Outsourcing, Unions, and Wages: Evidence from data matching imports, firms, and workers

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Abstract: How are wages and employment of manufacturing workers affected by trade competition ? In particular, how are wages and employment affected by the sourcing strategies of their employing firm and those of their competitors ? What is the role of unions in this process ? I attempt to answer these questions using unique French data that matches firm-level information on imports, value-added, employment,..., firm-level data on unions and negotiations, with individual worker data; at a unique moment – the first years of implementation of the Single Market Program (SMP) within the European Community (1986-1992) when French manufacturing sectors, formerly protected from competition, faced increased imports. A simple bargaining model, particularly well-suited to the French institutional setup, allows me to capture the mechanisms by which changes in competition can directly affect wages: changes in the firm's ability to pay (as measured by the quasi-rent, the total pie shared between the workers and the firm) as well as changes in trade competition and sourcing strategies that potentially affect the bargaining process by altering both the firm's and the workers' threat points. I use an IV strategy where export prices of American firms act as instruments for trade competition and outsourcing. First, trade competition affected the size of the quasi-rents, most particularly in large firms where these rents were large. Because workers received in average 20% of the quasi-rent but also because wages declined with competitive pressure induced outsourcing, trade competition has negatively impacted wages. To see how unions potentially entered the process, I re-examine my results when information on firm-level negotiations between firms and unions is added. As expected, in firms with strong unions (those able to impose bargaining on both employment and wages) workers were able to capture a large share of the declining quasi-rent (about 50%). However, the presence of strong unions has apparently led these, mostly large, firms to increase outsourcing with an associated decline in employment. As a result, unions' fight for workers' wages and employment appears to have backfired.

JEL codes: F3, F4, J30

1. Introduction

The media have expressed the popular feeling that global competition from low-wage countries has induced a race to the bottom: low-skilled manufacturing jobs should be compensated less or else disappear from OECD countries. The issue is well summarized by Richard Freeman: "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).

Imports from developing countries into the United States or Western Europe were not huge at the end of the 80s. However, the Single Market Program (SMP, hereafter), an attempt to implement the European Community (EC, hereafter)'s internal market, was conceived in 1985, launched in 1988, with the hope of being achieved around 1992. It entailed decreased tariffs and barriers within the EC. Hence, imports from the EC increased at a very rapid pace in France during the second half of the 80s.[1] In this context, the mere existence of new sourcing options was a signal that outsourcing was a potential threat, in particular for industries or firms in which high wages were due to the presence of strong unions and the absence of product market competition. At the same time, and for the same reasons, because European firms could export to France more easily, French firms faced increased market pressures.

Hence, the two questions that I examine in this article derive from the previous one: What is the impact of increased trade competition on wages (and employment) ? In this context of increased competitive pressures, was outsourcing a possible response to high wages and strong unions ?

Even though macro-economists have examined these questions both theoretically and empirically, at the country or the industry level, there is virtually no micro-econometric analysis, no empirical examination of the precise mechanisms at work using micro data sources. I will look at the effects that can be identified in the French context using differences across and within firms rather than across industries. For instance, I observe a firm's competitors importing behavior, the individual firms that outsource, the plants that

[1] French National accounts show that imports increased at a very fast rate over the years 1986 to 1992: above 6% per year in the first five years with a decrease to 3% in 1991 and 2% in the final year. In fact, whereas import growth was at best mild between 1981 and 1985, our sample period appears to be the beginning of a period of rapid growth of French imports, that continued most of the ensuing years. http://www.insee.fr/fr/indicateur/cnat_annu/Series/t_1501p_25_4.xls (accessed April 5, 2005). In addition, Biscourp and Kramarz (forthcoming) show that imports from low-wage countries were – and remained – a minor, albeit increasing, component of imports of goods over the analysis period.

downsize, the strength of particular unions, and the changes in individual, not aggregate, wages.

A clear answer to Richard Freeman's question as well as mine would contribute to at least two strands of the literature. First, it would inform the wage inequality debate.[2] 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.[3]

I start by presenting simple descriptive evidence on how trade competition affected employment and wages at the end of the eighties in France. I also sketch the story that, I think, describes best this evidence.

Then, I propose a simple bargaining model, particularly well-suited to the French institutional setup. This framework will help me capture the mechanisms by which trade competition and the firm's own imports can directly affect wages.

To understand the identification strategy that I pursue, the following thought experiment is helpful. French manufacturing was relatively protected from international competition at the beginning of the eighties. In addition, a relatively large fraction of firms (as compared to other similar western european countries) was State-owned, in particular after the election of president François Mitterrand. This lack of competition induced the creation of rents (a result documented in Abowd, Kramarz, Lengermann, and Roux, 2006). Because of these rents as well as because of the bargaining institutions, many French firms bargained with their workers, but not all. These bargaining regimes varied from firm to firm. However, all firms were hit by exogenous foreign competition shocks. In particular, all French firms were hit by the SMP at the end of the eighties, therefore faced increased foreign competition and increased opportunities for outsourcing. But, these increased competitors' imports or increased firm's sourcing strategies had the potential to affect the bargaining process because they were likely to change the firm's ability to pay

[2] 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 is not compelling and mostly relies on import penetration 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).

[3] 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 (2004) focus on recent changes induced by increased import competition and movements in exchange rates. Unfortunately, these last authors used industry-level measures of imports because of the lack of firm-level data.

the workers – the size of the quasi-rent – as well as the firm's and the workers' threat points. What happened to wages and employment in these different firms and under these different bargaining regimes ? How did unions react ?

To answer these questions, I first set up a bargaining model in which firms are able to import goods in advance in order to manipulate employment and wages outcomes. I show the conditions under which imports are increasing in unions' bargaining power, and the resulting impact on employment and wages. Then, I implement the set of equations derived from this bargaining model using matched employer-employee data. Information on a worker's wage and characteristics is matched with the characteristics of the worker's employing firm; in particular, its imports, value-added, capital stock, and employment. The resulting data set has 120,000 worker-firm observations for the years 1986-1992. The use of such unique data sources linking the firm and the worker, and linking imports to individual firms is one of the contributions of this paper.

I then explore empirically how wages and employment of manufacturing workers are directly 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. The identification of various mechanisms by which trade competition affect wages is another contribution of this paper.

On the employment side, Biscourp and Kramarz (forthcoming) shows using the same firm-level data that outsourcing, in particular to low-wage countries, affected employment of unskilled production workers in large firms. Results presented in the next section complement these findings: whereas employment losses in large firms mostly came from firms' outsourcing rather than trade competition (i.e. imports from competitors), the reverse held for smaller firms. On the wage side, the results also contained in the next sections show that, in a context where a fraction of manufacturing firms were protected from competition and their workers enjoyed sizeable rents (see Abowd, Kramarz, Lengermann, and Roux, 2005), wages declined when product market competition and competitive pressures increased. This negative effect came from a decrease in the firm's ability to pay (the quasi-rent) and a deterioration of the workers' threat point in the bargaining process because many of the firm's competitors imported. However, the origin of imports has no strong direct impact on wages: competition from low-wage countries only shows up in employment effects within large firms (for this, see Biscourp and Kramarz, 2003 and forthcoming). The

estimates also indicate that workers received in average 20% of the quasi-rent.

To delve further into the mechanisms at work, I then examine the relationship between unions behavior, increased trade competition, and firms imports. Therefore, I match the original observations with the 1992 survey on salary structure (ESS) that provides information on the bargaining activity at a representative sample of establishments and firms. The sample is reduced to roughly 40,000 worker-firm observations for which I know the bargaining regime; in particular I know if workers and firms negotiated over both employment and wages. For those firms, my results show that workers captured half of the quasi-rent. But they also suggest that these firms have used outsourcing in order to decrease their employment because of increased labor costs and strong unions. Showing the potential role of unions in firms' decisions when faced with increased competition and increased sourcing opportunities is the final contribution of this paper.

The article is organized as follows. To motivate my theoretical model, I start (Section 2) by introducing simple descriptive evidence. In Section 3, I present the simplified theoretical role of imports in the bargaining process. Then, I discuss the empirical implementation of my model. In Section 5, estimation results are presented and potential interpretations are presented. A brief conclusion ends the paper.

2. Import Competition and Firm Outcomes: Simple Descriptive Evidence

For years, many French firms have enjoyed the protection of various regulations, subsidies, tariffs, and entry restrictions. In addition, because of collective agreements (first signed by large firms and then extended in the 1970s by the Ministry of Labor to virtually every firm and every worker in the manufacturing sector), firms faced unions with strong power and minimum wages were high. Small firms, which typically depend on lower labor costs, were in a difficult position to compete against larger companies. Entry and growth of potential competitors was reduced. In addition, the first years of the Mitterrand presidency witnessed a thorough nationalization process of large private companies. All these facts generated rents in many industries, most particularly manufacturing. These rents were directly reflected into wages, particularly in the large firms.[4]

However, in the ensuing years, market reforms were introduced (see Bertrand, Schoar,

[4]See Abowd, Kramarz, and Margolis (1999) for evidence on France. More recently Abowd, Kramarz, Lengermann, and Roux (2005) analyze inter-industry wage differences in France and in the United States and show that the firm-specific component of these differentials is associated both with monopoly power on the firms side and union power on the workers side, in France and during the seventies and eighties, at least.

and Thesmar, forthcoming for the financial side of the reforms in the mid-eighties) and foreign competitors entered the French scene. Simultaneously, new markets opened. In response, some of those large French firms increased their imports of intermediates and launched outsourcing strategies. And, indeed, competition became fiercer. The early "equilibrium" started to unravel. More precisely, in the so-called White Paper from the Commission, the Single Market Program was announced in 1985.[5] The SMP was launched in 1988 with the stated goal of achieving a single internal market for goods in 1992. This program included lowering of tariffs and trade barriers within the EC. As already explained in Hoeller and Louppe (1994), the goal took more time to be reached than initially thought. However, the period under study is one of great changes in trade. European firms could both import and export more easily, at least within the EC. And numbers show that, indeed, trade increased dramatically.

In fact, at the beginning of our period of analysis, in 1986, *large* French manufacturing firms often imported. Furthermore, between 1986 and 1992, our sample period, they strongly increased their imports (on all this, see in particular, Biscourp and Kramarz, forthcoming). Their rents were strongly affected by import competition (see below). These firms also lost employment (again, see below). But, unions in these large firms strongly resisted any change in strategy. This resistance was facilitated by the Lois Auroux, voted in 1981 just after François Mitterrand's presidential election. These laws enhanced workers' bargaining power at the level of the firm, most particularly in the largest firms.[6] This resistance potentially magnified the effects of high labor costs, inducing manufacturing firms to increase their outsourcing and replace workers with imports in the face of increased competition.

In the rest of this section, and before turning to more structural results, I want to present simple descriptive evidence on the mechanisms described just above. Most of this evidence relies on worker-level and firm-level sources that are fully described in the Data Appendix Section. I briefly mention these sources now to help the reader understand the results presented below.

First, as mentioned in the introduction, the French Customs provides me with exhaustive information on imports of goods at the firm level. I separate these imports of

[5] See the text in http://aei.pitt.edu/archive/00001113/, accessed November 21, 2005.

[6] The Lois Auroux explicitly include the obligation to negotiate for establishment or firms with at least 50 employees, see Cahuc and Kramarz, 1997 for a description of their principles see also Abowd and Allain, 1996 who provide evidence supporting this claim.

goods into (i) imports of intermediates and (ii) imports of finished goods depending on the industry affiliation of the firm and industry classification of the imported good. More precisely, each record of the origin file of imports of goods contains a firm identifier, a country of origin, an amount expressed in Francs, and a 3-digit classification of the good. If the 3-digit industry affiliation of the importing firm and the 3-digit classification of the imported good are identical, I code the import as an import of finished goods. All other imports are coded as imports of intermediates. In what follows, I equate finished goods imports with outsourcing.

To measure the import competition that each firm faces in its industry, I aggregate the imports using the 3-digit classification of the imported good. To measure the import behavior of the industry competitors, for each firm I compute the ratio of imports of finished goods over production and the ratio of imports of intermediates over local purchases. Then, I compute percentiles of the resulting statistics by industry affiliation of the importing firm (4-digit). These percentiles measure the extent of import competition in each industry.[7][8] These measures of imports at the firm-level or at the industry-level can be matched with measures of profitability (from other administrative sources). In particular, I construct a measure of the size of the "pie" that the firm and its workers divide between them, that I call the *quasi-rent* hereafter. This quasi-rent is measured as value-added minus labor costs evaluated at the **workers' opportunity wage** (I describe in Section 4 how this opportunity or market wage is measured).

My first piece of evidence is presented in Table 1. The table shows different regressions with a similar format: a firm-level variable (employment, quasi-rent, labor costs per employee) is regressed on measures of import competition in the firm's industry.[9] In each column, the firm variable is regressed on the structure of imports of finished goods and the structure of imports of intermediates of the firm's competitors, i.e. firms that belong to the same 4-digit industry. The regression controls for firm-fixed effects.[10] Hence, I

[7] Because the initial data sources are virtually exhaustive (since they are of administrative origins), most firms within each 4-digit industry are small and do not import. The resulting distributions are therefore very skewed. To reflect the amount of imports in any given industry, one needs to use the 95th or the 99th percentiles of these distributions (see Biscourp and Kramarz, 2004 who give a full description all these facts).

[8] Black and Brainerd (2004) has a somewhat similar setting but their focus is inequality.and discrimination.

[9] The observations are individuals matched to their firm. Larger firms have more individual observations, in proportion to their size. Hence, these regressions are identical to doing firm level regressions weighted by employment.

[10] Most regressions discussed in the following paragraphs include firm fixed effects. If firm effects are not included, this will be explicitly mentioned in the text.

capture the impact of within-firm variations over the sample period (1986-1992) of the import competition measures on various economic variables.

Results in the first column show that more intense import competition deteriorates the size of the quasi-rent (per worker) that the workers and the firm will have to divide if they bargain. Interestingly, results in the next two columns show that import competition matters for relatively large firms (above 50 employees; the Auroux laws threshold) and does not have an impact on smaller firms where quasi-rents appear to be smaller (see the coefficient on the constant).

Now, we may ask whether import competition also affects firms' employment or not. The next columns of the same table help answer this question. And the simple answer is "not much". At least not much for the large firms but the smaller firms are adversely affected by more intense import competition (see the next two columns). And, in line with these last results, labor costs per employee are negatively impacted by import competition in the smaller firms, and much less in the larger firms.

In Table 2, I introduce firms' import behavior rather than competitors' behavior. Now, when an industry increases outsourcing (as measured in Table 1), then it is a manifestation that a potentially large share of firms have outsourced part of their production. Indeed, results show that firms, and almost exclusively large firms, that have increased outsourcing also have decreased quasi-rents. In addition, results are exactly equivalent for employment: large firms with increased outsourcing also have decreased employment. This is not so for the smaller firms. As a test of robustness, the joint inclusion of the import competition variables and the firms' import variables does not alter this last conclusion. Smaller firms decreased employment when import competition intensified whereas larger firms decreased employment when their own outsourcing increased. In addition, results in the last column of Table 2 show that exports are not associated with movements in employment. Hence, there is something specific to the firms' imports.[11]

These results suggest that rents or profits, employment, and wages are all associated with variations in international trade competition as measured by imports of potential competitors.[12] Furthermore, outsourcing is a strategy used by large firms, for reasons

[11] I tried to use the language of association rather than causality up to here. Obviously, the import decision of the firm is endogenous in all these regressions. This problem, as well as other econometric problems, will be addressed in the next sections.

[12] Note that value added equals revenue minus materials. The quasi-rent is computed by subtracting the opportunity cost of labor from value added. And profit is obtained by subtracting the rent to labor from the latter.

that appear to be specific to them, arguably related in particular to bargaining institutions (Auroux laws).

All these facts appear to be consistent with the story presented at the beginning of this section. The precise mechanism will be formally presented, estimated, and tested in the remaining sections. The bargaining framework that I introduce in the next section is particularly well-suited to thinking about such a mechanism.

3. Wages and Imports: A Simple Bargaining Framework

In a purely competitive framework, imports at the firm level and, in fact, any firm level variable should not affect wages. In this competitive world, imports' significance in a wage regression using data sources on individual workers should reflect unobserved heterogeneity in workers' skills. Therefore, to rationalize a potential *causal* impact of import competition on wages' differences across firms, I use a non-competitive framework.

Product market competition and wage bargaining are intimately related through the financial situation of the firm, their ability to pay their workers, as measured for example by rents (Abowd and Lemieux, 1993). Because import competition affects quasi-rents, 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. And evidence that I have just presented appears to support this claim. There may also be *additional* routes for imports to affect bargaining on top of this *ability to pay*, as measured by the quasi-rent. These routes are detailed below. In the remainder of this section, I briefly present a simplified representation of the bargaining process that takes place between a union and a firm using an extension of the classic bargaining model (Mc Donald and Solow, 1981, Brown and Ashenfelter, 1986) when firms can import.

The model that I use articulates a stage of bargaining with a first stage where the firm decides its optimal level of outsourcing, through imports. The bargaining model relies on the so-called strongly efficient bargaining, where workers and firms bargain over employment and wages,[13] because French institutions, as embedded in the French Labor Laws, and in particular the so-called Auroux Laws, clearly favor annual discussion of many issues including wages, hours of work, working conditions, and employment between the

[13] Rather than the right-to-manage model, where negotiation is restricted to wages. See again Brown and Ashenfelter (1986) or Abowd and Lemieux (1993).

firm and the workers' delegates or workers' union representatives.[14] As will be apparent from the next paragraphs, imports play the same role in my approach as inventories play in previous approaches (in particular Coles and Hildreth, 2000 among many others).

First stage: Firms determine their outsourcing level (imports of goods and intermediates) by finding

$$I_N = \arg\max_I \pi_I(I, l, w) = R(I, l) - wl - c(I) \tag{3.1}$$

in which $c(I)$ denotes the cost of imports, where w denotes workers' wage, l denotes the firm's employment, and $R(I, l)$ denotes the revenue function of the firm.

Second stage: In the strongly efficient bargaining framework, the union is rent-maximizing with objective function wl where, as above, w denotes workers' wage and l denotes the firm's employment (in France, all workers employed in the firm are represented by the unions or the personnel representatives). These representatives negotiate with a profit-maximizing firm with profit denoted by $\widetilde{\pi}$. The bargaining is over wages and employment. The threat points for the unions and for the firm are respectively $w_0 l$ and π_0.

To summarize, the Nash solution (w_N, l_N) to the bargaining problem solves the following equation:

$$\begin{aligned} (w_N, l_N) &= \arg\max_{w,l} \{(1-\theta)\ln[\widetilde{\pi} - \pi_0] + \theta \ln[(w - w_0)l]\} \\ \text{subject to } \widetilde{\pi} &= R(I, l) - wl \end{aligned} \tag{3.2}$$

where θ represents the workers' bargaining power, and, as before, I denotes firm's imports, and $R(I, l)$ denotes the firm's revenue function. Notice that the cost function, c, does not enter this second stage profit. Imports, being made in advance (first-stage), are subject to the usual hold-up problem (see Grout, among others).

Threat points: Because the threat points are central to my problem, I discuss their exact interpretation now. First, notice that π_0 has often been set to 0 in previous empirical research (Abowd and Lemieux, 1993, for instance).[15] Malcomson (1997) suggests that π_0

[14] For instance, the Auroux Laws that were enacted in 1981, force establishments with at least 50 employees to negotiate with the workers' representatives every year. I present direct evidence on this exact issue in the final Sections.

[15] Their explicit introduction within my framework is a clear departure from virtually all of the previous empirical research.

should measure the profits when the negotiations are inconclusive due to a delay or a breakdown. Hence, it should reflect market alternatives and pressures. In particular, the firm threat point may potentially vary with imports of competitors since they capture effective trade competition. This idea is explicitly incorporated in various theoretical papers relating trade and wages. Mezzetti and Dinopoulos (1991) or more recently Gaston (1998) explicitly interpret π_0 as the value of the option to switch production abroad. "That is, π_0 varies positively with a credible outsourcing alternative for the firm" (Gaston, 1998). Furthermore, "During any dispute, the domestic firm supplies the market from abroad" (id.). However, these papers provide no formal proof of these intuitions. This justification is in fact given by Coles and Hildreth (2000) in a context where inventories are used as a strategic threat.

Coles and Hildreth (2000) show that, in an infinite horizon bargaining game between a firm and a union with random alternating wage offers, inventories held by the firm during the negotiation process play a central strategic role. Furthermore, they show (Theorem 1, page 278) that their (dynamic) problem can be rewritten as a Nash bargaining problem in which the firm's expected discounted profits, using the optimal sales strategy should the strike never end, is exactly π_0. After identifying the optimal sales strategy during the strike, they demonstrate that inventories are used as a threat to "force lower wages" (Theorem 3, page 280).[16]

Imports of finished goods in my approach play the same role as inventories in Coles and Hildreth's. Outsourcing is obviously a way to externalize the building of inventories, potentially without the need of any local worker. This strategy is all the more effective since imports of finished goods are most often programmed in advance.[17] Because outsourced production has been put in place before bargaining, firms are able to use a sales strategy that does not rely on local workers (or at least not on all local workers, a fraction of them being still be available for certain tasks). Such strategies can obviously be implemented in various manufacturing industries through either foreign direct investments (FDI) or by

[16] In addition, they show that, because the firm's threatpoint increases faster than expected discounted revenues in inventories, wages are decreasing in inventories (Theorem 3, id.). Finally, they use this model to evaluate empirically changes in bargaining institutions in the UK.

[17] For instance, in the clothing industry in France (and more generally in Europe), all sourcing strategies that involve delocalization of the production process imply defining the product at least one year before selling it. See the discussions in Linge (1991) or Sadler (1994) for examples of other industries. Competing strategies are more short-term and allow the firm to produce locally in the so-called Sentier area, within Paris i.e. close to the customers. However, such strategies are almost exclusively used for restocking of small quantities based on the most recent information (Zara, a leading European clothing company, is another example of a firm using this constant restocking strategy).

using producers in relatively low-wage countries.

I follow Coles and Hildreth in that I do not specify the exact mechanism that helps the firm build its "inventories of imports". I just adapt their results to my problem. And, based on their results and following the rest of the literature, I pose my problem in the form of a Nash bargaining problem in which the firm's and the workers' threat point potentially depend on the sourcing strategies. Consistent with the Coles and Hildreth' theoretical results, I model the firm's threatpoint, $\pi_0(I)$, as a function of imports. Similarly, $w_0(\overline{I})$ may well depend on competitors' imports, $\overline{I}$, by decreasing demand for workers.

The game is solved by backward induction. The bargaining problem (3.2) is solved first. At the solution, the marginal product of labor is given by

$$R'_l(I,l) = w_0,$$

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

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

or, equivalently,

$$w = w_0 + \theta\frac{\widetilde{\pi}^0 - \pi_0(I)}{l}, \tag{3.3}$$

where $\widetilde{\pi}^0$ denotes the profit when the wage is evaluated at w_0:

$$\widetilde{\pi}^0 = R(I,l) - w_0 l.$$

therefore

$$\begin{aligned} w &= w(w_0, \theta, I, l) \\ l &= l(w_0, I) = R'^{-1}_l(I, w_0) \end{aligned}$$

are the first-order conditions for the bargaining game.

Now, in the first stage, the firm optimizes its outsourcing level I by setting the following expression to zero:

$$\frac{\partial \pi_I}{\partial I} = \frac{\partial R}{\partial I} + \frac{\partial l}{\partial I}\frac{\partial R}{\partial l} - c'(I) - \frac{\partial w}{\partial I}l - w\frac{\partial l}{\partial I}$$

After some manipulations, this yields the first-order condition for the first-stage problem:

$$\frac{\partial R}{\partial I} - c'(I) + \theta(\frac{\partial \pi_0}{\partial I} - \frac{\partial R}{\partial I}) = 0$$

Now, it can be shown that (computations are available from the author),:

Result: *Whenever* $(\frac{\partial \pi_0}{\partial I} - \frac{\partial R}{\partial I}) > 0$, *imports (outsourcing) are increasing in workers' bargaining power,* θ*. In addition, wages can be either increasing or decreasing in the firm's imports (outsourcing).*

Proof: See Appendix B.1.

Therefore, as soon as a firm can easily alter its threat point by outsourcing, when facing a union with a large bargaining power, θ, this firm will outsource a larger share of its production than a firm facing a relatively weak union. Because of the potential hold-up effect – the cost of outsourcing is substracted from revenues to compute the first stage profit of the game, π_I but does not enter the second stage profit $\widetilde{\pi}$ (bargaining) – the final effect of outsourcing on wages can be positive or negative.

In summary, we now have a structural model of wage determination, in which workers share rents with their employing firms. The size of rents is affected by competition, in particular trade competition, imports from French firms or exports of foreign firms to France. In some firms, unions are strong, in particular when the stakes – the rents – were high in previous years, for instance in formerly protected industries. Because firms may face strong unions, they may try to alter their threatpoint through outsourcing. This outsourcing takes place before entering the negotiation phase. Outsourcing acts as a deterrent in the bargaining process because the outsourced goods can be sold while negotiating with the unions. Firms facing unions with strong bargaining power are more likely to outsource. This model has clear game-theoretic foundations and clear predictions. And, I show in the remaining sections that it has strong empirical support.

4. Empirical Implementation

In order to structurally estimate the wage equation (3.3) exactly as derived just above, it is useful to list all the components that are necessary to perform this empirical task. It will help the reader understand the main differences between this paper and its predecessors as well as some of its contributions.

First, I need to relate a worker's wage with her employing firm measure of outsourcing, quasi-rents, employment, and competitive environment. To measure quasi-rent, I also need to measure each worker's opportunity wage. All these variables are **directly** measured in this article, in sharp contrast with the rest of the literature. To examine *wages*, I use person-level measures together with observable personal characteristics (in contrast with Abowd

and Lemieux, 1993 or Blanchflower et al., 1996 who use firm-level sources). To measure workers's *opportunity wage*, I estimate for each individual her alternative wage on the market (taking stock of recent developments in the analysis of matched employer-employee data, used in my analysis). To measure *competition*, and in particular trade competition, I use firm-level measures of outsourcing (in contrast with Bertrand, 2004, who only uses industry-level import data) and firm-level measures of quasi-rent (because they do not measure workers' opportunity wage, Abowd and Lemieux, 1993 use a relatively badly measured equivalent whereas Blanchflower et al., 1996 use profits). In addition, I am the first to use exhaustive information on all imports (and exports) in France, measured both at the firm-level and at the product level (to assess trade competition). Finally, because outsourcing decisions or quasi-rents are likely to be endogenous and OLS estimates biased, I use a strategy similar to my predecessors and use instruments (Abowd and Lemieux, 1993 for the quasi-rent; Bertrand, 2004 for industry-level imports). Because measurement and endogeneity issues are directly related, I will show that by providing solutions to the former I solve (part of) the latter.

4.1. Measurement of the variables in the estimating equation

4.1.1. Data on workers' wages, and their firm's imports and other economic outcomes

The estimating equation relates a worker's wage to her employing firm's imports, quasi-rent, ... Obviously, employee-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 to firms.[18] The first of these data sources is an administrative file based on mandatory declarations of all trade in goods. They are available for all years from 1986 to 1992.[19] 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

[18] 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.

[19] After 1992, data are less exhaustive: small transactions are not recorded any more.

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 education and demographic information. These sources are described in more detail in Appendix A.

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

Opportunity wage: Workers' alternative wage captures what workers can receive in case of a strike, i.e. their value outside the firm. I first rewrite this alternative wage, w_0, as the sum of two components: $w_0 = w^a + w_0(\overline{I})$. The first component, w^a, captures the unconditional opportunity cost of time, which only depends on workers' characteristics, both observed and unobserved, with value in every industry. The second component, $w_0(\overline{I})$, tries to capture workers' value in firms' that produce the same product as the original workers' employing firm.[20]

To directly measure each worker's opportunity wage, w^a, my strategy involves the estimation of the following basic statistical model

$$\ln w_{it} = x_{it}\beta + \alpha_i + \psi_{\mathrm{J}(i,t)} + \varepsilon_{it} \tag{4.1}$$

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 $\mathrm{J}(i,t)$ at which worker i is employed at date t, and ε_{it} is a statistical residual. Assume that a simple random sample of N individuals is observed for T years.[21] 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. The above equation gives a measure of this external (opportunity) wage rate, defined as $w^a_{it} = E\left(w_{it}\,|x_{it}, i\,\right)$.[22] Hence:

[20] Potential effects of unemployment are captured directly by introducing the local unemployment rate in the control variables.

[21] Identification and estimation of this type of equation 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 requires 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).

[22] Notice that $\ln w^a_{it} = \ln E\left(w_{it}\,|x_{it}, i\,\right) = (x_{it}\beta + \alpha_i) + \ln E(\exp(\psi_{\mathrm{J}(i,t)} + \varepsilon_{it}\,|x_{it}, i\,)$. Then, because the pure firm effect $\psi_{\mathrm{J}(i,t)}$ and ε both have mean 0, and variance σ^2_ψ and σ^2_ε respectively, we have $E[\exp(\psi + \varepsilon)] =$

$$\ln w_{it}^{a} \approx x_{it}\beta + \alpha_i \tag{4.2}$$

To measure $w_0(\overline{I})$, I use the following strategy. Because, it is directly related to the declining employment opportunities in the worker's industry due to import substitution away from the labor input, I use various statistics on imports of the **same good** made by the firm's competitors and made by the wholesale or retail trade industry. More precisely, for each firm, I compute a ratio of imports of intermediates over local purchases and a ratio of imports of finished goods over total production. As described previously, I use the 99th percentiles of the distributions of these statistics **within** each manufacturing industry.[23] 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 a 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.

Quasi-rent: To measure the firm's quasi-rent, I use the following strategy. First, I rewrite the wage equation (3.3) as

$$w = w^a + \theta\frac{\widetilde{\pi}^a - \pi_0(I)}{l} + (1-\theta)w_0(\overline{I}) \tag{4.3}$$

where $\widetilde{\pi}^a$ is the quasi-rent evaluated at worker's alternative wage, w^a:

$$\widetilde{\pi}^a = R(I,l) - w^a l$$

Now, assuming for simplicity that all workers have the same alternative wage w^a, we see that $w = w^a \times \exp\psi \times \exp\varepsilon$ (using both 4.1 and 4.2). Hence,

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

where E denotes the expectation taken in the firm of the relevant random variable. First, note that the firm effect is constant in the firm. Then, by the same reasoning as above,

$\exp\frac{\sigma_\psi^2+\sigma_\varepsilon^2}{2} \approx 1$, assuming that both ψ and ε are normal as they appear to be, and because σ_ψ^2 and σ_ε^2 are small (0.08 and 0.04 respectively, for all these results see Abowd, Creecy, and Kramarz, 2002) and can be taken as independent of the person observed or unobserved characteristics.

[23] To assess robustness of my results, I also compute the 90th and the 95th percentiles of these distributions. As mentioned previously, the use of such extreme percentiles is justified by the extreme skewness of the distribution. The median, for instance, is almost always zero.

the equation can be rewritten as:[24]

$$\widetilde{\pi}^a = R(I,l) - \frac{wl}{\exp\psi} \tag{4.4}$$

Therefore, the quasi-rent $\widetilde{\pi}^a$ uses a measure of labor costs, $\frac{wl}{\exp\psi}$, that eliminates the costs due to the pure firm-effects. All these elements are measured directly.

4.2. The resulting estimating equation

The above discussion has consequences for the specification of the estimating equation. Let us recall that we start from (4.3):

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

Appendix B.2 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

$$\begin{aligned} w_{it}(x_{it}) &= \exp(x_{it}\beta + \alpha_i) + \theta_{\mathrm{J}(i,t)}(x_{it})\frac{\widetilde{\pi}^a_{\mathrm{J}(i,t)t}}{l_{\mathrm{J}(i,t)}(x_{it})} - \theta_{\mathrm{J}(i,t)}(x_{it})\frac{\pi_{\mathrm{J}(i,t)t0}(I_{\mathrm{J}(i,t)t})}{l_{\mathrm{J}(i,t)}(x_{it})} \\ &\quad + (1-\theta_{\mathrm{J}(i,t)}(x_{it}))w_{it0}(\overline{I}_{\mathrm{J}(i,t)t}) + \xi_{it} \end{aligned} \tag{4.5}$$

where i denotes the worker, t denotes time, and $\mathrm{J}(i,t)$ denotes the firm at which i is employed at date t. Furthermore, α_i is estimated using equation (4.1), $\widetilde{\pi}^a_{\mathrm{J}(i,t)t}$ is directly measured using equation (4.4). $\theta_{\mathrm{J}(i,t)}(x_{it})$ denotes the bargaining power of worker i with characteristics x_{it} employed in firm $\mathrm{J}(i,t)$, and $l_{\mathrm{J}(i,t)}(x_{it})$ denotes the firm's labor demand for workers with characteristics x_{it}. Since $\frac{\pi_{\mathrm{J}(i,t)t0}(I_{jt})}{l_{\mathrm{J}(i,t)}(x_{it})}$ and $w_{it0}(\overline{I}_{\mathrm{J}(i,t)t})$ 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 levels and will be estimated in levels in contrast to most of the literature (a recent exception is Margolis and Salvanes, 2002).

Finally, it is important to note that equation (4.5) expressed in levels is compatible with equation (4.1) expressed in logarithms.[25]

[24] Assuming that ε is normal with mean 0, and variance σ^2_ε, we have $E[\exp\varepsilon] = \exp\frac{\sigma^2_\varepsilon}{2} \approx 1$, since σ^2_ε is small (0.04, see Abowd, Creecy, and Kramarz, 2002) and is independent of the person and the firm observed or unobserved characteristics, as derived previously.

[25] Starting from equation (4.1), then taking its exponent and rewriting it using a Taylor expansion yields the following:

4.3. Endogeneity and other potential econometric problems

Apart from measurement problems, discussed in the previous subsection, there are multiple potential econometric pitfalls in estimating equation (4.3):

(i) 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) (see Abowd and Lemieux, 1993). Our discussion of Section 2 suggests that the correlation should be positive because large rents are likely to induce strong unions.

(ii) When the contract is not strongly efficient, then wages, quasi-rent, and employment are determined jointly. This standard endogeneity bias makes OLS estimates inconsistent. Abowd and Lemieux (1993) as well as Abowd and Kramarz (1993) show that proper estimates of (4.5), using instrumental variables, yield a lower bound for the bargaining parameter when the contract is not strongly efficient (see in particular the discussion in Abowd and Lemieux from page 988 to page 990).

(iii) Because I want to separately identify the bargaining parameter θ from the threat point $\pi_0(I)$ and from import competition that affects $w_0(\overline{I})$, I must assume that θ does not depend on imports of the firm nor on imports of competitors. Put differently, $\theta(I, \overline{I})$ **is not separately identifiable from** $\pi_0(I)$ **and** $w_0(\overline{I})$ **in equation (4.3)**. Hence, I assume that θ is a fixed parameter, potentially varying by firm.

In all cases, *in order to identify this bargaining parameter* θ, movements reflecting changes in product market competition should translate into movements of the quasi-rent. To understand the issue, Appendix C presents a model that explicits the various problems. A first consequence of the model is the following. If the measure of the workers' opportunity wage is precise enough, the quasi-rent should not be endogenous in a **person-level** wage equation, as is estimated here.

However, an empirical strategy still has to be set-up **if** the quasi-rent is found to be

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

Therefore, we see that these equations are indeed compatible.

endogenous despite all measurement efforts. I follow the literature in using instrumental variables. These instruments should be correlated with the quasi-rent, seniority, and other endogenous variables such as firm's imports. In line with Abowd and Lemieux (1993), Abowd and Allain (1996), and Bertrand (2004), I must capture variations in the firms' *ability to pay*, as measured by the $\frac{R}{l}$. This ability to pay is in particular determined by supply conditions on the product market. And, to trace the supply (of goods) curve, I must find measures of exogenous demand shocks affecting product market competition.

4.4. Instruments: Export Prices of US Firms to Measure French Product Market Conditions

Valid instruments must reflect changes in product market conditions inducing movements in the *quasi-rent* or in the *import* decisions of the firms, but they must be uncorrelated with the error terms in the wage equation.

Product market conditions are determined by local conditions as well as by global factors. Many among these local factors can be affected by the local firms' behavior. But, most often, the global factors are beyond the reach of the French firms that I examine. Among these global factors, exchange rates naturally come to the mind. Economic conditions and productivity shocks that take place in any countries that trade in the World market are likely to affect many local decisions of French firms. For instance, a positive productivity shock in the textile industries of some Asian economies might affect outsourcing decisions of French firms, hence their imports and their employment. An increase in the price of oil might have an impact on the ability to consume and to import of Middle Eastern countries. A positive productivity shock in the American steel industry willl affect negatively the French steel producers but they will affect positively the French automobile industry, a heavy user of steel. These shocks in different countries will have a differentiated impact on the different firms depending in particular on their exposures to these various global markets since some export whereas some do not, some import whereas some do not, some are global competitors whereas some are not.

In addition, as explained earlier, the period under consideration is one of implementation of the Single Market Program (SMP) within the European Community. Competition increased drastically in virtually all manufacturing industries; accordingly the reaction of firms to shocks should also be easier to identify during this period.

Based on the preceding discussion, I use international market prices, in US Dollars,

to instrument both firm- and person-level variables. More precisely I use industry-specific export prices of United-States manufacturing firms in four destinations. These variables meet the various requirements presented above. Because they are export prices, they are determined on the world market and are therefore beyond reach of French producers. In addition, because they are export prices as set by US firms, they reflect world competition as perceived by a large player. In particular, *they should incorporate the shocks induced by the SMP*. Furthermore, as these price indices are in fact unit value indices computed in US dollars, they also reflect exogenous variations in the exchange rate of the US dollar vis à vis different destination countries. These prices are measured at the 3-digit industry level. Therefore, I should be able to capture multiple variations, affecting *differently* firms according to their *specific exposures* to the various markets.

Abowd and Lemieux (1993) used ideas related to this procedure when studying Canadian firms, Abowd and Allain (1996) also used a similar idea when instrumenting French firms' quasi-rents, Bertrand (2004) used a related strategy when instrumenting industry-level import penetration ratios by source-weighted industry exchange rates, and Gourinchas (1999) shows how exchange rates affect job flows. Here, the procedure is extended in three 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.[26] 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 C.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

[26] Abowd and Allain (1996) used a unique aggregate destination.

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).[27] 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.

5. Estimation Results

Table 3 presents the OLS results for equation (4.5). To summarize the main findings, firm's quasi-rent and worker's seniority are shown to be endogenous in the worker's wage equation. Hence, I need to use instrumental variables to estimate the bargaining model. In order to focus on the main messages of the paper, I have relegated the full and very detailed discussion of Table 3 in Appendix C.

However, several points are in order. First, all my regressions control for person-specific unobserved heterogeneity using the estimated person effect (see Appendix C for details). Second, the instrumenting equations appear to be sensible and statistical tests validate the instruments (see Appendix C for details and Appendix Tables C.2 and C.3 for a summary of the results). Third, based on these instruments, I tested for endogeneity of 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 fraction of local purchases), the competitors import behavior (the 99th percentile of the distribution of imports of goods as a fraction of production in the same 4-digit sector and the 99th percentile of the distribution of imports of intermediates as a fraction of local purchases in the same 4-digit sector), worker's seniority, and seniority-square (see again Appendix C for details). To find which of these potentially endogenous variables are indeed endogenous, I use an augmented regression strategy. More precisely, I construct a residual for each potential endogenous variable by regressing this variable on all instruments and all exogenous variables. Then, each residual is added to an OLS regression that also includes each potential

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

endogenous variable. As results of this augmented regression show (see Appendix Table C.4), none of the residuals from the import variables (firm or industry level) regressions on the set of instruments are significantly different from zero. Hence, I conclude that all variables **but** quasi-rent and seniority are exogenous in the *person-level wage equation*. Therefore, in what follows, I will instrument these two variables. Importantly, results on the competition variables (quasi-rent, in particular) are not affected by either exclusion of seniority or non-instrumenting of seniority.

5.1. Firm's trade and competition matter

Table 4 presents the estimates of the bargaining equation (4.5) where quasi-rent and seniority are both instrumented.[28] 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, in addition, 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 unit values measured in US dollars of American firms to 4 destinations) - and the other control variables.

Competition enters through at least two routes in the estimated equation. First, competition affects the size of the quasi-rent. Hence, the magnitude of sharing of this quasi-rent between workers and the firm is central in the way the competitive pressure affects workers' wages. Second, firms's trade and competitors' import behavior directly affect wages. We study the two routes in turn.

Shocks in the competitive environment affect the size of the quasi-rent, as shown in Section 2. Results from Table 4 show that when competition increases (and the quasi-rent decreases), workers' wages are negatively affected because workers receive a 20% share of this quasi-rent. This bargaining coefficient obtained from IV estimates is quite similar to that obtained using OLS. This estimate of the bargaining parameter, 0.20, is roughly half that obtained for France by Abowd and Allain (1996) and Abowd and Kramarz (1993) using firm-level equations or that obtained for Canada by Abowd and Lemieux (1993).

[28] The concern for the weak instruments bias (see Bound, Jaeger, and Baker, 1995 and Staiger and Stock, 1997) leads me to present in Table 4 the F-statistics that tests the nullity of the instruments in the first-stage regressions. These values are large, in particular for the instrumentation of quasi-rent, suggesting that there is no weak instruments problem. 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 of the following tables.

But the parameter is much larger than that obtained by Blanchflower, Oswald, and Sanfey (1996) who use a logarithmic specification.[29]

I turn now to the second route through which competition affects wages. Coefficients on the firm's own imports variables should tell us how wages are affected by trade, through the effects of the firm and the worker outside options: the model tells us that the firm's own imports affect the bargaining outcome by changing (decreasing) the quasi-rent and, simultaneously, offering hold-up opportunities to the workers.[30] Coefficients on the "competitors" variables should tell us how workers' outside options – options when the workers leave the firm – 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.[31] 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:

- The firm's trade matters. Workers employed by a manufacturing firm that imports are better compensated than those who are employed in a non-importing manufacturing firm. The model tells us that this positive effect comes from the potential from hold-up in the two-stage game in which firms commit to outsource part of their production at the first-stage.

- Competition matters. Workers employed in industries where firms outsource a large share of their production are negatively affected. Imports of intermediates by competitors has a positive impact on workers' wages.

Discussion and interpretations of these two results will be presented in the final subsection of this section.

- The total of the two effects for **outsourcing** is **negative** for most workers employed in the manufacturing industries. More precisely, 50 percent (resp. 75 percent) of

[29] In an unreported regression, a logarithmic specification of (4.5) yields estimates that are in the same ballpark as those found by Blanchflower et al. (1996).

[30] As discussed in the previous Section, identification of the threat points require the maintained hypothesis that workers' bargaining power does not depend on imports.

[31] Since I know the 3-digit good imported by these trade firms, I can relate this good to the industry of the firm and therefore measure the total value of goods imported by trade firms in each 3-digit industry, for each year of my sample period.

workers are employed in firms that import less 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 the firm's imports.

- 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.

- Bargaining matters and the size of the quasi-rent affects workers' wages. Competitive pressures decrease the quasi-rent. This is the third effect of trade and competition on workers' wages.

Table 5 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 4.[32]

5.2. Differential effects by worker skills and origins of imports

Since my equation uses worker-level data, I can very easily focus on specific categories of workers. Table 6 presents results for different types of workers. I selected those most likely to be affected by changes in competition. In addition, I present estimates of equation (4.5) 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 two groups of experience and for the low-education group (high-school dropouts). Four groups of countries of sourcing 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,

[32] In unreported results, to further test robustness of my estimates, I estimate equation (4.5) 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. 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).

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[33] who benefit more than any other group from imports from far-away low-wage countries or other OECD countries of their employing firm.

5.3. Imports and wages: unobserved heterogeneity or causal effect ?

The positive effect of the firm's own imports on wages: Even though it is not very large for most firms, this positive effect has two potential explanations. In the first, it is just the manifestation of unobserved heterogeneity on the firm side: firms that import are better firms in that they have a higher ability to pay their workers. In the second, the effect is causal and firms pay their workers more because they import. In the bargaining framework as mentioned above, workers are in a better negotiating position vis-à-vis their employing **because** their firm imports, generating hold-up opportunities. In that sense, outsourcing has two effects. First, the rent that is shared between workers and firms is decreased but outsourcing may have induced a hold-up effect. I examine these two explanations in turn.

In all the preceding regressions, I tried to control for unobserved heterogeneity as much as I could. I did this in multiple ways. First, I tested for endogeneity of the various firm-level, industry-level, and match-level regressors. I searched and found intruments, similar in spirit to those used by other analysts of near identical problems. Second, I directly controlled for unobserved person heterogeneity by introducing as an additional regressor the person heterogeneity as estimated in a general wage equation with many more observations, individuals, firms and time periods, the only way to obtain relatively precise estimates of these "nuisance" parameters (see Section 3, equation, 4.1). Still, the positive coefficient of imports in the wage equation could be viewed by the skeptical reader as manifestation of firm-level unobserved heterogeneity, as in the size-wage literature. For instance, it could reflect better management; firms that import having better managers and longer survival in a highly competitive environment. To **directly** address this issue, I took

[33] 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).

wage equation (4.5) where the quasi-rent and seniority are both instrumented in which I added a direct measure of unobserved firm heterogeneity as estimated using (4.1). Because I have only a relatively limited number of observations per firm, introduction of firm indicator would yield very imprecise estimates and a potentially unconvincing conclusion whereas using the precise estimates of this "nuisance" parameter, the firm fixed-effect, the resulting estimates should tell us if, indeed, imports capture unobserved firm heterogeneity. Results are presented in Table D.1. They are exactly identical to those presented in Table 4 in which there is **no direct** control of firm unobserved heterogeneity. Firm's own imports, a time-varying measure, positively affects individual wages of its employees. So, to summarize, in equation (4.5), and conditional on observed and unobserved person heterogeneity, conditional on the quasi-rent, and even conditional on unobserved firm heterogeneity, imports are exogenous and movements of imports appear to have a causal impact on wages. The question is the potential mechanism that drives this effect. The next subsection considers the possibility that unions are the mechanism.

The negative effect of competitors' imports of finished goods on wages: The discussion that precedes is also applicable to competitors' imports. And indeed, the results presented in Table D.1 control both for firm unobserved heterogeneity and industry unobserved heterogeneity. I therefore consider these effects to be causal. I now turn to the mechanisms for these effects.

5.4. And what about unions ?

To understand the role of unions in the bargaining process and its connection with trade, I need some measure of union activism at the establishment or firm level. Hence, I match my original file with a survey that gathers information on firm and establishment level bargaining activity, the so-called Enquête Structure des Salaires (ESS, hereafter) for year 1992. This survey collects information on firm or establishment level bargaining under the Lois Auroux. Let me recall that the Lois Auroux stipulate that bargaining must take place every year in an establishment or a firm with at least 50 employees. But, crucial for the analysis, even though bargaining is mandatory, firms can refuse to bargain on some subjects, employment for instance, and firms are not forced to sign an agreement at the end of the bargaining process.[34]

The data tell me if a round of bargaining took place in that year. In addition, I know

[34] Even though bargaining is supposedly mandatory, some establishments do no start a round of negotiation every year.

the topic of the negotiation: wages, employment, other. Finally, for each topic of the negotiation, I know if an agreement was signed in that year. Unfortunately, because the ESS samples establishments using a frame based on establishment or firm size, I lose a fraction of my observations, mostly in smaller units (explaining why I did not use this source for the earlier analysis). The resulting file has 37,698 (workers) observations, a third of the original file.

Descriptive statistics show that 26% of workers were employed in a firm where negotiations on employment took place in 1992. For most of them, 82%, an agreement was signed after the negotiation. Virtually all these firms also negotiated wages with their employees. Only 4% of the workers are employed in firms that negotiated on employment without negotiating on wages. Furthermore, 81% of the workers were employed in firms that negotiated on wages; with 65% among them eventually signing an agreement. Even though the different bargaining regimes are not perfectly aligned with the theory, I focus on a limited number of bargaining regimes. Hence, for each individual observation, I classify the employing firm as:

i) bargained with unions (or personnel delegates) on employment (and wages);

ii) bargained with unions (or personnel delegates) on wages;

iii) did not bargain with unions or personnel delegates.

In what follows, in line with the efficient bargaining model with imports that I adopted, I mostly constrast firms in the first category with the rest of the firms. Robustness checks confirm that this distinction is the most relevant. To distinguish between firms with heterogeneous bargaining regimes, I estimate a variant of (4.5) in which θ can take two values, θ_b, θ_n depending on the bargaining regime:

$$w = w^a + \theta_i \frac{\widetilde{\pi}^a - \pi_0(I)}{l} + (1-\theta_i) w_0(\overline{I}) \quad \text{where } i = b, \quad n \tag{5.1}$$

This equation is estimated as before, using the same set of instruments, and the results are presented in Table 7. They tell a clear story. Firms that negotiate on employment with their unions have to share half of their quasi-rents with their workers. In other words, in those firms, unions are strong enough to extract half of the quasi-rent. However, in firms that did not negotiate on employment with their unions, workers bargaining power was essentially zero and workers received their opportunity cost of time, w^a, plus their negotiation threat point, $w_0(\overline{I})$. In other words, in firms where unions were too weak to impose negotiations on employment, workers were compensated at the market rate.

In addition, because $\theta_n = 0$ (for those firms that did not bargain on employment), the coefficient on the imports of competitors give us direct estimates of $w_0(\overline{I})$. First, workers suffer slightly from competitors' imports of finished goods but the threat point is improved by competitors' imports of intermediates. Second, they show that the threat point increases with the firms' own imports of finished goods. Hence, it seems that w_0 is also a function of the firm's own import and should be noted $w_0(I, \overline{I})$. This is a simple extension of the theoretical model and just makes the optimal level of employment dependent on the firm's own imports, complexifying the ensuing computations, without changing the main conclusions.

Now, for firms in which negotiations on employment took place, hence where $\theta_b = 1/2$, results should be an equal mixture of $\frac{\pi_0(I)}{l}$ and $w_0(\overline{I})$ (see 5.1) First, there is no significant impact from firm's own imports. But, the most striking result is the strong and robust negative impact of the firm's competitors imports of finished goods as well as intermediates (albeit slightly less so) on workers' wages. Hence, workers benefit from the sharing of the rent, even though this quasi-rent appears to be under attack because of increased competition (see Table 1 and Table 2), but import competition strongly decreases wages in firms that negotiated (were forced to) on employment.

It is important at this point to remind the reader that, as shown by Abowd, Kramarz, Lengermann, and Roux (2005), France was, in those years, a country where high-wages often came from the lack of product market competition (virtual monopoly rents), giving unions incentives to bargain hard. Indeed, large firms mostly benefited from these rents. As stated above, the Lois Auroux force firms with at least 50 employees to negotiate with their workers but the topic is left to the parties. Indeed, most firms negotiate on something. However, not all firms accept to bargain on wages and even less bargain on employment (and wages, in fact). In that respect, because firms must negotiate but need not sign an agreement, signature of an agreement, on wages for instance, is is also a proof of strong unions, as (unreported) results show: in firms that sign an agreement, the bargaining power is $\theta_b = 0.37$.

To complete the story, it is useful to understand why some firms negotiated on employment or wages and why other firms did not. What were the changes that favored these negotiations. To do this, I analyze (using a "multinomial logit" specification) the likelihood of a negotiation on employment, a negotiation on wages alone, or no negotiation conditional on various firm-level observables as measured from their growth rates over the

analysis period.

Results are presented in Table 8. They show that firms that agreed or were forced to negotiate on employment with their unions at the end of the sample period had high growth in labor costs per person, lower employment growth, and a higher growth in the quasi-rent per person over the sample period (in contrast with those firms that negotiated only on wages, the reference group). On the trade side, these firms increased strikingly more their imports of finished goods than firms that negotiated only on wages (the opposite holds for imports of intermediates). They also faced tougher competition. Hence, firms were potentially willing or forced – there is no way to identify one from the other – to negotiate changes with unions or personnel delegates in their attempts to further reduce employment in this increasingly competitive environment. However, firms improved their bargaining position (threat point) over the period because they increased outsourcing before bargaining, exactly as the model suggests. Hence, these firms appear to have been substituting imports for employment because of increasing unit labor costs and strong unions that forced them to share a very large fraction, $\theta_b = 1/2$, of their quasi-rent. Unions appear to have been able to resist some changes mostly because of their very strong bargaining power. Their resistance was associated with increased outsourcing, eventually leading to further declines in their employing firms' employment.

6. Conclusion

In this paper, I present the first direct micro-econometric evidence of the relation between workers' wages, employment and the import behavior of employing firms (see Bertrand, 2004 and Goldberg and Tracy, 2001 for evidence in the United States based on industry-level measures of import competition). The story that I evaluate relates trade competition and firms' wages and employment behavior in an imperfectly competitive labor market where unions and firms have to bargain. To accomplish this task, I 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. I show that the size of the quasi-rent is directly affected – decreased – by international trade and increased

competition. I also show that the effects of trade go **beyond** movements in the quasi-rent. Estimates demonstrate that worker's compensation is directly affected by the firm's import behavior and import competition, reflecting changes in workers' and firms' threat points.

To summarize my results, I find a bargaining power around 0.20, half the power estimated using firm-level equations. Workers' wages deteriorate through competitive pressures. Three effects are at play. In formerly protected industries and in large firms, quasi-rents decreased. In industries where competitors of their employing firm actively import (finished) goods, workers' wage also decreased. But, firm's own imports of these (finished) goods "protect" workers. The total of these three effects is negative for most workers. All these results are robust to the various specification checks that I conducted.

Finally, I delve further into the relationship between the behavior of unions and firms' imports. For firms that bargained on both employment and wages with their workers' unions, my results show that workers captured half of the quasi-rent. Workers in other firms were not able to capture a significant share of the rents. But these results also demonstrate that firms that bargained with their workers over employment and wages have apparently tried to use outsourcing in order to decrease their employment in the face of increasing unit labor costs and strong unions. Unions' resistance appears to backfire.

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Appendix A: 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.[35] Our extract runs from 1976 through 1996, with 1981, 1983, and 1990

[35] Meron (1988) shows that individuals employed in the civil service move almost exclusively to other

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 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.[36]

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

positions within the civil service. Thus the exclusion of civil servants should not affect our estimation of a worker's market wage equation.

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

are collected.

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.[37] Descriptive statistics are given in Table A.1.

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

Appendix B.1: Proof

Let us denote by $\phi^{\ell}(I,l))=0$ the first-order condition on employment $R'_{\ell}(I,l)=\omega_0$; by $\phi^{\omega}(I,l,\theta,\omega)=0$, the condition on wage: $\omega=\omega_0+\theta\left[\frac{R(I,l)-\omega_0 l-\pi_0(I)}{l}\right]$

Finally, let us denote by $\phi^{R}(I,l,\theta,\omega)=0$, the first stage condition that maximizes revenue as a function of imports:

$\frac{\partial R}{\partial I}-c'(I)-\theta\left[\frac{\partial R}{\partial I}-\pi'_0(I)\right]=0.$

From these three sets of equations, total derivation yields:

$\phi'^{l}_{I}(I,l)dI+\phi'^{l}_{\ell}(I,l)dl=0$

$\phi'^{\omega}_{\omega}d\omega+\phi'^{\omega}_{I}+\phi'^{\omega}_{l}dl+\phi'^{\omega}_{\theta}d\theta=0$

$\phi'^{R}_{\omega}d\omega+\phi'^{R}_{I}dI+\phi'^{R}_{l}dl+\phi'^{R}_{\theta}d\theta=0$

The first equation yields $\frac{dl}{dI}=-\frac{\phi'^{l}_{I}(I,l)}{\phi'^{l}_{\ell}(I,l)}=-\frac{\frac{\partial^2 R}{\partial I\partial l}}{\frac{\partial^2 R}{\partial l^2}}$

$\frac{dl}{dI}$ is of the sign of $\frac{\partial^2 R}{\partial I\partial l}$ since $\frac{\partial^2 R}{\partial l^2}<0$. Now, using the above expression:

$\phi'^{\omega}_{\omega}d\omega+\left(\phi'^{\omega}_{I}-\phi'^{\omega}_{l}\frac{\phi'^{l}_{I}}{\phi'^{l}_{l}}\right)dI+\phi'^{\omega}_{\theta}d\theta=0$

$\phi'^{R}_{\omega}d\omega+\left(\phi'^{R}_{I}-\phi'^{R}_{\ell}\frac{\phi'^{l}_{I}}{\phi'^{l}_{l}}\right)dI+\phi'^{R}_{\theta}d\theta=0.$

We can directly compute the different elements of these expressions:

$\phi'^{\omega}_{\omega}=-1$

$\phi'^{\omega}_{\theta}=\left(\frac{R(I,l)-\omega_0 l-\pi_0(I)}{l}\right)$

$\phi'^{R}_{\omega}=0$

$\phi'^{R}_{\theta}=-\frac{\partial R}{\partial I}+\pi'_0(I)$. Taken together, this yields

$\frac{dI}{d\theta}=-\left(\pi'_0(I)-\frac{\partial R}{\partial I}\right)/\left(\phi'^{R}_{I}+\phi'^{R}_{l}\times\frac{\partial^2 R/\partial I\partial l}{\frac{\partial^2 R}{\partial l^2}}\right)$

But, $\phi'^{R}_{I}=(1-\theta)\frac{\partial^2 R}{\partial I^2}-c"(I)+\theta\pi''_0(I)<0$ given the concavity of R and π_0 in I and the convexity of c in I .

In addition, $\phi'^{R}_{l}=(1-\theta)\frac{\partial^{\ell} R}{\partial l\partial I}$ then $\phi'^{R}_{I}+\phi'^{R}_{l}\times\frac{\frac{\partial^2 R}{\partial I\partial l}}{\frac{\partial^2 R}{\partial l^2}}=\phi'^{R}_{I}+(1-\theta)\frac{\left(\frac{\partial^2 R}{\partial l\partial I}\right)^2}{\frac{\partial^2 R}{\partial l^2}}<0$. Therefore, this shows that $\frac{dI}{d\theta}$ is always of the sign of $\left[\pi'_0(I)-\frac{\partial R}{\partial I}\right]$.

Now, $\frac{d\omega}{dI}=\left(\phi'^{\omega}_{I}-\phi'^{\omega}_{l}\frac{\frac{\partial^2 R}{\partial l\partial I}}{\frac{\partial^2 R}{\partial l^2}}\right)+\frac{\phi'^{\omega}_{\theta}}{\left[\frac{\partial R}{\partial I}-\pi_0(I)\right]}\times\left[\phi'^{R}_{I}+\phi'^{R}_{l}\frac{\partial^2 R/\partial I\partial l}{\frac{\partial^2 R}{\partial l^2}}\right]$ with:

$\phi'^{\omega}_{I}=\frac{\theta}{l}\left[\frac{\partial R}{\partial I}-\pi'_0(I)\right]$

$\phi'^{\omega}_{l}=-\frac{\theta}{l^2}\left[R(I,l)-\omega_0 l-\pi_0(I)\right]+\frac{\theta}{l}\left[\frac{\partial R}{\partial l}-\omega_0\right]=-\frac{\theta}{l^2}\left[R(I,l)-\pi_0(I)-l\frac{\partial R}{\partial l}\right]=-\frac{\theta}{l^2}\left[R(I,l)-\omega_0 l-\pi_0(I)\right]<$

Assuming that $\pi'_0(I)-\frac{\partial R}{\partial I}>0$, we deduce that $\phi'^{\omega}_{I}<0$. Since $\phi'^{\omega}_{l}<0$ there are two cases.

a) If $\frac{\partial^2 R}{\partial l\partial I}>0$ then the first part of $\frac{d\omega}{dI}$ is negative and the second part is of the sign of ϕ'^{ω}_{θ} but $\phi'^{\omega}_{\theta}>0$ and the sign of

then the sign of $\frac{d\omega}{dI}$ is not determined.

b) If $\frac{\partial^2 R}{\partial l\partial I}<0$ the sign of $\frac{d\omega}{dI}$ is also undetermined since $\phi'^{\omega}_{I}<0$ but $-\phi'^{\omega}_{\ell}\frac{\frac{\partial^2 R}{\partial l\partial I}}{\frac{\partial^2 \ell}{\partial l^2}}>0.$■

Appendix B.2: 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 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 :

$$\pi_{jt} = p_{jt}f(l_{jt}) - \int_{\mathcal{X}_{jt}} w_{it}(z_{it})l_j(z_{it})dz_{it} \tag{6.1}$$

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 :

$$\max_{w(.),l_j(.)} \left[(1-\theta_j)\ln \pi_{jt} + \int_{\mathcal{X}_{jt}} \theta_j(z_{it}) \ln\left[(w_{it}(z_{it}) - w^a_{it}(z_{it}))l_j(z_{it})\right] dz_{it} \right] \tag{6.2}$$

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

$$\begin{array}{rcl} p_{jt}f'(l_{jt}) & = & w^a_{it}(z_{it}) \\ w_{it}(z_{it}) & = & w^a_{it}(z_{it}) + \pi^a_{jt}\frac{\theta_j(z_{it})}{l_j(z_{it})} \end{array} \tag{6.3}$$

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

$$\pi^a_{jt} = p_{jt}f(l_{jt}) - \int_{\mathcal{X}_{jt}} w^a_{it}(z_{it})l_j(z_{it})dz_{it} \tag{6.4}$$

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 C: Endogeneity and Instruments; a Detailed Discussion

Sources of endogeneity: Let us consider simplified versions of our first-order conditions with no imports:

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

Now, in contrast to Abowd and Lemieux (1993), assume that markets for goods are not fully competitive and that $p = D^{-1/\eta}$ 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 will affect the 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. $e^w \simeq 0$. The use of individual level data sources matched with firm level data allows the analyst to decompose the wage into person effects, including the contribution of observables, and firm effects, producing a good measure of the opportunity wage.

The instrumentation strategy (principle and tests): To understand the results of Table 3, several points must be discussed. First, all my regressions control for the person-specific

unobserved heterogeneity using the estimated person effect. More precisely, all estimates, in this table as well as in those that follow, include an estimated person effect that results from estimating (4.1) 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 (4.1) is obtained using the full sample of more than 13 millions observations and a conjugate gradient algorithm.[38] These last two effects are then used in the restricted sample that is analyzed here. The estimated person effect is directly used in the regression as an additional control variable whereas the firm effect is used to compute the quasi-rent using equation (4.4). 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.

In Table 3, 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. They also tend to support the idea that workers still employed in manufacturing industries benefit from their employing firm's imports. Import competition effects are apparently 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, these OLS estimates are likely to be affected by endogeneity biases. Therefore, I test for endogeneity of 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 competitors import behavior (the 99th percentile of the distribution of imports of goods as a fraction of production in the same 4-digit sector and the 99th percentile of the distribution of imports of intermediates as a fraction of local purchases in the same 4-digit sector), worker's seniority, and seniority-square. The test strategy that I use 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 variables. I compute the residuals of these regressions and augment the wage equation with these residuals. The exogeneity test amounts to a zero coefficient on the residual in this last equation for the variable of interest. For robustness purposes, I used the two measures of the quasi-rent. Results point to similar conclusions. All variables but quasi-rent and seniority are exogenous in this person-level wage

[38] See Abowd, Creecy, and Kramarz (2002). Notice that I do not correct for the fact that this person effect is estimated. Since I know the asymptotic variance of this effect as well as the covariance with other explanatory variables, I could push in this direction. However, first attempts at doing so show that this correction would be trivial.

equation. Results are presented in Table C.4. In addition, treating seniority as exogenous does not affect any of the results presented in this paper.[39]

Note again that the analysis sample is restricted for three reasons: a) only those workers that are present both in the DADS and in the EDP are included because I 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); b) the observation period is restricted to 1986 to 1992, the only years for which I also observe the import behavior of firms; c) only manufacturing workers are included since, again, imports are restricted to imports of goods (not services) even though I observe and use imports of such goods coming from other sectors such as the retail or wholesale trade industries. Of course, I could directly include person- and firm-fixed effects in equation (4.5). However, the relatively small number of observations per person and per firm would lead to potentially very imprecise estimates and this imprecision would affect all other coefficients. Therefore, I chose to use in equation (4.5) these effects as estimated from (4.1). 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.[40] [41]

Since quasi-rent and seniority are the only variables that are instrumented when estimating the wage equation, it is useful to examine the instrumenting equations for these two variables. As explained previously, I instrument the rent and 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.[42] The detailed estimates are available from the author, but are summarized in Tables C.2 and C.3 (in Appendix C). First, consider Table C.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 although the correlation is not perfect. 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 C.2, this is not always so. When export prices of US firms to OECD countries increase, the quasi-rent in French firms indeed increases; French firms apparently benefit from these higher prices. On the other hand, when export prices to Eastern European countries increase, quasi-rent of French firms decreases; possibly indicating increased import competition between French and American firms. 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. However, two effects are at play. Quasi-rent mixes profits and workers' opportunity wages. And,

[39] 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.

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

[41] In what follows, I do not correct for the presence of estimated coefficients because these person and firm effects are quite precisely estimated given the length and size of my data source (see Abowd, Creecy, Kramarz, 2002 for the formulas of the variance of these effects).

[42] 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.

if both increase at different rates, negative signs have a potential economic interpretation. Now, consider Table C.3 which presents results for seniority. Here, for most destinations and dates, coefficients are positive. This agrees with the view that price increases translates into lower pressure on workers, potentially because workers are in better position vis-à-vis the firms. 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.

Table A.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 C.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 C.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 C.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 C.4: Augmented Regression, Endogeneity Tests

	Wage Level	
	(1)	(2)
Quasi-Rent Residual	-0.0569	-0.0709
	(0.0315)	(0.0349)
(Imports of goods)/production Residual	-33.6278	-37.3133
	(56.8296)	(57.7904)
(Imports of IC)/(Local purchases) Residual	14.4764	19.4086
	(33.0161)	(34.2664)
Competitors imports of goods (99th perc.,sh. of production) Residual	-4.5034	-3.9188
	(6.5499)	(6.5155)
Competitors imports of IC (99th perc., sh. of local purchases) Residual	6.7885	5.9848
	(4.7205)	(4.6980)
Seniority Residual	5.1801	6.0883
	(4.3099)	(4.1766)
Seniority-squared/10 Residual	-2.0367	-2.4109
	(1.3882)	(1.3447)

Notes: 111,380 person-year observations. The sample period is 1986-1992. Regression (2) uses a measure of quasi-rent that discounts assets. For both columns, Quasi-rent, the various Imports variables, Seniority and Seniority-squared were first regressed on all exogenous variables and the instruments (lagged export price indices of US firms to 4 destinations in US $ of the same industry as the employing firm). Residuals were obtained and entered into the above regression, in addition to the (potentially) endogenous variables and all exogenous variables. The coefficients reported are those on the residuals. The exogeneity tests amount to the nullity of the coefficient on these residuals. Robust standard errors allowing for clustering at the industry-level are between parentheses. The regression includes the following variables (coefficients unreported): Quasi-rent, the various Imports variables, Seniority, Seniority-squared, 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).
Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices.

Table D.1 : Workers' Wages: The Respective Roles of Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports
Robustness Check with the Firm Fixed-Effect
(Firms' Quasi-Rent and Workers' Seniority Instrumented)

	Wage-Level With firm fixed-effect
Quasi-Rent	0.2114
	(0.0222)
	[0.0375]
Firm fixed-effect	4.6988
	(2.0199)
	[2.1284]
(Imports of goods)/production	32.1716
	(5.2510)
	[9.1630]
(Imports of IC)/(Local purchases)	23.4902
	(4.6798)
	[5.7137]
[(Imports of goods)/production]**2	-0.2930
	(0.0444)
	[0.0752]
[(Imports of IC)/(Local purchases)]**2	-0.1373
	(0.0304)
	[0.0348]
Competitors imports of goods (99 th perc.,sh. of production)	-3.9499
	(1.0225)
	[2.2853]
Competitors imports of IC (99th perc., sh. of local purchases)	3.6446
	(0.8147)
	[1.5369]
Competitors imports of goods (99th perc., in level)	0.0004
	(0.0005)
	[0.0015]
Competitors imports of IC (99th perc., in level)	0.0006
	(0.0014)
	[0.0067]
Imports of goods from the trade ind. (sh. of total purchases)	0.1247
	(0.0853)
	[0.1899]
Imports of goods from the trade industry (total level)	-0.0100
	(0.0156)
	[0.0212]
Seniority	-6.9168
	(1.7334)
	[2.9095]
Seniority-squared/10	2.2444
	(0.7480)
	[1.2522]
Chi-square (df=41)	46.79
Over-identification test (p-value)	0.2469

Notes: 111,380 person-year observations. The sample period is 1986-1992. Regression 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 1: Rents, Employment, Labor Costs and Trade Competition

	Quasi-Rent	Quasi-Rent (>50)	Quasi-Rent (<=50)	Employment (in logs)	Employment (in logs, >50)	Employment (in logs, <=50)	Labor Costs (per emp., in logs)	Labor Costs (per emp., in logs, <50)	Labor Costs (per emp., in logs, <=50)
Competitors imports of goods (99th perc.,sh. of production)	-9.2959	-10.0339	-3.1311	-0.0234	-0.0113	-0.1078	-0.0191	-0.0135	-0.0658
	(0.6613)	(0.6785)	(2.3566)	(0.0045)	(0.0040)	(0.0185)	(0.0030)	(0.0022)	(0.0165)
	[4.1678]	[4.3443]	[3.3219]	[0.0213]	[0.0213]	[0.0335]	[0.0144]	[0.0136]	[0.0339]
Competitors imports of IC (99th perc., sh. of local purchases)	-12.5085	-13.0270	-1.6365	0.0053	0.0095	-0.0550	-0.0232	-0.0199	-0.0795
	(0.4409)	(0.4425)	(2.0816)	(0.0030)	(0.0026)	(0.0163)	(0.0020)	(0.0015)	(0.0146)
	[5.9985]	[5.9426]	[2.6492]	[0.0269]	[0.0256]	[0.0391]	[0.0080]	[0.0080]	[0.0258]
Intercept	82.8155	92.3066	49.1545	5.9205	6.9320	2.7873	4.6028	4.6568	4.4541
	(0.3276)	(0.3690)	(0.8723)	(0.0022)	(0.0022)	(0.0069)	(0.0015)	(0.0012)	(0.0062)
	[3.6200]	[3.8777]	[1.0572]	[0.0132]	[0.0138]	[0.0156]	[0.0084]	[0.0086]	[0.0131]
R-Square	0.8446	0.8545	0.7855	0.9943	0.9929	0.9423	0.8634	0.9072	0.7276
Number of Observations	119,860	91,070	28,790	121,260	91,808	29,452	121,260	91,808	29,452

Notes: Sources: DADS-EDP matched with BAL-SUSE (BRN). Each regression includes 16,078 (resp. 16,284) firm indicators when 119,860 observations (resp. 121,260 observations). Standard errors between parentheses. Standard errors adjusting for clustering at the detailed industry level (3-digit) between brackets. The quasi-rent is measured per employee.

Table 2: Rents, Employment, Labor Costs and Firm's Trade

	Quasi-Rent	Quasi-Rent (>50)	Quasi-Rent (<=50)	Employment (in logs)	Employment (in logs, >50)	Employment (in logs, <=50)	Employment (in logs, >50)	Employment (in logs, <=50)	Employment (in logs)
Competitors imports of goods (99th perc.,sh. of production)							0.0007	-0.1065	
							(0.0041)	(0.0185)	
							[0.0209]	[0.0320]	
Competitors imports of IC (99th perc., sh. of local purchases)							0.0119	-0.0561	
							(0.0026)	(0.0163)	
							[0.0197]	[0.0282]	
(Imports of goods)/production	-35.2563	-39.0082	3.7053	-0.1286	-0.1333	-0.0660	-0.1343	-0.0472	-0.1286
	(1.6400)	(1.6880)	(5.8838)	(0.0110)	(0.0099)	(0.0464)	(0.0100)	(0.0464)	(0.0110)
	[8.2040]	[8.9514]	[11.2350]	[0.0509]	[0.0545]	[0.0732]	[0.0535]	[0.0734]	[0.0509]
(Imports of IC)/(Local purchases)	7.2746	8.7769	-2.4706	-0.0796	-0.0923	0.0286	-0.0936	0.0308	-0.0796
	(0.8318)	(0.8906)	(2.2513)	(0.0056)	(0.0052)	(0.0176)	(0.0052)	(0.0176)	(0.0056)
	[7.0055]	[8.0317]	[3.4125]	[0.0829]	[0.0962]	[0.0293]	[0.0962]	[0.0293]	[0.0829]
(Total Exports)/(Sales in France)									0.0017
									(0.0217)
									[0.0204]
Intercept	74.0972	82.4073	47.7757	5.9291	6.9529	2.7385	6.9467	2.7869	5.9291
	(0.1435)	(0.1745)	(0.2144)	(0.0010)	(0.0010)	(0.0017)	(0.0023)	(0.0069)	(0.0010)
	[0.6004]	[0.8081]	[0.2374]	[0.0096]	[0.0130]	[0.0017]	[0.0154]	[0.0118]	[0.0096]
R-Square	0.8435	0.8533	0.7855	0.9943	0.9930	0.9421	0.9930	0.9423	0.9943
Number of Observations	119,860	91,070	28,790	121,260	91,808	29,452	91,808	29,452	121,260

Notes: Sources: DADS-EDP matched with BAL-SUSE (BRN). Each regression includes 16,078 (resp. 16,284) firm indicators when 119,860 observations (resp. 121,260 observations). Standard errors between parentheses. Standard errors adjusting for clustering at the detailed industry level (3-digit) between brackets. The quasi-rent is measured per employee.

Table 3: 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 4: 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 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.

Table 7: Workers' Wages: Workers' Bargaining Power and Firm-Level Imports, Controlling for Competitors' Imports

The Role of Negotiations

(Firms' Quasi-Rent and Workers' Seniority Instrumented)

		Wage Level
Quasi-Rent	(neg. on employment)	0.5211
		(0.0521)
		[0.0853]
Quasi-Rent	(no neg. on employment)	0.0185
		(0.0384)
		[0.0406]
(Imports of goods)/production	(neg. on employment)	21.8944
		(17.1492)
		[34.2176]
(Imports of goods)/production	(no neg. on employment)	24.6543
		(4.7628)
		[10.5556]
(Imports of IC)/(Local purchases)	(neg. on employment)	-47.6270
		(15.7203)
		[46.5176]
(Imports of IC)/(Local purchases)	(no neg. on employment)	6.9186
		(4.9157)
		[12.7914]
Competitors imports of goods (99th perc.,sh. of production)	(neg. on employment)	-41.5820
		(7.5401)
		[13.9573]
Competitors imports of goods (99th perc.,sh. of production)	(no neg. on employment)	-3.1373
		(1.5790)
		[2.7383]
Competitors imports of IC (99th perc., sh. of local purchases)	(neg. on employment)	-20.2981
		(4.9574)
		[16.3141]
Competitors imports of IC (99th perc., sh. of local purchases)	(no neg. on employment)	5.1224
		(0.9143)
		[2.3842]
Chi-square (df=38)		47.0476
Over-identification test (p-value)		0.1491

Notes: 37,698 person-year observations. The sample period is 1986-1992. The regression uses a measure of quasi-rent that discounts assets. The regression includes the following variables (coefficients unreported): Competitors imports of goods (99th perc., in level), Competitors imports of IC (99th perc., in level), Imports of goods from the trade ind. (sh. of total purchases), Imports of goods from the trade ind. (total purchases), seniority and seniority-squared, 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).

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. ESS for bargaining outcomes.

Table 8: Negotiation in 1992 and Firm-Level Changes in the Preceding Period (1986-92)

	No Negotiation, either on Wages or Employment		Negotiation on Employment and Wages	
	Coef.	Std. Err.	Coef.	Std. Err.
Change in Labor Costs (per person, in logs)	1.2803	0.3207	2.9370	0.3430
Change in Employment (in logs)	0.5041	0.1351	-0.7447	0.1556
Change in Imports of Goods (as a fraction of production)	-1.4728	0.3077	1.7646	0.3230
Change in Imports of IC (as a fraction of local purchases)	0.1312	0.1183	-0.6472	0.1273
Change in the Quasi-rent (per person)	0.0007	0.0005	0.0023	0.0004
Change in the Competitors Imports of IC (99th perc., sh. of local purchases)	0.4842	0.1093	-0.4260	0.1209
Change in the Competitors Imports of Goods (99th perc., sh. of production)	0.7731	0.1742	0.5312	0.1754
Pseudo-R2	0.1818			
Number of Observations	7,210			

Sources: BAL-SUSE for firm-level variables, DADS-EDP for individual variables, Customs file for import measures, OECD for the export prices. ESS for bargaining outcomes. Estimated by Maximum Likelihood. The reference group comprises firms that only negotiated on wages.