, I obtain

direct estimates of the bargaining parameter, 0.20, roughly half of those obtained for France by Abowd and Allain (1996) and Abowd and Kramarz (1993) using firm-level equations or those obtained for Canada by Abowd and Lemieux (1993), but much larger than those obtained by Blanchflower, Oswald, and Sanfey (1996). In an unreported regression, I find that estimation of the logarithmic approximation of (3.4) yields estimates that are in the same ballpark as those found by these last authors. I therefore believe that their low estimates of workers' bargaining power comes from a potential misspecification of the equation of interest.

4.2. The returns to seniority and the selection of the "best"

Coming back to the seniority coefficients, it appears that they are much larger (more negative) in the IV estimates than in the OLS version. Are these estimates credible? Equation (3.4) is estimated in levels of annual earnings (thousands of 1980 French Francs). For all levels of seniority below 14 years, returns are decreasing. Wage increases due to pure seniority effects start at 14 years and those increases then go up with seniority (5,000 Francs at 18 years for instance). Should we believe that returns to seniority are decreasing in France for as long as 14 years despite the fact that returns to experience accumulate during this time ? Three answers can be provided at this point. First, the estimates are not very precise. Second and more importantly, returns to experience are increasing, in particular during the first years of labor market experience. The total effect – experience plus seniority – is increasing for most of the population but for those with wage close to the minimum wage. For those workers, compensation may stay quite close to the minimum wage, the SMIC, for long periods of time. Hence, the compensation profile of these persons should be quite flat. By way of consequence, if wages increase because of accumulated experience, returns to seniority should adjust to generate this observed flatness. This result is confirmed by Abowd, Kramarz, and Margolis (1999) who show that, allowing for heterogeneity across firms, average returns to seniority are roughly equal to zero in France, with many firms having negative returns. Second, and directly related to our model, these returns, although imprecisely estimated, give us evidence on the selection process operating in manufacturing firms that face import competition. Not controlling for selection, returns are essentially zero. Hence, workers who remain in the firm are obviously the "best" workers, i.e. those with the largest wage growth.

4.3. Hold-up and competition matter

Table 2 also gives estimates of the impact of import competition as derived from my structural equation (3.4). Remember that, from the model, a positive sign on the firm's own imports is expected if these imports allow workers to grab a part of this "investment". In addition, coefficients on the "competitors" variables should tell us how workers' outside options are affected when foreign trade is active in the industry, either because firms outsource their production themselves or because wholesale or retail trade firms import foreign goods. I include two types of "competitors" variables: levels should capture growth in the industry whereas the shares should capture substitution between local and foreign production. Notice that the resulting estimates "within-industry" since I control for 3-digit industry indicators (my competition measures are time-varying). Results of this table can be summarized as follows:

- Hold-up matters. Workers employed by a manufacturing firm that imports are better compensated than those who are employed in a non-importing manufacturing firm. Imports are measured as a fraction of production or purchases to eliminate size effects and to capture the respective magnitudes of outsourcing and local production.

- Competition matters. Workers employed in industries where firms import (finished) goods – a good is a product in the same 3-digit industry as the firm's – actively (as a share of their production) are negatively affected. In addition, imports of intermediates (an intermediate is a product in a different 3-digit industry as the firm's) by competitors has a positive impact on workers' wages. An interpretation of these results is provided by the bargaining model. When many firms import (finished) goods, outside options (the threat point) are decreased because alternative employment options diminish whereas they are potentially increased when firms import intermediates.[8]

- The total of the two effects for (finished) **goods** is **negative** for most workers employed in the manufacturing industries. More precisely, 50 percent (resp. 75 percent) of workers are employed in firms that import less

[8] The use of the 99th centile of the distribution of the ratio imports/production or purchases is justified by the extreme skewness of the distribution **within** each industry. And the median is almost always zero and the variation of the mean across industries is not informative.

than a thousandth (a hundredth) of their production. The average 99th centile of this ratio being equal to 0.4, workers lose around 1,600 French Francs from "import of goods" competition in the average industry and 50 percent (resp. 75 percent) of workers gain at most 30 French Francs (resp. 300 French Francs) from hold-up.

- Competition from the trade industry – trade firms importing goods in the same 3-digit industry as the firm's – does not seem to affect workers' compensation very strongly, and if an effect is present, it is positive.

Table 3 presents robustness results. I use the two measures of the quasi-rent and other measures of competition based on the 90th and the 95th percentiles of imports in the industry. Results are very similar to those described in Table 2. In unreported results, to further test robustness of my estimates, I estimate equation (3.4) where, in addition to the estimated person effect interacted with the various person characteristics, I introduce a dummy for each person (a person fixed-effect). Notice that, as forcefully shown in Abowd, Kramarz, and Margolis (1999), this person fixed effect not only captures person heterogeneity but also firm-heterogeneity. Therefore, this should bias the estimates for the firm-level variable in the equation. And, indeed, the estimated returns to seniority are negative and exactly identical to those obtained in Tables 2 and 3. But, the bargaining power θ (the coefficient on the quasi-rent variable) decreases to 0.03 (highly significant). This result is not surprising because this "fixed person-effect" is in fact a person plus the average firm effect of the firms at which the worker was employed. Hence, the coefficient on the quasi-rent is biased (see the formulas in Abowd, Kramarz, and Margolis, 1999).

Since my equation uses worker-level data, I can very easily focus on specific categories of workers. Table 4 presents estimates for three levels of education and for workers born outside France. The bargaining power is increasing in education – a result also found by Abowd and Kramarz (1993) for high-skill workers with totally different methods and sources – even though the estimate for workers born outside France, generally low-skilled immigrants, appears to be relatively large. By contrast, the hold-up effect mostly comes from high-school education workers. In addition, these high-school education workers are those most adversely affected by competitors' imports of goods. Finally, considering returns to seniority, they also get the most negative (all others are not significantly different from zero). Globalization has obviously affected these workers **directly** through selection and import competition. On the contrary, high-education workers benefit

from increased competition and imports. Finally, and maybe surprisingly, the low-education workers (of French or foreign origin) appear to be relatively unaffected by import competition or selection. One potential explanation is that globalization affected those workers in an earlier period. Those remaining are employed in jobs that cannot be eliminated without closing the plant.

Table 5 has the same format as Table 4 but I analyze three experience groups (20 years and above, between 6 and 19 years, 5 years and below). Bargaining power is much higher for those workers with shorter experience. But, the benefits of hold-ups induced by imports of goods and intermediates are only captured by the most experienced workers. However, workers with more than 5 years experience are also those who suffer most from imports of goods by industry competitors when the young appear to be insulated from this competition. To summarize, competition and firm direct imports affect differently workers in these different age groups. For instance, older workers are the unique beneficiaries of hold-ups but are those most affected by import competition of (finished) goods and by selection (their returns to seniority are the only one to be significantly different from zero, negative in fact) .

Finally, Table 6 presents estimates of equation (3.4) where the countries of origin of the imports are distinguished. The first column presents results for the whole population whereas the remaining columns show results for the three education groups and those born out of France. Four groups of countries are contrasted: Europe, other OECD countries, low-wage countries close to France (Maghreb and Eastern Europe countries), low-wage countries far away from France (China, India, NIC, among others). Indeed, the origin of imports matters, even though effects are not precisely estimated. Contrasting European countries with other OECD countries and close low-wage countries with far-away low-wage countries, we see that coefficients on firm's imports is always larger for the latter, other OECD and far-away low-wage countries than for the former. Distance matters. Note though that low-education workers do not benefit from distance. This is particularly striking when compared with the high-education group[9] who benefit more than any other group from imports from far-away low-wage countries or other OECD countries of their employing firm. If we believe that distance favors networks over markets in importing, then these results are directly interpretable

[9]I do not present these results in Table 6 because the price instruments do not seem to be very good for this group, even though I am able to come up with impeccable chi-square statistics. In fact, the first-stage F statistics is too low (around 3). However, the result that I just mentioned is very stable (with different set of instruments or OLS).

using Rauch (1999)'s ideas. All the more so that those workers who benefit less (resp. most) from these network effects are, in conformity with sociological evidence, the high-school dropouts (resp. highly educated) who speak less (resp. more) languages and are less (resp. more) mobile.

5. Conclusion

In this paper, I present the first direct micro-econometric evidence of the relation between individual wages and the import behavior of French firms (see Bertrand, 1999 and Goldberg and Tracy, 2001 for evidence in the United States based on industry-level measures of import competition). To accomplish this task, I have first derived wage equations from a bargaining model that allows the analyst to examine the impact of firms imports on the workers and firms bargaining positions. To estimate this model, I have used a unique matched employer-employee data source that contains information on firms inputs, including imports by type of product and by country of origin, as well as individual characteristics of a representative sample of workers employed at those firms. I estimate the structural person-level equation induced by the bargaining model, in which wages are taken in levels not logarithms. In contrast to previous approaches, in particular the various papers by Abowd, endogeneity issues are not only due to the presence of the quasi-rent - a firm-level variable - in the wage equation but from seniority - a person-level variable directly affected by competition and firm's strategic choices such as importing. Trade has a direct impact on workers' mobility and the associated job loss probability. Of course, the size of the quasi-rent is directly affected by international trade. My results show that the effects of trade go **beyond** movements in the quasi-rent. Estimates show that worker's compensation is directly affected by the firm's import behavior and import competition.

To summarize my results, I find a bargaining power around 0.20, half the power estimated using firm-level equations, but larger than the one estimated in logarithms, a result I also find in unreported regressions. I also show that workers' wages deteriorate through competitive pressures. Two effects are at play. In industries where competitors of their employing firm actively import (finished) goods, workers' wage is decreased. But, firm's own imports of these (finished) goods "protect" workers through the so-called hold-up effect. The total effect is negative for most workers. The impact of import competition on mobility and workers' selection is strong. My results show that manufacturing firms keep their best workers. When taking this selection effect into account, estimated returns to

seniority decrease and even become negative. All these results are robust to the various specification checks that I conducted.

The use of matched employer-employee data sources also allows me to examine specific categories of workers. And, the situation of highly educated workers who appear to benefit from trade stands in stark contrast with that of less educated workers, in particular those with a high-school degree. Also, very experienced workers, when still employed in manufacturing firms, benefit from the hold-up effect induced by imports of (finished) goods by their employing firm but are those most affected by the firm's competitors imports of (finished) goods and the induced selection effect.

This direction of research – the search for direct effects on workers of firms decisions – is quite new. I hope to have shown some of its potential.

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Appendix A: Derivation of the Bargaining Model When Workers' Characteristics Matter

Let us consider the program of a firm j which employs L_{jt} workers at date t. Assume that each individual worker i has a set of characteristics z_{it}, observed by i's employing firm j. Denote l_j the measure of these characteristics within the firm defined on the space $\mathcal{X}_{jt}$. Hence, $l_{jt} = \int_{\mathcal{X}_{jt}} l_j(z_{it})dz_{it}$. Then, the profit function of the firm of employing these workers is :

$$\pi_{jt} = p_{jt}f(l_{jt}) - \int_{\mathcal{X}_{jt}} w_{it}(z_{it})l_j(z_{it})dz_{it} \tag{5.1}$$

where $w_{it}(z_{it})$ is the wage paid to a worker with characteristics z_{it} and p_{jt} is the price of the good produced by j at t. This price reflects product market conditions and could also incorporate technology characteristics. Therefore, $WB = \int_{\mathcal{X}_{jt}} w_{it}(z_{it})f(z_{it})dx_{it}$, are the total labor costs. When the firm and workers bargain efficiently over wages and employment, the following static objective is a natural extension of the classic model :

$$\max_{w(.),l_j(.)} \left[(1-\theta_j)\ln \pi_{jt} + \int_{\mathcal{X}_{jt}} \theta_j(z_{it}) \ln\left[(w_{it}(z_{it}) - w^a_{it}(z_{it}))l_j(z_{it})\right] dz_{it} \right] \tag{5.2}$$

where $\int_{\mathcal{X}_{jt}} \theta_j(z_{it})dz_{it} = \theta_j$ and where $w^a_{it}(z_{it})$ denotes worker i's alternative wage. The objective has two parts: one for the firm, the other one for the workers. This setup corresponds to a bargaining game between all parties, the firm and the workers bargain with the firm but also between themselves over their share of the rent $w_{it}(z_{it}) - w^a_{it}(z_{it})$ given their characteristics z_{it} and bargaining power $\theta_j(z_{it})$. As usual in this setup, the threat points are respectively zero profits for the firm and the workers' alternative wage (opportunity cost of time). The major difference with the classic model is the replacement of $\theta_j \ln\left[l_j(w_j - w^a_j)\right]$ where w_j denotes some measure of the average wage at the firm j and w^a_j some measure of the opportunity wage of the workers employed at the same firm by the integral $\int_{\mathcal{X}_{jt}} \theta_j(z_{it}) \ln\left[(w_{it}(z_{it}) - w^a_{it}(z_{it}))l(z_{it})\right] dz_{it}$ that captures the potential differences in bargaining power across workers at the firm (see Osborne and Rubinstein, 1990, page 23 for the simplest extension to more than two players). After simple computations, first-order conditions are as follows

$$\begin{aligned} p_{jt}f'(l_{jt}) &= w^a_{it}(z_{it}) \\ w_{it}(z_{it}) &= w^a_{it}(z_{it}) + \pi^a_{jt}\frac{\theta_j(z_{it})}{l_j(z_{it})} \end{aligned} \tag{5.3}$$

where π^a_{jt} denotes the total quasi-rent

$$\pi^a_{jt} = p_{jt}f(l_{jt}) - \int_{\mathcal{X}_{jt}} w^a_{it}(z_{it})l_j(z_{it})dz_{it} \tag{5.4}$$

To summarize the results, the equations that define the outcome of the bargaining are similar to those described, for instance in Abowd and Lemieux (1993), with the simple difference that the bargaining power depends on workers' characteristics.

Appendix B: Data Description

The Customs File: All movements of traded goods that enter or leave France are declared to the customs either by their owner or by the authorized customs commissioners. These declarations constitute the basis of all French trade statistics. Each movement - an operation - generates a record. All records are aggregated first at the monthly level. In the analysis file, these records are only available on an annual basis. They were aggregated at the firm-level using the firm identification number, the SIREN. Even though, each individual movement is present in the base files, the resulting files are not tractable. Hence, the analysis file contains for all exporting or importing firms and for all years, the amount of their total transactions in each year between 1986 and 1992 for each product of the NAP 100 classification (3-digit equivalent of the SIC code). Transactions are recorded in French Francs and measure the amount paid by the firm (i.e. including discounts, rebates,...). Even though our file is exhaustive - all export or import of goods are present - direct aggregation of all movements differ from published trade statistics, the latter being based on list prices. Furthermore, amounts are disaggregated by destinations for the exports and origins for the imports and by products (at the 3-digit classification level). The geographic classification is the most detailed possible since we know the exact country of origin or destination. In a previous analysis, I aggregated the data up to the following country classification:

(a) Germany (b) Spain, and Portugal (c) United Kingdom, Ireland (d) Italy (e) Benelux (f) Other EC countries (g) Switzerland (h) Eastern Europe countries (i) Turkey (j) Maghreb countries (k) Middle East countries (l) Other African countries (m) United States of America and Canada (n) Other American contries (o) India (p) China (q) Asian "Tigers" (Malaysia, Thailand, Taiwan,...) (r) Japan (s) Other countries. These groups of countries have been further aggregated for this particular study in 4 categories: European Community, Other OECD countries, Low-wage countries close to France (Eastern Europe and Maghreb), Other low-wage countries (referred in the tables as far-away low-wage countries) such as India, China,...

In addition, I define two groups of imported products. I compare the 3-digit industry of the imported good with the 3-digit industry of the importing firm. If they match, I call this import a "good". If not, I call this import an "intermediary consumption" (IC, as already defined).

The original file has 4,159,208 observations for the period 1986-1992. An observation contains the firm identifier, the year, the transaction value, the product, the origin or the destination. However, I do not know the price of the transaction.

To deflate our measures of firm-level trade, I use 4-digit import and export prices computed for three geographic zones (EC, OECD outside EC, outside OECD) by the statisticians from the French National Accounts.

OECD export prices: I also use export prices of US manufacturing firms. These price indices are based on OECD computations based on US customs declarations. They are unitary values indices computed as a weighted average of the ratio of either transaction values or list values to quantities declared by American exporters. All these values are expressed in US dollars. These indices were aggregated at INSEE from the CTCI classification to the 3-digit level used in the French NAP (nomenclature d'activités et de produits, 1973) and are available for four destinations: developed countries including in particular OECD countries; countries from eastern Europe; countries from OPEC; and developing countries. These series are available for the years 1961 to 1992 even though I will restrict to the years 1981 to 1986 (INSEE, 1993).

BAL-SUSE: The BAL-SUSE database is constructed from the mandatory reports of French firms to the fiscal administration. These reports are then transmitted to INSEE where controls and confrontation with various other data sources (such as the EAE, Enquête Annuelle d'Entreprises) are made. All firms subject to the Bénéfices Industriels et Commerciaux regime (a fiscal regime mandatory for all firms with a turnover above 3,000,000FF in 1990 and 1,000,000FF in 1990 in the service industries) are included. Roughly 2,000,000 firms are present each year in the database. In 1990, these firms comprised more than 60% of the total number of firms in France whereas their turnover comprised more than 94% of total turnover of firms in France. The analysis period is 1984 to 1992. Hence, the BAL-SUSE is dynamically representative of French enterprises in all sectors except the public sector. From this source, we use balance sheet information (total sales, total labor costs, total wage-bill, sales,value-added, total purchases, total assets, full-time employment, and, finally, the dates of creation and of death, if any). The total number of observations is greater than 13,000,000. To deflate those variables, I use various industry-level prices, production, value-added, and wages. All these prices come from French National Accounts using a 2-digit level of aggregation (24 manufacturing industries, in the NAP classification).

Since the Customs file contains only information on the trade of goods – nothing on services – we will essentially focus on firms from the manufacturing sectors as well as on firms of the trade (retail or wholesale) sectors that may import goods in place of manufacturing firms and, therefore, act as competitors of these manufacturing firms.

The data on workers come from two data sources, the Déclarations Annuelles de Données Sociales (DADS) and the Echantillon Démographique Permanent (EDP) that are matched. The DADS is a longitudinal dataset based on firm declarations of individual wages to the fiscal administration. An extract of the original information is sent to the French statistical institute (INSEE) for statistical purposes. It consists of a 1/25th sample of the individuals based on their date of birth (october of an even year). Information is available whenever these individuals are employed by a firm of the private or the semi-public sector in any given year. Our sample period goes from 1976 to 1996. Data were not computerized both in 1981, 1983, and 1990. The EDP is a collection of sociodemographic information on individuals and their families. It comes from the various Censuses (1968, 1975, 1982, and 1990) and from the registers of the Civil Status which collect data on births, deaths, marriages.

The DADS data set: Our main data source is the DADS, a large collection of matched employer-employee information collected by INSEE (Institut National de la Statistique et des Etudes Economiques) and maintained in the Division des revenus. The data are based upon mandatory employer reports of the gross earnings of each employee subject to French payroll taxes. These taxes apply to all "declared" employees and to all self-employed persons, essentially all employed persons in the economy.

The Division des revenus prepares an extract of the DADS for scientific analysis, covering all individuals employed in French enterprises who were born in October of even-numbered years, with civil servants excluded.[10] Our extract runs from 1976 through 1996, with 1981, 1983, and 1990 excluded because the underlying administrative data were not sampled in those years. Starting in 1976, the division revenus kept information on the employing firm using the newly created SIREN number from the SIRENE system. However, before this date, there was no available identifier of the employing firm. Each observation of the initial dataset corresponds to a unique individual-year-establishment combination. The observation in this initial DADS file includes an identifier that corresponds to the employee (called ID below) and an identifier that corresponds to the establishment (SIRET) and an identifier that corresponds to the parent enterprise of the establishment (SIREN). For each observation, we have information on the number of days during the calendar year the individual worked in the establishment and

[10] Meron (1988) shows that individuals employed in the civil service move almost exclusively to other positions within the civil service. Thus the exclusion of civil servants should not affect our estimation of a worker's market wage equation.

the full-time/part-time status of the employee. For each observation, in addition to the variables mentioned above, we have information on the individual's sex, date and place of birth, occupation, total net nominal earnings during the year and annualized net nominal earnings during the year for the individual, as well as the location and industry of the employing establishment. The resulting data set has 13,770,082 observations.

The Echantillon Démographique Permanent: The division of Etudes Démographiques at INSEE maintains a large longitudinal dataset containing information on many sociodemographic variables of all French individual. All individuals born in the first four days of the month of October of an even year are included in this sample. All questionaires for these individuals from the 1968, 1975, 1982, and 1990 Censuses are gathered into the EDP. Since the exhaustive long-forms of the various Censuses were entered under electronic form only for a fraction of the population leaving in France (1/4 or 1/5 depending on the date), the division des Etudes Démographiques had to find all the Censuses questionaires for these individuals. The INSEE regional agencies were in charge of this task. But, not all information from these forms were entered. The most important sociodemographic variables are however available.[11]

For every individual, education measured as the highest diploma and the age at the end of school are collected. Since the categories differ in the three Censuses, we first created eight education groups (identical to those used in Abowd, Kramarz, and Margolis, 1999) that are later aggregated in three education groups, labelled low-, medium-, and high-education. The following other variables are collected: nationality (including possible naturalization to French citizenship), country of birth, year of arrival in France, marital status, number of kids, employment status (wage-earner in the private sector, civil servant, self-employed, unemployed, inactive, apprentice), spouse's employment status, information on the equipment of the house or appartment, type of city, location of the residence (region and department). At some of the Censuses, data on the parents education or social status are collected.

In addition to the Census information, all French town-halls in charge of Civil Status registers and ceremonies transmit information to INSEE for the same individuals. Indeed, any birth, death, wedding, and divorce involving an individual of the EDP is recorded. For each of the above events, additional information on the date as well as the occupation of the persons concerned by the events are collected.

[11] Notice that no earnings or income variables have ever been asked in the French Censuses.

Finally, both Censuses and Civil Status information contain the person identifier (ID) of the individual.

Creation of the Matched Data File: Based on the person identifier, identical in the two datasets (EDP and DADS), it is possible to create a file containing approximately one tenth of the original 1/25th of the population born in october of an even year, i.e. those born in the first four days of the month. Notice that we do not have wages of the civil-servants (even though Census information allows us to know if someone has been or has become one), or the income of self-employed individuals. Then, this individual-level information is matched with the firm-level information. Because we focus on the imports of various goods, we keep all observations of individuals employed in a manufacturing firm at some point during the period 1986 to 1992. The resulting and final number of observations is 112,682 (when the first measure of quasi-rent is used) and 111,380 (when the quasi-rent with assets discounted) for whom all time-varying person and firm-level characteristics are non-missing.[12] Descriptive statistics are given in Table B.1.

[12] And outliers eliminated. Notice that less than a hundred observations have missing information on education. All programs are available from the author.

Table A.1: Using U.S. Export Prices to Instrument the Price of Value-Added in French Manufacturing

	Firm-Level Real Sales		
	(1)	(2)	(3)
	OLS	Firm Fixed Effects	IV (in 1st difference)
Price of Value-Added (Industry-level)	-0.5015	0.1555	0.4580
	(0.1046)	(0.0443)	(0.1756)
Wage (Industry-level)	2.3416	0.1664	0.4714
	(0.0535)	(0.0772)	(0.0811)
R-Square	0.0377	0.9673	0.0077
Number of Observations	60,197	60,197	42,402

Notes: Each observation is a firm-year. The prices and wages are measured at the 2-digit level (40 industries). The sample period is 1986-1992. Instruments for the industry-level price of value-added are export prices in US $ for the years 1981-1986 of US firms to 4 destinations.

Sources: BAL-SUSE, French National Accounts, OECD

Table A.2: Summary of the Signs and Significance of the Coefficients in the Regression of Quasi-Rent on U.S. Export Prices to Various Destinations

	Destination			
	Eastern Countries	OECD Countries	Petroleum Producers	Developing Countries
Year 1985	Always Negative	Always Positive	Always Negative	Always Negative
Year 1986	Negative	Always Positive	Most Positive, Once Negative	Always Positive
Year 1987	Always Negative	Always Positive	Once Positive, Once Negative	n.s.
Year 1988	n.s.	Always Positive	n.s.	n.s.
Year 1989	n.s.	Always Positive	n.s.	Negative

This Table reports the signs and significance of the instrumenting regression of quasi-rent on US export prices. n.s. means that the coefficients in that cell (country-year) are never significantly different from zero in the regression. Similarly for the other cells country-year. Always Positive means that the coefficients for that cell are often positive, significantly so, and sometimes not significantly different from zero. Positive means that they are sometimes positive, significantly so, and often not significantly different from zero. Similarly for negative signs. The regression also includes measures of the workers' employing firms imports, of the competitors imports, and experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate, the estimated person-effect, industry indicators (3-digit), and a full interaction of the person-effect with all previous variables (except seniority, import variables, and industry indicators). 111,380 person-year observations.
The sample period is 1986-1992.

Table A.3: Summary of the Signs and Significance of the Coefficients in the Regression of Seniority on U.S. Export Prices to Various Destinations

	Destination			
	Eastern Countries	OECD Countries	Petroleum Producers	Developing Countries
Year 1985	n.s.	Always Positive	Always Positive	Always Positive
Year 1986	Always Negative	Most Positive, Once Negative	Always Negative	Always Positive
Year 1987	Most Positive, Once Negative	Always Positive	n.s.	n.s.
Year 1988	Positive	n.s.	n.s.	n.s.
Year 1989	Positive	Always Positive	n.s.	n.s.

This Table reports the signs and significance of the instrumenting regression of seniority on US export prices. n.s. means that the coefficients in that cell (country-year) are never significantly different from zero in the regression. Similarly for the other cells country-year. Always Positive means that the coefficients for that cell are often positive, significantly so, and sometimes not significantly different from zero. Positive means that they are sometimes positive, significantly so, and often not significantly different from zero. Similarly for negative signs. The regression also includes measures of the workers' employing firms imports, of the competitors imports, and experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate, the estimated person-effect, industry indicators (3-digit), and a full interaction of the person-effect with all previous variables (except seniority, import variables, and industry indicators). 111,380 person-year observations.
The sample period is 1986-1992.

Table B.1: Descriptive Statistics

	Mean	Std Dev
Earnings	94.9813	94.8287
Quasi-Rent	83.1629	76.7386
Quasi-Rent (assets discounted)	72.9103	71.5158
(Imports of goods)/production	0.0559	0.1213
(Imports of IC)/(Local purchases)	0.1090	0.2058
(Imports of goods from Europe)/production	0.0412	0.0979
(Imports of goods from other OECD)/production	0.0069	0.0331
(Imports of goods from close low-wage countries)/production	0.0035	0.0253
(Imports of goods from far-away low-wage countries)/production	0.0043	0.0253
(Imports of IC from Europe)/local purchases	0.0842	0.1699
(Imports of IC from other OECD)/local purchases	0.0133	0.0556
(Imports of IC from close low-wage countries)/local purchases	0.0044	0.0311
(Imports of IC from far-away low-wage countries)/local purchases	0.0072	0.0379
Competitors imports of goods (99th perc.,sh. of production)	0.4180	0.2972
Competitors imports of IC (99th perc., sh. of local purchases)	0.4806	0.3003
Competitors imports of goods (99th perc., in level)	442594.4	1555874.0
Competitors imports of IC (99th perc., in level)	147449.3	442278.9
Imports of goods from the trade ind. (sh. of total purchases)	6.3927	5.5426
Imports of goods from the trade industry (total level)	2.4014	10.8722
Person-effect	0.8119	0.4610
Firm-effect	1.5363	1.1317
Experience	19.5901	11.4992
Seniority	8.3349	8.3874
Experience in France	0.6552	4.0437
Married	0.6010	0.4897
Leaves in couple	0.0628	0.2427
A child between 0 and 3	0.0957	0.2942
A child between 3 and 6	0.0877	0.2829
Leaves in Paris region	0.1228	0.3283
Part-time	0.0822	0.2747
Local unemployment rate	9.7351	2.2694
Male	0.6842	0.4649

Notes: Sources: DADS, EDP, Customs file and BAL. 1986-1992. Number of observations: 112,682 for quasi-rent; 111,380 for quasi-rent with assets discounted and other firm-level variables; 112,682 for person-level variables.

Table 1: Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports
The OLS View

	Wage Level	
	(1)	(2)
Quasi-Rent	0.1675	0.1779
	(0.0179)	(0.0192)
(Imports of goods)/production	25.7527	26.5634
	(10.6165)	(10.4539)
(Imports of IC)/(Local purchases)	18.8096	18.4185
	(5.0753)	(4.9315)
[(Imports of goods)/production]**2	-0.2432	-0.2473
	(0.0901)	(0.0883)
[(Imports of IC)/(Local purchases)]**2	-0.1097	-0.1066
	(0.0335)	(0.0334)
Competitors imports of goods (99th perc.,sh. of production)	-2.2859	-2.9064
	(1.9552)	(1.9486)
Competitors imports of IC (99th perc., sh. of local purchases)	3.7652	3.8492
	(1.5987)	(1.6043)
Competitors imports of goods (99th perc., in level)	-0.0010	-0.0009
	(0.0006)	(0.0006)
Competitors imports of IC (99th perc., in level)	0.0052	0.0055
	(0.0033)	(0.0031)
Imports of goods from the trade ind. (sh. of total purchases)	0.1793	0.2058
	(0.2287)	(0.2260)
Imports of goods from the trade industry (total level)	-0.0053	-0.0012
	(0.0201)	(0.0204)
Seniority	-0.4992	-0.5020
	(0.1538)	(0.1570)
Seniority-squared/10	0.1262	0.1272
	(0.0705)	(0.0715)
R-Square	0.3353	0.3340

Notes: 111,380 person-year observations. The sample period is 1986-1992. Regression (2) uses a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate, 3-digit industry indicators, the estimated person-effect, and a full interaction of the person-effect with all previous variables (except seniority and industry indicators). In all columns, the model is estimated by OLS. Robust standard errors are between parentheses.
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures.

Table 2: Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports.
Instrumenting Firms' Quasi-Rent and Workers' Seniority

	Wage Level	
	(1)	(2)
Quasi-Rent	0.1993	0.2212
	(0.0193)	(0.0219)
	[0.0364]	[0.0383]
(Imports of goods)/production	31.3016	32.4917
	(5.2344)	(5.2598)
	[9.1798]	[9.4534]
(Imports of IC)/(Local purchases)	24.0493	23.4162
	(4.6230)	(4.6934)
	[5.7858]	[5.9500]
[(Imports of goods)/production]**2	-0.2905	-0.2970
	(0.0440)	(0.0445)
	[0.0756]	[0.0781]
[(Imports of IC)/(Local purchases)]**2	-0.1404	-0.1361
	(0.0301)	(0.0306)
	[0.0334]	[0.0361]
Competitors imports of goods (99th perc.,sh. of production)	-2.9966	-4.0562
	(1.0072)	(1.0233)
	[2.5254]	[2.2944]
Competitors imports of IC (99th perc., sh. of local purchases)	3.7122	3.8616
	(0.8054)	(0.8162)
	[1.5832]	[1.5581]
Competitors imports of goods (99th perc., in level)	0.0001	0.0003
	(0.0005)	(0.0005)
	[0.0015]	[0.0015]
Competitors imports of IC (99th perc., in level)	0.0014	0.0010
	(0.0014)	(0.0014)
	[0.0066]	[0.0067]
Imports of goods from the trade ind. (sh. of total purchases)	0.1196	0.1389
	(0.0847)	(0.0853)
	[0.2163]	[0.2023]
Imports of goods from the trade industry (total level)	-0.0143	-0.0102
	(0.0159)	(0.0158)
	[0.0198]	[0.0221]
Seniority	-5.8943	-7.1116
	(1.6952)	(1.7393)
	[3.1354]	[2.9524]
Seniority-squared/10	1.8804	2.3738
	(0.7308)	(0.7496)
	[1.3089]	[1.2677]
Nullity of the Instruments for the Quasi-Rent (F-Statistics)	77.8	72.11
Nullity of the Instruments for Seniority (F-Statistics)	7.39	7.39
Chi-square (df=39)	48.1229	47.3190
Over-identification test (p-value)	0.1501	0.1694

Notes: 111,380 person-year observations. The sample period is 1986-1992. Regression (2) uses a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate, 3-digit industry indicators, the estimated person-effect, and a full interaction of the person-effect with all previous variables (except seniority and industry indicators). In all columns, the Quasi-rent, Seniority and Seniority-squared are instrumented by lagged export price indices of US firms to 4 destinations in US $ of the same industry as the employing firm. The chi-square tests the validity of the instruments. Robust standard errors are between parentheses. Robust standard errors allowing for clustering at the industry-level are between brackets.
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices.

Table 3: Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports
Robustness Checks
(Firms' Quasi-Rent and Workers' Seniority Instrumented)

	Quasi-Rent incl. Assets 90th perc. for Competitors (1)	Wage-Level Quasi-Rent, Assets discounted 90th perc. for Competitors (2)	Quasi-Rent, Assets discounted 95th perc. for Competitors (3)
Quasi-Rent	0.2130	0.2364	0.2379
	(0.0182)	(0.0209)	(0.0212)
	[0.0360]	[0.0368]	[0.0380]
(Imports of goods)/production	24.9400	26.8053	23.7140
	(6.3731)	(6.3783)	(6.3859)
	[10.9103]	[10.8181]	[11.1403]
(Imports of IC)/(Local purchases)	18.0589	18.0061	19.0685
	(4.7226)	(4.7691)	(4.8705)
	[8.9803]	[9.0234]	[8.1546]
[(Imports of goods)/production]**2	-0.2313	-0.2417	-0.2270
	(0.0537)	(0.0540)	(0.0533)
	[0.0868]	[0.0860]	[0.0866]
[(Imports of IC)/(Local purchases)]**2	-0.1058	-0.1043	-0.1110
	(0.0301)	(0.0305)	(0.0311)
	[0.0527]	[0.0545]	[0.0497]
Competitors imports of goods (90 or 95 th perc.,sh. of production)	-9.0490	-11.5734	-2.2699
	(3.2039)	(3.2552)	(2.1544)
	[5.1647]	[5.3313]	[4.7815]
Competitors imports of IC (90 or 95th perc., sh. of local purchases)	9.8868	8.8493	2.7245
	(4.7349)	(4.7892)	(3.5968)
	[7.6876]	[8.4155]	[3.3161]
Competitors imports of goods (90 or 95th perc., in level)	0.0047	0.0134	0.0049
	(0.0119)	(0.0118)	(0.0054)
	[0.0078]	[0.0064]	[0.0065]
Competitors imports of IC (90 or 95th perc., in level)	0.0096	0.0080	0.0047
	(0.0115)	(0.0117)	(0.0069)
	[0.0256]	[0.0256]	[0.0127]
Imports of goods from the trade ind. (sh. of total purchases)	0.1761	0.1768	0.1547
	(0.0854)	(0.0867)	(0.0833)
	[0.2856]	[0.2586]	[0.2193]
Imports of goods from the trade industry (total level)	-0.0188	-0.0146	-0.0146
	(0.0154)	(0.0153)	(0.0153)
	[0.0230]	[0.0267]	[0.0310]
Seniority	-5.9274	-7.6506	-7.3868
	(1.6180)	(1.6375)	(1.6524)
	[3.2373]	[3.0211]	[2.9392]
Seniority-squared/10	2.3012	2.9447	2.7774
	(0.6016)	(0.6143)	(0.6181)
	[0.9941]	[0.9834]	[1.0308]
Chi-square (df=41)	50.81	50.72	49.50
Over-identification test (p-value)	0.1401	0.1420	0.1704

Notes: 111,380 person-year observations. The sample period is 1986-1992. Regressions (2) and (3) use a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate,3-digit industry indicators, the estimated person-effect, and a full interaction of the person-effect with all previous variables (except seniority and industry indicators). In all columns, the Quasi-rent, Seniority and Seniority-squared are instrumented by lagged export price indices of US firms to 4 destinations in US $ of the same industry as the employing firm. The chi-square tests the validity of the instruments. Robust standard errors are between parentheses. Robust standard errors allowing for clustering at the industry-level are between brackets.
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices.

Table 4: Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports By Education and Country of Origin
(Firms' Quasi-Rent and Workers' Seniority Instrumented)

	Wage Level			
	High-School Dropouts	High-School Education	College Education	Born Out of France
Quasi-Rent	0.1423	0.1639	0.2776	0.2306
	(0.0197)	(0.0274)	(0.0548)	(0.0499)
	[0.0478]	[0.0440]	[0.0631]	[0.0821]
(Imports of goods)/production	18.2007	34.9523	9.7728	2.2723
	(4.6749)	(6.8400)	(19.8942)	(15.8553)
	[10.5086]	[11.4778]	[21.2655]	[19.3671]
(Imports of IC)/(Local purchases)	22.2432	24.9130	-4.3806	17.7155
	(4.0927)	(8.1633)	(14.1395)	(12.5607)
	[6.1909]	[8.6542]	[17.3188]	[16.5020]
[(Imports of goods)/production]**2	-0.1707	-0.2823	-0.0774	-0.0013
	(0.0424)	(0.0589)	(0.1659)	(0.1302)
	[0.0853]	[0.0973]	[0.1640]	[0.1337]
[(Imports of IC)/(Local purchases)]**2	-0.1252	-0.1780	0.0722	-0.1039
	(0.0246)	(0.0557)	(0.1068)	(0.0735)
	[0.0323]	[0.0600]	[0.1262]	[0.0894]
Competitors imports of goods (99th perc.,sh. of production)	-2.0482	-6.5044	1.0452	1.2320
	(1.1028)	(1.7746)	(3.0522)	(3.5831)
	[2.3127]	[2.6425]	[4.3686]	[7.1365]
Competitors imports of IC (99th perc., sh. of local purchases)	2.6202	4.0613	6.2504	4.3805
	(0.7824)	(1.5667)	(2.6308)	(2.3223)
	[2.3903]	[1.9285]	[2.4266]	[3.3254]
Competitors imports of goods (99th perc., in level)	0.0011	0.0000	-0.0020	-0.0020
	(0.0007)	(0.0006)	(0.0009)	(0.0015)
	[0.0016]	[0.0013]	[0.0018]	[0.0018]
Competitors imports of IC (99th perc., in level)	0.0040	0.0003	0.0037	0.0114
	(0.0021)	(0.0017)	(0.0032)	(0.0052)
	[0.0061]	[0.0060]	[0.0060]	[0.0066]
Imports of goods from the trade ind. (sh. of total purchases)	0.2134	-0.1259	0.0087	-0.3094
	(0.0767)	(0.1870)	(0.2137)	(0.2693)
	[0.2124]	[0.2302]	[0.3862]	[0.4394]
Imports of goods from the trade industry (total level)	0.0072	-0.0168	-0.0621	-0.0024
	(0.0198)	(0.0222)	(0.0490)	(0.0826)
	[0.0256]	[0.0186]	[0.0532]	[0.0342]
Seniority	-2.2607	-9.6050	5.0745	7.2222
	(1.8675)	(2.3340)	(6.1545)	(3.8635)
	[2.6790]	[2.4338]	[4.4232]	[4.8157]
Seniority-squared/10	0.2095	3.4609	-0.4044	-3.2024
	(0.7007)	(1.0140)	(2.7156)	(1.4212)
	[1.1372]	[1.1874]	[2.7102]	[1.8491]
Chi-square (df=39)	22.17	17.99	21.54	30.24
Over-identification test (p-value)	0.9861	0.9984	0.9895	0.8415
Number of Observations:	50,393	43,922	17,065	6,799

Notes: The sample period is 1986-1992. Regressions use a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate,3-digit industry indicators, the estimated person-effect, and a full interaction of the person-effect with all previous variables (except seniority and industry indicators). In all columns, the Quasi-rent, Seniority and Seniority-squared are instrumented by lagged export price indices of US firms to 4 destinations in US $ of the same industry as the employing firm. The chi-square tests the validity of the instruments. Robust standard errors are between parentheses. Robust standard errors allowing for clustering at the industry-level are between brackets.
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices.

Table 5: Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports By Experience Levels
(Firms' Quasi-Rent and Workers' Seniority Instrumented)

	Wage Level		
	Experience, 20 years and above	Experience, bet. 5 and 20 years	Experience, 5 years and below
Quasi-Rent	0.1685	0.2416	0.2455
	(0.0234)	(0.0498)	(0.0388)
	[0.0507]	[0.0413]	[0.0442]
(Imports of goods)/production	43.7262	18.5009	-8.5910
	(8.6351)	(7.0055)	(7.4236)
	[14.0055]	[6.1633]	[9.9740]
(Imports of IC)/(Local purchases)	41.6120	-5.5817	-2.7293
	(6.6545)	(6.1505)	(6.0186)
	[5.6778]	[7.7348]	[10.4089]
[(Imports of goods)/production]**2	-0.4101	-0.1536	0.0399
	(0.0756)	(0.0561)	(0.0597)
	[0.1185]	[0.0518]	[0.0928]
[(Imports of IC)/(Local purchases)]**2	-0.2406	0.0381	-0.0029
	(0.0423)	(0.0449)	(0.0353)
	[0.0352]	[0.0543]	[0.0549]
Competitors imports of goods (99th perc.,sh. of production)	-4.7280	-3.3804	2.8530
	(1.6532)	(1.2197)	(1.9481)
	[3.0916]	[2.2912]	[2.5777]
Competitors imports of IC (99th perc., sh. of local purchases)	3.7618	4.8387	2.3093
	(1.3366)	(0.9765)	(1.6680)
	[1.9316]	[1.4566]	[1.5743]
Competitors imports of goods (99th perc., in level)	0.0002	-0.0016	-0.0009
	(0.0007)	(0.0007)	(0.0006)
	[0.0013]	[0.0010]	[0.0012]
Competitors imports of IC (99th perc., in level)	-0.0004	0.0089	0.0093
	(0.0021)	(0.0019)	(0.0024)
	[0.0046]	[0.0036]	[0.0055]
Imports of goods from the trade ind. (sh. of total purchases)	0.1581	0.2062	0.0487
	(0.1424)	(0.1023)	(0.2022)
	[0.3050]	[0.2252]	[0.3192]
Imports of goods from the trade industry (total level)	0.0020	-0.0088	-0.0436
	(0.0213)	(0.0247)	(0.0431)
	[0.0166]	[0.0205]	[0.0348]
Seniority	-4.2058	1.9591	-4.8598
	(1.9384)	(2.5945)	(11.3516)
	[2.7771]	[3.8647]	[11.9107]
Seniority-squared/10	1.3548	-1.6146	9.6794
	(0.7425)	(1.7006)	(22.4539)
	[1.2083]	[1.8766]	[20.1868]
Chi-square (df=39)	37.96	44.88	23.60
Over-identification test (p-value)	0.5170	0.2389	0.9755
Number of Observations	55,196	42,032	14,152

Notes: The sample period is 1986-1992. Regressions use a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate,3-digit industry indicators, the estimated person-effect, and a full interaction of the person-effect with all previous variables (except seniority and industry indicators). In all columns, the Quasi-rent, Seniority and Seniority-squared are instrumented by lagged export price indices of US firms to 4 destinations in US $ of the same industry as the employing firm. The chi-square tests the validity of the instruments. Robust standard errors are between parentheses. Robust standard errors allowing for clustering at the industry-level are between brackets.
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices.

Table 6: Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports
Does the Country of Origin of Imports Matter ?
(Firms' Quasi-Rent and Workers' Seniority Instrumented)

	Wage Level			
	Full Sample	Experience, 20 years and above	Experience, bet. 5 and 20 years	High-School Dropouts
Quasi-Rent	0.2215	0.2006	0.2395	0.1788
	(0.0212)	(0.0222)	(0.0495)	(0.0200)
	[0.0412]	[0.0468]	[0.0412]	[0.0426]
(Imports of goods from European countries)/production	27.8506	44.9507	16.0984	17.8596
	(6.0354)	(10.2317)	(7.9793)	(4.9005)
	[9.7647]	[15.8164]	[5.1385]	[10.2503]
(Imports of goods from other OECD countries)/production	37.9946	44.2497	25.8600	6.8188
	(6.2940)	(10.0687)	(9.1401)	(6.8391)
	[16.8831]	[15.0201]	[18.5891]	[12.9177]
(Imports of goods from close low-wage countries)/production	21.5399	28.5953	15.9067	23.6371
	(9.4109)	(20.3445)	(11.7110)	(11.4069)
	[8.2747]	[19.6395]	[10.2068]	[14.3781]
(Imports of goods from far-away low-wage countries)/production	33.1639	29.3563	33.1589	22.8010
	(7.6565)	(14.5052)	(10.2398)	(10.9277)
	[11.0633]	[18.5690]	[16.7411]	[16.7040]
(Imports of IC from European countries)/(Local purchases)	21.4328	42.1347	-5.7301	21.2586
	(4.4500)	(6.7233)	(5.4405)	(3.9646)
	[7.2179]	[6.9658]	[7.3763]	[5.8319]
(Imports of IC from other OECD countries)/(Local purchases)	20.6793	41.7207	-10.1888	28.7614
	(7.4503)	(11.2067)	(10.7621)	(8.1848)
	[6.4613]	[11.9436]	[12.1854]	[14.1765]
(Imports of IC from close low-wage countries)/(Local purchases)	16.4485	17.4860	16.0188	25.9995
	(6.8521)	(7.5904)	(15.9993)	(9.3205)
	[7.1213]	[8.1726]	[13.4760]	[7.0632]
(Imports of IC far-away low-wage countries)/(Local purchases)	20.8523	49.8102	-14.3944	23.6833
	(7.7396)	(11.9650)	(10.4993)	(7.3687)
	[15.1242]	[18.4726]	[16.9562]	[12.3374]
[(Imports of goods)/production]**2	-0.2663	-0.4056	-0.1518	-0.1709
	(0.0439)	(0.0744)	(0.0575)	(0.0438)
	[0.0668]	[0.1125]	[0.0452]	[0.0789]
[(Imports of IC)/(Local purchases)]**2	-0.1233	-0.2419	0.0427	-0.1280
	(0.0300)	(0.0421)	(0.0449)	(0.0253)
	[0.0415]	[0.0361]	[0.0560]	[0.0338]
Competitors imports of goods (99th perc.,sh. of production)	-3.7391	-4.8068	-3.5343	-2.1691
	(1.0125)	(1.6633)	(1.2083)	(1.1025)
	[2.1555]	[3.1044]	[2.2932]	[2.4121]
Competitors imports of IC (99th perc., sh. of local purchases)	3.9938	3.7736	4.7709	2.6581
	(0.8036)	(1.3251)	(0.9717)	(0.7954)
	[1.4815]	[1.8532]	[1.4034]	[2.4173]
Competitors imports of goods (99th perc., in level)	-0.0001	0.0005	-0.0017	0.0014
	(0.0005)	(0.0007)	(0.0007)	(0.0007)
	[0.0015]	[0.0015]	[0.0011]	[0.0017]
Competitors imports of IC (99th perc., in level)	0.0022	-0.0015	0.0090	0.0020
	(0.0013)	(0.0020)	(0.0019)	(0.0021)
	[0.0056]	[0.0048]	[0.0036]	[0.0069]
Imports of goods from the trade ind. (sh. of total purchases)	0.1394	0.1296	0.1999	0.1733
	(0.0838)	(0.1424)	(0.1003)	(0.0748)
	[0.2004]	[0.2656]	[0.2260]	[0.1848]
Imports of goods from the trade industry (total level)	-0.0099	-0.0029	-0.0097	0.0037
	(0.0155)	(0.0210)	(0.0245)	(0.0204)
	[0.0210]	[0.0184]	[0.0202]	[0.0283]
Chi-square (df=41)	56.32	42.35	45.71	34.19
Over-identification test (p-value)	0.0559	0.4124	0.2829	0.7654
Number of Observations	111,380	55,196	42,032	51,060

Notes: The sample period is 1986-1992. Regressions use a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): experience(quartic), marital status, indicators for having children below 3, children between 3 and 6, for living in Ile de France, for working part-time, year dummies, experience in France (for the immigrants), the local unemployment rate,3-digit industry indicators, the estimated person-effect, and a full interaction of the person-effect with all previous variables (except seniority and industry indicators). In all columns, the Quasi-rent, Seniority and Seniority-squared are instrumented by lagged export price indices of US firms to 4 destinations in US $ of the same industry as the employing firm. The chi-square tests the validity of the instruments. Robust standard errors are between parentheses. Robust standard errors allowing for clustering at the industry-level are between brackets.
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices.