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FROM THE INVISIBLE HANDSHAKE TO THE INVISIBLE HAND? HOW IMPORT COMPETITION CHANGES THE EMPLOYMENT RELATIONSHIP

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ABSTRACT

There is a popular perception that increased competitive pressures in U.S. product markets are turning the employment relationship from one governed by implicit agreements into one governed by the market. In this paper, I examine whether changes in import competition indeed affect the use of implicit agreements between employers and workers in a key aspect of their relationship, wage setting. I focus on the extent to which employers, after negotiating workers' wages upon hire, subsequently shield those wages from external labor market conditions. If increased competition induces a switch from these implicit agreements to spot market wage setting, then: (1) the sensitivity of workers' wages to the current unemployment rate should increase as competition increases; and (2) the sensitivity of workers' wages to the unemployment rate prevailing upon hire should decrease as competition increases. I find evidence supporting both of these predictions, using exchange rate movements to generate exogenous variation in import competition. I then show more directly that increased financial pressure on employers is one mechanism behind these effects -- both of the wage-unemployment sensitivity changes are larger in high leverage industries than in low leverage ones. Moreover, declines in corporate returns following increased competition directly increase the sensitivity of wages to the current unemployment rate. There are two general interpretations of my set of results. Wage flexibility may be a response to competition either because such flexibility reduces the probability of costly financial distress or because lower corporate profits weaken the enforceability of implicit wage setting agreements.

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1 Introduction

Complete employment contracts are expensive to design and enforce. As a result, employers and workers often let their relationship be governed by informal agreements. They share an unwritten understanding about pay, hours, work quality, working conditions, job security and other dimensions of employment.[1] To use Okun's (1981) characterization, the market for labor is governed by an invisible handshake rather than cleared by an invisible hand.

According to the popular press, however, the past decade has witnessed a substantial transformation of the employment relationship in the United States. In particular, multiple episodes of downsizing and an increase in the use of temporary workers are commonly cited as evidence of a decline in the prevalence of those informal arrangements between employers and workers. In response to increased product market competition, the pundits claim, the employment relationship has become more like a spot market transaction. In this paper, I show that exogenous changes in the level of import competition alter the use of implicit agreements in the labor market. I also find suggestive evidence that increased financial pressures on employers are one mechanism behind this effect.[2]

The unwritten understanding between employers and workers addresses many dimensions, as I mentioned above. I concentrate on implicit arrangements in the wage setting process. Under the arrangements I consider, wages are negotiated when workers enter into a firm and are thereafter

[1] Union contracts are an exception. They are written and can be enforced in a court of law. However, they probably do not cover all possible contingencies and are, in that sense, incomplete. In the empirical section of the paper, I distinguish between union and non-union workers.

[2] This research project complements a growing literature that aims to directly assess evidence of a decline in internal labor markets. Researchers have previously looked at trends in labor market outcomes such as job tenure (Farber (1996, 1997), Diebold, Neumark, and Polsky (1997) and Swinnerton and Wial (1995)), earnings instability (Gottschalk and Moffit (1994)), and wage dispersion between and within firms (Groshen and Levine (1997)). While there is only weak evidence of a decrease in job stability over the last twenty years, within-job earnings instability does appear to have increased over that period. My approach in this paper differs from the existing literature in a fundamental way. Rather than looking solely at trends in labor market outcomes, I study the causal link between such labor market outcomes and changes that independently occurred in other markets.

shielded from the external labor market. I focus on such "shielding agreements" in the wage setting process for three main reasons. First, they are theoretically relevant. Under fairly general conditions, such agreements optimally emerge as a way for risk-neutral firms to insure risk-averse workers against cyclical fluctuations. The resulting risk-sharing wages are sensitive to the external labor market conditions at the time the worker is hired (and the agreement negotiated) but do not respond to the current state of the labor market. Second, previous ethnographic and case studies validate the realism of these wage setting arrangements. For instance, Doeringer and Piore (1971) describe how contacts between internal and external labor markets in large manufacturing establishments are limited to a subset of jobs, or "ports of entry." Insiders' wages are determined by a set of administrative rules and customs that are typically only weakly influenced by changes in the external labor market. Similarly, one of the main findings of Baker, Gibbs and Holmstrom's (1994a, 1994b) case study of twenty years of personnel data are "cohort effects" in wages. Once workers are inside the firm, their wages seem to follow a common pattern that is very different from the pattern of wages for new entrants; much of the wage differences across cohorts comes from variation in the starting wages. The third main reason for studying these wage setting arrangements, besides their theoretical and practical relevance, is that they can easily be examined empirically. I will regard a low elasticity of current wages to the current local labor market unemployment rate *and* a high elasticity of current wages to the unemployment rate at the time of job start as two "symptoms" of the use of shielding agreements in the employment relationship. I will ask whether and how increased competitive pressures in the product market affect both of these wage-unemployment elasticities.

Empirically, product market competition can be correlated with the use of informal agreements in the wage setting process without exerting a direct influence. Employers who buffer their work-

ers' wages from the vagaries of the external market face relatively higher costs during economic downturns, which may weaken their competitive position at those times. Poorly managed firms may be both relatively more likely to protect their workers and to be targeted by competitors. These examples justify the need to identify a source of variation in product market competition that is independent of all management choice variables. To that purpose, I focus on foreign competition as one form of product market competition and use industry source-weighted exchange rate movements to generate exogenous variation in the level of import penetration.

I merge labor, trade and corporate data sets over the period 1976-1992. I first show that an exogenous increase in import competition increases the elasticity of workers' current wages to the current local unemployment rate.[3] This result is robust to various specification and sample changes. Second, I find that stronger import competition reduces the elasticity of current wages to the unemployment rate that was prevailing when the worker got hired. This in turn suggests that wages are less likely to be negotiated once and for all upon entry in a firm when competition is higher. I also test the robustness of this finding to specification assumptions and sample choices. The combination of these two elasticity changes is consistent with the hypothesis that stronger competitive pressures shift the wage setting process away from implicit shielding agreements between employers and workers, and towards spot labor markets.

I then attempt to identify some of the microfoundations of this effect and specifically study financial mechanisms by which foreign competition may weaken the informal wage setting agreements. To do so, I introduce measures of corporate performance and capital structure as potential

[3]It is worth stating why my focus is *not* on the impact of product market competition on wage *levels*. One might argue that a reduction of wages following an increase in import penetration is evidence of a change in the wage setting institutions that give workers above-market wages. However, a change in wage levels can also be interpreted under constant wage setting rules. For example, trade reduces the product demand faced by domestic firms and shifts down the demand for labor. If the wage setting curve is not perfectly elastic, the shift down of the labor demand curve will reduce wages. Hence trade can reduce wages without any change in wage setting. Similarly, as rents go down in a sector, wages set under rent-sharing will also go down even without any change in the rent-sharing rule.

explanatory variables. I first show that declines in industry corporate returns induced by exchange rate movements increases the sensitivity of wages to current external labor market conditions. I then use industry leverage as a proxy for financial constraints and show that changes in competitive pressures have a larger impact on the sheltering of workers' wages among the more leveraged industries. These findings are consistent with the hypothesis that tougher competition, by lowering firms' earnings, raising default probabilities and shortening corporate horizons, increases firms' preferences for wage flexibility. Firms may no longer be willing to shelter their workers' wages if such a sheltering implies a risk of financial distress that can be reduced when wages are set on a spot market. Alternatively, the sheltering of wages may become impossible to enforce when lower survival rates reduce firms' costs of reneging on their previous implicit commitments.[4]

The rest of the paper is organized as follows. Section 2 outlines some potential mechanisms by which competitive pressures can alter the use of shielding agreements in the employer-worker relationship. In Section 3, I present my empirical methodology and discuss the identification strategy. Section 4 reviews the different data sources and describes the main variables. I present and interpret the results in Section 5. I first establish a causal relationship between product market competition and the sheltering of workers' wages (Section 5.2). I then investigate the intermediating role of corporate attributes such as leverage and rents (Section 5.3 to Section 5.5). Section 6 summarizes and offers concluding remarks.

[4]The corporate results can also be reconciled with two alternative mechanisms under some additional assumptions. First, workers may consider it *fair* for firms that are experiencing financial pressure to pay the spot market wages (Kahneman, Knetsch and Thaler (1986)). Second, managers may have a "preference" for honoring wage setting arrangements but see their discretion to do so reduced with higher levels of competition in the product market (Shleifer and Summers (1988)). I discuss these alternative models in Section 5.5.

2 Theoretical Background

This section briefly outlines a simple theory of how greater product market competition can affect the structure of the employment relationship and offers a set of empirically testable predictions.[5]

Consider a model of the labor market where explicit wage contracts between firms and workers cannot be implemented (for example because the terms of the contracts cannot be verified ex post by a third party). Rather, wages are either set on a spot market or through informal agreements. If workers cannot insure their labor income against aggregate shocks (say, due to moral hazard or adverse selection problems), these informal agreements can voluntarily emerge ex ante as a means for risk-neutral firms to insure, or shield, risk-averse workers. I consider the case of full insurance under which workers are paid a constant wage in every period under the informal agreements. When workers face mobility costs, the level of this constant wage is simply the result of a bargaining process that occurs when workers originally "contract" with the firm.[6]

Hence, under the implicit shielding labor market arrangements, current wages should have a low sensitivity to current external labor market conditions but should be correlated to the conditions that were prevailing at the time workers got hired by the firm. In contrast, wages set on a spot market should respond to current external labor market conditions but should not be correlated to the conditions prevailing upon hire. This directly justifies the two types of tests I perform in this paper to distinguish spot market wage setting from contractual wage setting. I will use state unemployment rates to proxy for the state of the external labor market. First, I will interpret a stronger correlation between *current* wages and *current* unemployment rate as evidence of a switch away from shielding and towards spot market wage setting curve. Second, controlling for current

[5] A more formal analysis is available in Bertrand (1998).

[6] In the absence of mobility costs for workers, risk-sharing wages will instead be sensitive to the minimum unemployment rate since the worker was hired (see Harris and Holmstrom (1982) and Beaudry and DiNardo (1991)).

unemployment, I will interpret a stronger correlation between *current* wages and unemployment *at the contract start* as evidence of a switch away from spot market wage setting and towards shielding.

I theoretically distinguish two channels by which the greater financial pressures that firms face when product market competition gets stronger can cause a switch from implicit wage shielding contracts to spot market wage-setting. First, in the presence of capital market imperfections, stronger product market competition may reduce firms' *ex ante* preference for insuring their risk-averse workers. Tougher competitive pressures reduce the rents that any firm can capture. Increased trade openness, for example, leads to the entry of new firms in product markets where incumbent firms used to have substantial market power; rents fall as a consequence. This weakens firms' ability to fulfill their capital market obligations and can lead to financial distress. Insuring workers during downturns may then be extremely expensive if it implies that firms may have to be liquidated. In order to eliminate or reduce the risk of a default, employers may find it no longer optimal to "contract" with their workers ex ante and may prefer to pay the more flexible spot-market wages.[7]

Second, even if capital markets are perfect and firms ex ante prefer shielding their workers' wages from the vagaries of the external labor market, a higher level of product market competition may reduce the *ex post* enforceability of the shielding agreement, thereby constraining the set of time-consistent wage setting rules. Because implicit contracts cannot, by definition, be enforced by a third party, they need to be self-enforcing. When there is a lot of slack in the labor market, the shielding agreements become more difficult to sustain. Indeed, firms can in those times realize short-term gains by paying workers their reservation wage on the spot market. For firms not to be willing to renege on their ex ante commitments, the cost of losing their reputation must be

[7]Chevalier and Scharfstein (1995) use a very similar theoretical argument to explain movements in markups over the business cycle. The risk of default assumed in their model and in the set-up here can be seen as naturally deriving from an optimal debt contract under incomplete contracting. See Hart and Moore (1989) and Bolton and Scharfstein (1996) for a general theoretical treatment of these optimal debt contracts.

sufficiently high. Competitive pressures, by lowering expected future rents and shortening the corporate horizon, reduce such a cost. As a consequence, implicit agreements in wage setting cannot credibly be "signed" anymore and the employment relationship may evolve towards a spot market.[8]

To summarize, I propose to test whether product market competition affect the employment relationship inside of firms by examining whether an exogenous increase in the level of product market competition: (1) *increases* the sensitivity of current wages to the current unemployment rate, and (2) *decreases* the sensitivity of current wages to the unemployment rate prevailing at the time of job start. Moreover, I propose to investigate the relevance of the financial channels by studying whether changes in corporate profits and the resulting changes in financial pressure mediate the link between product market competition and the wage-unemployment elasticities. I now proceed to present in more details the empirical strategy adopted to test these different propositions.

3 Empirical Strategy

In this section, I discuss econometric issues common to most of the regressions I estimate. I justify the need for instrumentation and describe the proposed instruments. Appendix A addresses

[8]This second mechanism thus relies on a reputation argument. The importance of reputational concerns in the enforcement of implicit agreements is obviously not new. Nor is its application to the employment relationship. Akerlof (1980, 1982) suggests that firms invest in their long-term reputation to generate productive high morale among employees. Espinoza and Rhee (1989) develop a repeated game version of the monopoly union bargaining model. They show that if unions and firms have enough to gain from future interactions, cooperation is possible and the dynamic version of the monopoly union model needs not be as inefficient as the static version. Bull (1987) models implicit incentive contracts in a similar repeated game framework. He considers a case where transaction costs limit the usage of market reputation as an enforcement device. He assumes that information about any breach of agreements inside the firm does not flow rapidly to the outside labor market. Under such circumstances, implicit contracts can still be supported by intrafirm reputation. Finally, a crucial element in Kreps' (1990) theory of corporate culture is reputation. In that theory, the way a firm reacts to an unforeseen contingency directly affects the amount of "faith" workers have in the firm.

simultaneous equations issues.

Using repeated cross-sections of individual-level data, the first basic equation I estimate is:

$$log(w_{ijkt}) = a\,u_{kt} + b\,imp_{jt} + c\,(imp_{jt} * u_{kt}) + d_k + e_t + f_j + g\,D_i + \psi_{ijkt} \qquad (1)$$

where i, j, k, t respectively indexes individual, industry, state and time, w_{ijkt} is the wage rate for individual i, u_{kt} is the unemployment rate in state k and time t, imp_{jt} is a measure of the level of product market competition in industry j at time t, d_k is a vector of state fixed effects, e_t is a vector of time fixed effects, f_j is a vector of industry fixed effects, D_i is a vector of individual characteristics, and ψ_{ijkt} is an error term. A negative value for c means that a higher level of product market competition increases the current wage-current unemployment elasticity.

Because of data limitations, I cannot exploit firm-level variation in imp.[9] Rather, I use industries as units of production. This may raise some concerns because of the difficulty of comparing competition levels between industries. The addition of industry fixed effects f_j partly alleviates these concerns. Industry fixed effects allow me to look at within industry variation in imp_{jt} and $imp_{jt} * u_{kt}$.[10]

I use individual level data even though the source of variation I exploit only operates at the industry-state-year level. The main advantage of a micro data set for this research project is to mitigate the importance of potential composition biases. Suppose that important demographic reshufflings of the workforce accompany changes in the competitive environment, and that the elasticity of wages to the unemployment rate differs across demographic groups. One might then worry that the estimated coefficient on $imp_{jt} * u_{kt}$ captures some of these compositional changes in

[9] See Section 4 for a description of the data used here.

[10] Obviously, concerns could still arise if there is between industry variation in the wage-unemployment elasticity. I have considered alternative specifications of equation (1) where I allowed for interactions of industry and year fixed effects with u_{kt}. The results were qualitatively unaffected.

the industry workforce. Controlling for a vector of individual characteristics D_i captures observable changes in the demographic mix of an industry.

While various specifications of equation (1) are estimated using repeated cross-section data, I also use panel data to estimate a second basic equation. The equations estimated in the panel data set have two main advantages over equation (1). First, I can control for individual fixed effects. Individual fixed effects deal even more thoroughly with the issues raised in the previous paragraph. Controlling for individual fixed effects eliminates compositional problems caused by unobserved characteristics that are constant over time. Second, the panel data set I use allows me to consider changes in the sensitivity of current wages to the unemployment rate that was prevailing upon entry in the firm.[11] The second basic equation I estimate is:

$$log(w_{ijkt}) = a\,u_{kt} + b\,imp_{jt} + c\,(imp_{jt} * u_{kt}) + h\,us_{ikt} + k\,(imp_{jt} * us_{ikt}) + d_k + e_t + f_j + g_i + \psi_{ijkt} \quad (2)$$

where us_{ikt} is the state unemployment rate that was prevailing in the year individual i started working for her present (period t) employer and g_i is a vector of individual fixed effects.

Because I look within individuals, it lessens concerns that the estimated coefficients on us_{ikt} and $imp_{jt} * us_{ikt}$ are biased due to the fact that individuals that start a job when the unemployment rate is high may be different along observable and unobservable dimensions.[12] Another issue that cannot as easily be dealt with by individual fixed effects is match quality. Suppose that match quality is procyclical, so that firm-worker matches happening when the labor market is depressed are worse on average than matches happening during labor market booms. Then the estimated coefficient on us_{ikt} may partly reflect the omitted control for match quality. However, I am not

[11] I use the Merged Outgoing Rotation Groups (MORGs) of the Current Population Survey (CPS) to construct the cross-sectional sample. The MORGs do not contain information about work history. The mobility supplements to various January CPSs do contain information on how long workers have held their current jobs. However, these supplements are not available on a frequent base. Only 6 mobility supplements are available between 1973 and 1991.

[12] Obviously, the individual fixed effects only reduce concerns about the impact of these dimensions on the wage level, not wage growth.

interested by the sensitivity of wages to starting conditions. Rather, I am interested in how this sensitivity varies with competition, as captured by the term $imp_{jt} * us_{ikt}$. Because I expect a positive sign on $imp_{jt} * us_{ikt}$, match quality could drive my results if match procyclicality is lower in industries where competition is high. I can think of no theory or intuition that predicts such a pattern.

3.1 Instrumental Variables Strategy

One could, in principle, directly estimate equations (1) and (2) using Ordinary Least Squares (OLS) and proxy for *imp* with some measure of product market competition or corporate returns. However, one might suspect that these variables are correlated with some component of the error term ψ, in which case OLS will yield biased and inconsistent estimates of the parameters of the model. For instance, suppose that "poorly managed companies" tend to shield their workers relatively more from outside conditions. Suppose that poorly managed companies are also more likely to be targeted by competitors. In that case, the OLS estimates will be subject to an omitted variable bias.[13] Reverse causation can also contaminate the OLS estimation if firms' personnel practices directly impact their competitive position. Firms buffering their workers' wages from the vagaries of the external labor market may face relatively higher production costs during recessions, which may leave them more vulnerable to competitors.

These examples justify the need to identify a source of variation in product market competition that is independent of all management choice variables. To that purpose, I focus on foreign competition as a source of product market competition. A consistent and unbiased estimate of the effect

[13]Note that the bias induced here should lead one to find a negative correlation between competition and the absolute value of current wage-current unemployment elasticity, while I expect from the model that more competition will increase the elasticity of current wage to the current unemployment rate. Consistent with this sign of the bias, I typically find in the CPS regressions that the OLS estimates of c are economically insignificant.

of import competition on wage setting can be obtained by using instrumental variables. I employ Revenga's (1990, 1992) technique and instrument industry measures of import penetration with source-weighted industry exchange rates.[14] The exchange rate variable is correlated with industry-level measures of import penetration but is primarily determined by macroeconomic variables that, conditional on year dummies, can reasonably be regarded as exogenous to the behavior of a certain industry in a certain period.[15] Thus, it is a valid instrument for import penetration. A similar logic can be applied in order to justify the instrumentation of industry corporate return measures with source-weighted exchange rates.

The empirical strategy consists in estimating equations (1) and (2) by Two-Stage Least Squares. In equation (1), two variables are instrumented: imp_{jt} and $imp_{jt} * u_{kt}$. The instruments are xr_{jt} and $xr_{jt} * u_{kt}$, where xr_{jt} is the source-weighted exchange rate for industry j at time t.[16] For equation (2), three variables need to be instrumented: imp_{jt}, $imp_{jt} * u_{kt}$ and $imp_{jt} * us_{ikt}$. The instrumental variables in that case are: xr_{jt}, $xr_{jt} * u_{kt}$ and $xr_{jt} * us_{ikt}$.

4 Data

In this section, I briefly review the principal data sources used in this paper. Appendix B contains more detailed descriptions of the data sources.

4.1 Individual-Level Data

I use two different individual-level labor data sets: a Current Population Survey (CPS) extract and a Panel Study of Income Dynamics (PSID) extract.

[14] See Section 4 and Appendix B for a detailed description of how the exchange rate variables are constructed.

[15] Controlling for year dummies is possible because the exchange rate variable varies between industry based on the composition of imports by country of origin.

[16] In practice, I often use both the current and lagged industry source-weighted exchange rates as instruments.

The CPS extract is a repeated cross-section data set. It is a random subset of the entire set of manufacturing workers in the May CPSs and Merged Outgoing Rotation Groups (MORGs) of the CPS over the period 1976-1992. I limit the sample to manufacturing workers since import penetration data is available for only the manufacturing sector of the economy. I use the May CPSs over the period 1976-1981 and the MORGs over the period 1983-1992. Both the use of the May CPSs over the period 1976-1981 and the absence of data for 1982 are justified by the need to extract a control for union status. Union status is not available in 1982 and is only available in the May CPSs prior to 1982.

As I have already alluded to in Section 3, the PSID extract has two main advantages over the CPS extract. First, The PSID contains information about the length of tenure with the current employer.[17] This information is crucial to the construction of a measure of local labor market conditions at the time of job start. Second, the PSID extract permits a superior control for compositional effects because of its panel structure. Unfortunately, the PSID also has major drawbacks. First, the sample size is limited. It is especially so in the case of this study as I have to concentrate on workers in the manufacturing sector. Second, the PSID does not contain a detailed industry code prior to 1981. This limits the time span of the PSID extract to the period 1981-1992.

Both the CPS and the PSID extracts are merged by industry and year with an import penetration variable and a real exchange rate index. The import penetration variable is constructed from the NBER Trade Database. This database is described in detail in Feenstra (1996). Import penetration is defined as the ratio of imports over imports plus domestic production in a given industry

[17]The wording of this question has substantially changed over time. Before 1984, the question could have been interpreted as duration of continuous employment rather than time together with the present employer. After 1984, the question explicitly asks for time together with the present employer (Polsky (1996)). This imprecise and changing wording of the tenure question is likely to introduce measurement error and bias the estimated coefficients on us_{ikt} and $imp_{jt} * us_{ikt}$ towards 0.

and a given year. The real exchange rate index also varies at the industry-year level. It is defined as the weighted geometric average of the real exchange rates of the importing countries. The weights for a given industry are the shares of each foreign country's imports in the total imports of that industry in a base period (1981-1982). I use a concordance between the 1972 SIC code (in which the trade data is expressed) and the Census of Population industry classification code to link the import penetration and exchange rate variables to the individual-level labor data sets.

The two labor extracts are merged by state and year with an unemployment rate measure. The unemployment rate measure is the log state unemployment rate for the total civilian population in a given year.

The two labor extracts are then merged by industry and year with a set of corporate variables constructed from COMPUSTAT. COMPUSTAT reports historical financial data for more than 7500 corporations established in the U.S. The data is drawn from shareholders' reports, 10-K and 10-Q reports and generally consists of large companies with substantial public ownership. While manufacturing firms in COMPUSTAT represent only a limited proportion of the total number of manufacturing *firms* in the U.S., they represent a very large proportion of total manufacturing *employment.* For example, in 1985, manufacturing employment in COMPUSTAT totals about 16 million.[18] According to the Bureau of Labor Statistics *Employment and Earnings*, 19 million workers were employed in manufacturing in the U.S. in 1985. The industry-level corporate variables I compute are weighted industry averages of the equivalent firm-level variables. Each firm is weighted in a given year by the share of its total assets in that year in the "total total" assets of the industry. I use a concordance between the SIC-72 code (in which COMPUSTAT data is expressed) and the Census of Population industry classification code to merge the corporate variables with the CPS

[18]Total manufacturing employment represented by COMPUSTAT firms is between 14 and 17 million workers in every available year.

and PSID extracts. I compute industry-level measures for accounting return, stock market return and leverage.

After being merged with the import penetration, exchange rate and corporate variables, the CPS extract covers 62 different industries while the PSID extract covers 65 different industries.

5 Empirical Results

5.1 Descriptive Means

Tables 1 and 2 present summary statistics of the main variables of interest for the CPS and PSID data, respectively. In addition to studying the full samples, I examine two important subsamples. First, I restrict the analysis to male workers. Implicit agreements typically require some relatively long-term attachment to the labor force. Because males have more stable labor force participation, one might suspect that they are more likely to be covered by the implicit wage setting contracts. This implies that they are also more likely to be affected by changes in product market competition. Finding larger changes in wage-unemployment elasticities for male workers would, in that sense, be a first check of the validity of the results.

Second, I further limit the set of male workers to the subset of non-unionized males. One might worry that the results in this paper capture a transformation of *explicit*, rather than implicit, contracting. Previous work has indeed documented how changes in the competitive environment of an industry may lead to a breakdown of national union contracts in that industry. For example, Belzer (1995) studies how the economic deregulation of the trucking industry affected the nature of union bargaining. He finds that bargaining between the Teamsters and general freight motor carriers became more decentralized following deregulation. While wage levels in the trucking industry used

to be very uniform across regions under national bargaining, deregulation increased the sensitivity of wages to local economic conditions. Hence, changes in explicit contracting could explain why product market competition increases the elasticity of wages to state unemployment rates. I will show that results are not driven by changes in the nature of union contracts.[19]

The PSID samples (Table 2) appear to have a lower proportion of females and unionized workers than the CPS samples (Table 1). Also, mean import penetration is higher in the PSID extract. Lower unionization and higher imports in the PSID reflect the fact that the PSID extract covers a more recent time period on average. Workers in the PSID samples are younger and, having education levels similar to the CPS workers, less experienced.[20] Hourly wages are lower on average in the PSID samples. In both the PSID and the CPS extracts, the full sample and two subsamples differ in expected ways. Male workers earn higher wages, are somewhat more educated (especially if they are not unionized), and have a higher unionization rate. Non-union males appear less experienced and slightly younger than the average male worker. Tenure with employer (only available in the PSID sample and reported in months) is higher for male workers, although it is about 4 months lower for non-unionized males than for the average worker in the full sample.

5.2 Basic Results

In this section, I present evidence that increased product market competition has increased the sensitivity of wages to current unemployment rate and has lowered the sensitivity of wages to the unemployment rate at the time of job start. I will first discuss the CPS results. The CPS data set is much larger than the PSID data set and covers a longer time period. However, it does not

[19]Note that, when I use the full sample or the sample of male workers, I always control for union status. Thereby, I account for the decline in unionization rate that might be correlated with the increase in product market competition.

[20]Part of this age gap is directly induced by the construction of the PSID extract. Because I need state unemployment rate at the time of tenure start and because state unemployment rates are only available since 1970, I exclude from the PSID extract observations for which tenure with employer started prior to 1970.

contain the work history information required to compute the time of job start. Hence, in the CPS I can only study changes in the current wage-current unemployment elasticity. In the second part of this section, I will remedy this weakness of the CPS by using the PSID extract.

5.2.1 CPS Results

Table 3 presents the effect of import penetration on the elasticity of wages to the current rate of unemployment.[21] I consider two different measures of foreign competition. First, I simply measure competition with the contemporaneous level of import penetration. However, one might argue against the use of such a contemporaneous measure. Indeed, only sufficiently persistent movements in the level of competition will alter for example the long run equilibrium number of firms in the industry. A more relevant measure should capture therefore permanent changes in the level of import penetration.

While this point has merit, there are two important caveats. First, recall that in the presence of capital market imperfections, even a transitory shock to product market competition can prohibitively raise the cost of using informal agreements in the employer-worker relationship. If firms face a higher risk of default in any given period, they display higher discount rates and become less able to commit. In Section 5.4, I will show that such a mechanism is very likely driving some of the transformation of the wage setting process. The second caveat is related to the stochastic process followed by exchange rates. Meese and Rogoff (1983) test different structural models of exchange rates and conclude that none of these models performed out of sample as well as a random walk. If one accepts that exchange rates indeed move according to a random walk, then firms' expectations about the future level of import penetration are well proxied by the current level of import pene-

[21] Appendix C presents estimates of a basic wage setting curve in the different CPS and PSID samples.

tration, at least in the IV regressions. Despite these two caveats, I propose to deal directly with the concern raised above and also look at more permanent changes in the level of competition. I use as an alternative measure of foreign competition the mean level of import penetration over a three-year period: current period, one-year and two-year leads.[22][23]

Columns 1 to 6 of Table 3 present the IV regressions. Columns 1 to 3 use current import penetration as the measure of foreign competition while columns 4 to 6 use the three-year average future import penetration. Columns 1 and 4 use the full sample, columns 2 and 5 concentrate on male workers and columns 3 and 6 on non-unionized males. Columns 7 to 12 are the equivalent OLS specifications. The dependent variable in each column is the log of deflated hourly wage. Each regression includes 16 year dummies, 51 state dummies, 62 industry fixed effects and a set of demographic controls. The demographic controls are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy, and interactions for the four experience terms with the female dummy. In each IV regression, two variables are being instrumented: the import penetration measure and the interaction of import penetration with the current state log unemployment rate. The instruments are current and one-year lagged industry exchange rate indices as well as the interaction of each of these indices with the current state log unemployment rate. Standard errors are adjusted for group effects. As an illustrative example, Appendix D reports the two first-stage equations associated with regression (4) in Table 3. The instruments are jointly very highly significant for each of the first-stage regressions ($p < .001$).

Before discussing the impact of import penetration on the current wage-current unemployment

[22]For 1991, the mean import penetration is over a two-year period: current period and one-year lead. For 1992, I simply use current import penetration.

[23]In Section 5.3, I propose an even more rigorous response to this concern. I instrument industry average stock market returns with current exchange rate movements. In efficient stock markets, adjustments in stock market value caused by current exchange rate movements represent the change in the net present value of expected future dividends due to these exchange rate movements.

elasticity, I will briefly review the other determinants of log wages. Appendix E presents the coefficients on the demographic variables for regression (4). Wages are significantly higher for whites, males, unionized, more educated and more experienced workers. The returns to experience are lower for females. Because all of the estimated coefficients on the demographic variables are as expected, I will not emphasize them in the rest of the analysis.[24] Also, consistent with Revenga (1990), I find that a higher level of import penetration reduces the level of wages. A 1% point increase in import penetration significantly decreases wages by about .9%.[25]

Results in Table 3 show that foreign competition increases the elasticity of wages to the current unemployment rate. The change in elasticity is stronger for the subset of male workers, and stronger yet for non-unionized males.[26] However, none of these differences is statistically significant.[27] The changes in elasticity are somewhat smaller when I use the three-year average import penetration measure. Again, none of these differences is statistically significant. Consider column 1. At the mean level of import penetration (about 10%), a one standard deviation increase in the unemployment rate reduces wages by about 1%. If import penetration increases by 10 percentage points (a little more than one standard deviation), wages drop by about 1.6% for the same increase in the unemployment rate. In column 3, a one standard deviation increase in the unemployment rate

[24]When I drop the demographic controls, the estimated coefficients on $imp_{jt} * u_{kt}$ becomes more negative (although not significantly). This indicates that some compositional effects may be at play.

[25]Several authors have studied the impact of competitive pressures on the *level* of wages. In a panel of manufacturing industries over the period 1977-1987, Revenga (1992) shows that changes in import *prices* significantly reduce wages. Rose (1987) shows an important decline in union premiums after the deregulation of the trucking industry. Card (1996) studies the labor market consequences of the deregulation of the airline industry in the late 1970s and early 1980s. He shows that relative earnings of airline workers went down by about 10% after deregulation. Other studies have concentrated on the impact of trade and deregulation on wage inequality (see Borjas and Ramey (1995) for trade and Fortin and Lemieux (1997) for deregulation).

[26]I have also split the sample based on whether the individual has at best completed high school or has at least completed one year of education after high school. I find that the change in elasticity is stronger in the high education group. This is consistent with the idea that educated workers are more likely to be covered by implicit employment contracts. This fact also matches the popular perception that the conditions of employment are especially changing for the white collar workforce.

[27]The estimated coefficient on $imp_{jt} * u_{kt}$ is not statistically different either when I restrict the data set to unionized workers only.

reduces non-unionized male workers' wages by 2.5% instead of 1.5% when import penetration is 10 percentage points higher.

A comparison of columns 1 to 6 and 7 to 12 confirms the need for instrumentation. First, like Revenga (1990, 1992), I find no significant impact of trade on wage levels in the OLS specifications. Second, and importantly for my purpose, there is no apparent effect of foreign competition on the sensitivity of wages to the local unemployment rate in the OLS model. The point estimates on the interaction term $imp_{jt} * u_{kt}$ are both economically and statistically insignificant in the OLS specifications. The Hausman test reported at the bottom of the IV panel in Table 3 checks for a statistically significant difference between the OLS and IV estimates of the coefficients on $imp_{jt}*u_{kt}$ and imp_{jt}.[28] For all specifications in Table 3, the Hausman test rejects the null hypothesis that $imp_{jt} * u_{kt}$ and imp_{jt} are exogenous. As I mentioned before, a potential explanation of the discrepancy between the OLS and IV results is that industries that protect their workers are likely to engage at the same time in other personnel practices (such as paying above market wages) that reduce their competitiveness and weaken their protection from foreign producers. The partial test of whether the instrumental variables are correlated with the error term (not reported here) fails to reject the null hypothesis of no correlation at the .10 level in all cases.

In all the specifications of Table 3, I have restricted the returns to all the demographic variables to be constant over the entire sample period. These restrictions are not realistic. For example, it is well known that the returns to education have increased over the period under study. Table 4 verifies the robustness of my results to these specification assumptions. I present only the IV results. In columns (1) to (5), I allow the returns to education, unionization, race, experience and

[28]The Hausman endogeneity test involves regressing the OLS residuals on the fitted values (from the first stage) of the variables that are instrumented as well as all on all the variables in the OLS regression. N times the R^2 from this regression, where N equals the number of observations, asymptotically follows a χ-squared distribution.

sex, respectively, to vary over time. The coefficient on $imp_{jt} * u_{kt}$ is not affected.

Other specification form issues naturally arise whenever one uses a differences-in-differences methodology. The interaction term $imp_{jt} * u_{kt}$ could be proxying for the fact that log hourly wages w_{ijkt} are not linear in imp_{jt} or u_{kt}. For example, in an (s, S) rule model, wages are adjusted for only sufficiently large changes in import penetration.[29] Also, the elasticity of wages to the unemployment rate may vary with the unemployment rate. In regressions not reported here, I have studied the robustness of my results to allowing for a quadratic in ur_{kt}, a quadratic in imp_{jt}, or both. The results are insensitive to the addition of a quadratic in ur_{kt}. The point estimate on $imp_{jt} * u_{kt}$ becomes even larger in absolute value when one controls for a quadratic in imp_{jt} or for both a quadratic in ur_{kt} and in imp_{jt}. The statistical significance of the estimate is, however, weakened in these last two cases ($p = .11$).

The findings to this point suggest that greater product market competition has increased the flexibility of wages over the business cycle. While this fact is consistent with a switch from contractual wage setting to spot market wage setting, it is also in accord with alternative models of wage determination. First, in an adverse selection theory of wage rigidity, firms do not lower wages during recessions because they fear that the most qualified workers will quit first. One effect of stronger foreign competition may be to force domestic firms to produce lower quality goods that do not require such a qualified labor force. Because of the now lower cost of having qualified workers quit, wages become more flexible.[30] Second, the lower shielding of workers' wages may reflect a reduction in the level of managerial discretion in wage setting. Suppose that wages are not set by firms' owners. Rather, they are set by managers who display a preference for paying high

[29] I thank Caroline Minter Hoxby for suggesting this possibility to me.

[30] An alternative and equally plausible story is that stronger foreign competition actually leads firms to produce *higher* quality products. In that case, the value of having a stable and qualified workforce may have increased, not decreased.

wages.[31] These managers will not lower wages when the unemployment rate goes up. Stronger product market competition, by reducing agency problems inside of the firms, may force managers to abandon their "expense preference" behavior and to set wages in a more profit-maximizing way.[32] The next section provides additional evidence on how competition alters the wage setting process. These further findings cannot as easily be reconciled with the alternative models proposed in this paragraph.

5.2.2 PSID Results

Table 5 has the same structure as Table 3. Columns 1 to 6 present the IV regressions. Columns 1 to 3 use current import penetration as the measure of foreign competition and columns 4 to 6 use the three-year average future import penetration. Columns 1 and 4 use the full sample, columns 2 and 5 concentrate on male workers and columns 3 and 6 on non-unionized males. Columns 7 to 12 are the equivalent OLS specifications. The dependent variable in each column is the log of the deflated hourly wage.

The regressions reported in Table 5 differ from the CPS regressions in two main respects. First, because of the panel structure of the PSID, I have included individual fixed effects in each of the regressions in Table 5 in addition to the state, year and industry fixed effects. By looking within individuals, I control for possible compositional effects. In the CPS regressions, I partially address this issue by looking within demographic groups. The PSID allows me to go further because I can also take into account unobserved individual characteristics.

Second, and most importantly, because of the work history information available in the PSID,

[31] Bertrand and Mullainathan (1997) present empirical support for such a model of wage determination.

[32] Theory is however unclear about the link between product market competition and managerial discretion. Hart (1983) develops a model where competition lowers discretion while Scharfstein (1988) develops a model where competition raises discretion.

I can study how product market competition affects the sensitivity of wages to the labor market conditions at the time of tenure start. Recall that an important characteristic of the shielding agreements described in Section 2 is that the fixed wages paid to workers by a firm are negotiated upon entry in the firm and depend on the labor market conditions at that time. Hence, while workers are shielded from current conditions, the fixed wage they are paid in every period is higher if entry occurred during an expansion and lower if entry occurred when there was a lot of slack in the labor market. As I mentioned in the introduction, Baker, Gibbs and Holmstrom's (1994a and 1994b) case study of management employee records in a medium-size U.S. service firm provides a striking illustration of this aspect of internal labor markets. They find strong evidence of "cohort effects" in wages. Once workers are inside of the firm, their wages seem to follow a common pattern that is very different from the pattern of wages for new entrants. Most of the wage differences between cohorts essentially come from differences in the starting wages that have persisted over time. Doeringer and Piore (1971) describe some characteristics of employment in large U.S. manufacturing establishments that are also consistent with a correlation between wages and starting unemployment rate. Entry in these establishments is generally limited to a set of particular jobs, which they call "ports of entry." Both career paths and wages once inside the firm are determined by administrative rules and customs that are only weakly influenced by changes in the external market for labor. Thus, in internal labor markets where rules and customs are sufficiently rigid, only at the ports of entry are wages sensitive to the unemployment rate on the relevant external market. Beaudry and DiNardo (1991) show that the correlation between current wages and contemporaneous unemployment is much weakened when one controls for the unemployment rate at the time of entry. Current wages seem to be more negatively correlated with

the starting unemployment rate than with the contemporaneous unemployment rate.[33] My model predicts that, as product market competition increases, current wages become less correlated with the starting unemployment rate. The PSID sample allows me to test this prediction.

In each IV regression in Table 5, three variables are being instrumented: the import penetration measure, the interaction of import penetration with the current state unemployment rate and the interaction of import penetration with the state unemployment rate at the time of job start. The instruments are the current industry exchange rate index and the interaction of this index with the current state unemployment rate and state unemployment rate at the time of job start. The first-stage equations, not reported here, show that the instruments are jointly very highly significant in all cases ($p < .001$).

Before discussing directly the coefficients on the two interaction terms, let me briefly comment on the other covariates. Demographic controls included in each regression are a quartic in experience, a union dummy, age, tenure with present employer and interactions for the four experience terms with a female dummy. As in the CPS regressions, the coefficients on the demographic controls (not reported) are consistent with expectations. Wages increase with experience and tenure and are higher for unionized workers. The returns to experience are lower for females. Like Beaudry and DiNardo (1991), I find that the negative dependence between wages and current unemployment rate is seriously weakened when I control for the unemployment rate at the time of tenure start. Actually, the point estimate on u_{kt} appears positive, although not significant, in most specifications. There is a strong negative correlation between wages and unemployment rate at tenure start: a one

[33]Beaudry and DiNardo also investigate the importance of the minimum unemployment rate since the job start. They find that the minimum unemployment rate is superior to the current and starting unemployment in explaining current wages. They interpret this finding as evidence for a model of implicit contracting where workers have limited mobility costs. There are, however, some serious selection issues associated with the use of the minimum unemployment rate. Jobs that are kept when the unemployment rate is very low are likely to be better matches and *should* pay higher wages. Obviously, the wage effect of the starting unemployment rate might be subject to similar criticism if match quality is procyclical.

standard deviation increase in the starting unemployment rate reduces current wages by 1.6 to 2.1%. Second, the effect of import penetration on wages is not significant either in the IV regressions or in the OLS regressions. However, the point estimates in the IV regressions are negative, indicating a .5% decrease in wages for every 1% point increase in import penetration.

The results in Table 5 are consistent with the predictions offered in Section 2. First, the effect of import penetration on the elasticity of wages to current unemployment rate is qualitatively similar to the effect found in the CPS extract. In the IV regressions, the point estimates on the interaction term $imp_{jt} * u_{kt}$ are somewhat larger than in Table 3, ranging from $-.24$ to $-.49$. The increase in sensitivity to current labor market conditions is largest for the subset of male workers. Note, however, that the increase in sensitivity is not statistically significant when I restrict the sample to non-union males. None of the OLS coefficients is significant, even though the point estimates are in general of the same sign as in the IV regressions. All of the regressions show a weakening of the wage cohort effect but, again, the results are imprecise when I focus on the subset of non-union male workers. Consider column 1. At the mean level of import penetration, a one standard deviation decrease in the unemployment rate at the time of job start increases wages by 1.8%. When import penetration is 10 percentage points higher, the same reduction in the starting unemployment rate increases the cohort's wages by only .6%. Interestingly, the OLS and IV regressions deliver similar coefficients on $imp_{jt} * us_{ikt}$.[34]

Why are the PSID results hard to reconcile with the alternative models proposed at the end of Section 5.2.1? Because these alternative models do not predict any relation between wages and the unemployment rate at the time of job start. In standard efficiency wage models such as adverse selection or shirking, wages are set to maximize firms' profits in every period under some effort

[34]As I did the CPS regressions, I ran specifications where the returns to the main demographic variables (age, experience, sex and union status) were allowed to vary over time. The results were unaffected.

(no-shirking condition) or quality (worker quality is increasing in the wage) constraints. There is no clear theoretical reason for efficiency wages to be linked to the starting unemployment rate. In a simple managerial discretion model, managers derive utility from paying high wages. If managers have the same level of discretion when setting wages for "insiders" and "outsiders," one should not observe a strong correlation between current wages and unemployment rate at the time of entry after controlling for the current unemployment rate.[35]

In summary, the results to this point show that an exogenous shock to product market competition reduces the shielding of wages from external current labor market conditions and reduces wage cohort effects. These two findings are consistent with the idea that an increase in product market competition influences implicit wage setting arrangements and can move the employment relationship towards a spot market transaction. In the following section, I discuss some microfoundations the transformation of the wage setting process. More specifically, I link the labor market changes to corporate variables such as performance and leverage.

5.3 The Role of Corporate Returns

The model outlined in Section 2 suggests that the causal link between competition and the governance of the employment relationship is mediated by current and/or future corporate earnings. In this section, I test this condition. In Table 6, I estimate an equation similar to equation (1). However, I replace imp_{jt} with measures of industry corporate returns instrumented by exchange rate fluctuations.[36]

[35]Shleifer and Summers (1988) present what could be regarded as an alternative managerial discretion model where managers have a "preference" for honoring implicit contracts with their workers. In their model, discretion allows non-contractible investments in firm-specific capital to take place despite the time-inconsistency problem. See Section 5.4 for a discussion of their model.

[36]The existing empirical literature on rent-sharing typically uses profit-per-head as a measure of corporate profitability (Abowd and Lemieux (1993) and Blanchflower, Oswald and Sanfrey (1996)). Profit-per-head indeed proxies well for employers' ability to pay their workers. In this section, I use measures of corporate performance that are not

Columns 1 to 3 of Table 6 present the IV results while columns 4 to 6 present the OLS results. Each regression includes the same set of control variables as for the regressions presented in Table 3. In columns 1 and 4, corporate return is measured by current industry average operating income (COMPUSTAT data item 178) to total assets (COMPUSTAT data item 6) ratio. In columns 2 and 5, I consider the three-year average of current, one-year and two-year lead operating income to total assets ratios in order to concentrate on more permanent movements in firm's financial performance. In columns 3 and 6, I use industry average stock market return. In an efficient market, adjustments in stock market value caused by current exchange rate movements represent the net present value of the changes in expected future dividends due to those movements.[37] Hence, the stock market return should completely capture the impact of current shocks to competition on the value of the firm, and hence the (changes in the) benefits of future transactions between the firm and its workers.

The instrumental variable strategy should by now be clear. Both corporate returns and the interaction of corporate returns with the log unemployment rate are instrumented. The instruments are the current and one-year lagged exchange rate indices as well as the interaction of each of these indices with the state log unemployment rate. Assuming that the exchange rate indices are valid instruments for import penetration, they will also be valid instruments for corporate returns if import penetration affects wage setting rules only through its impact on corporate returns. Otherwise, the instrumental variables will not be orthogonal to the error terms and equations 1 to 3 in Table 6 will not be properly specified. A test (not reported here) of whether the instrumental variables in equations 1 to 3 are correlated with the error term fails to reject the null hypothesis of

normalized by the number of workers in the industry. Indeed, I am not as much interested in capturing firms' ability to pay wages as in proxying for firms' total profit or firms' profit relative to their financial obligations.

[37] For exposition, I am assuming that the first-order effect of exchange rate movements is to change expected dividends, not the cost of capital.

no correlation.

Appendix F presents the first-stage equations associated with column 3 in table 6. The instruments are all jointly very significant for each first-stage regression ($p < .001$). The first-stage equations associated with the accounting return measures (not reported here) display the same high joint significance for the instruments. One can see that stock market return (column 1) is negatively correlated with current source-weighted exchange rates. Hence, current movements in the exchange rate seem to have long-term impact on industry performance.

In all of the IV regressions, I find that higher corporate returns leads to a lower sensitivity of wages to the current local labor market unemployment rate. However, the effect of stock market return on the wage-unemployment elasticity (column 3) is noisily estimated (p=.12). The magnitudes are large. Consider for example column 1. At the mean level of import penetration, a one standard deviation increase in the unemployment rate decreases wages by 1%. When the ratio of operating income over assets is one percentage point lower, the same one standard deviation increase in the unemployment rate decreases wages by 1.7%. In the OLS regressions, I find no economically or statistically significant effect of corporate returns on the wage-unemployment elasticity.

The results in this section suggest that mechanisms such as the ones presented in Section 2 may be at play when explaining the link between competition and the wage setting process. Tougher competition lowers corporate returns. Lower returns may increase firms' "discount rates," which reduces the cost to firms of reneging on previous commitments with their workers. Lower corporate returns may also introduce a risk of financial distress, which increases firms' ex ante preference for paying a more flexible wage bill.[38] In the next section, the role of discount rates and financial distress is further tested using data on industry leverage.

[38]In Section 5.5, I discuss two alternative, mostly behavioral, mechanisms by which financial liquidity can affect the use of implicit agreements.

5.4 The Role of Leverage

In order to test whether discount rates or risks of financial distress affect the nature of the wage setting process, one could consider a simple empirical test that consists of comparing wage-unemployment sensitivities for high and low leverage industries. Liquidity constrained industries indeed face a higher probability of default and should display higher discount rates. However, such a test suffers from a serious endogeneity problem as firms' wage policies almost certainly affect their liquidity. Rather, my test consists of studying the differential impact of an exogenous change in product market competition between high and low-leverage industries, where leverage is measured in a base year.[39] Intuitively, a given shock to product market competition should a have a stronger impact on default risk for industries that started with an already weak financial position.[40] Consequently, if liquidity constraints mediate the changes in the wage setting process, I should find a relatively stronger impact of product market competition on the wage-unemployment elasticities among the industries that were more leveraged at the beginning of the period under study.

Tables 7 and 8 present the results of this exercise. In these tables, I estimate equations (1) and (2) separately for high and low leverage industries. As I explain in Appendix B, I compute two different measures of financial leverage. Table 7 uses a debt-to-equity ratio while Table 8 uses a "net leverage" measure. The first measure is simply the ratio of total debt (COMPUSTAT data

[39] I have also studied whether the size of the coefficient on $ret_{jt} * u_{kt}$ differs between high and low leverage industries. I find (in regressions not reported here) that, for a given decrease in accounting returns, industries with low leverage display a relatively weaker increase in the wage-unemployment elasticity than more constrained ones. This fact is consistent with the results in Tables 7 and 8. However, I find no significant difference between the two types of industries when I compare their wage setting reaction to a given change in stock market returns.

[40] While intuitively appealing, the idea that more levered firms are more likely to fail when competition gets tougher on the product market is theoretically ambiguous. Indeed, one could envision a model where debt forces firms to react faster to changes in the competitive environment (Jensen (1989)). However, the results of a growing empirical literature on the link between capital structure and product market competition tend to validate the more intuitive model. Chevalier (1995) studies the supermarket industry. She finds that rivals of chains that undertook a leverage buyout were relatively more likely to expand in their local market. Zingales (1997) shows that highly levered trucking firms were less likely to survive the newly competitive environment that followed the deregulation of the motor carrier industry.

item 181) over total equity (COMPUSTAT data item 216). The second measure is a net measure that takes into account cash reserves (COMPUSTAT data item 1). It is defined as the ratio of total debt minus cash reserves to total debt minus cash reserves plus total equity. For each leverage measure, I compute the median industry leverage in a base year (1976 for the CPS extract and 1981 for the PSID extract). I then split the full CPS and PSID extracts into two subgroups: individuals who work in industries with below median financial leverage in the base year and individuals who work in industries with above median financial leverage in the base year.

In both tables, columns 1 to 4 show results using the CPS extract while columns 5 to 8 show results using the PSID extract. Columns 1, 2, 5 and 6 display the IV regressions while the other columns show the OLS results. Odd columns focus on the high leverage industries, even columns on the low leverage industries.

I first discuss Table 7. I concentrate on the IV regressions. In both the CPS and the PSID samples, product market competition increases the current wage-current unemployment elasticity for the high leverage industries but does not significantly affect this elasticity for the low leverage industries. Moreover, the point estimates on the interaction term $imp_{jt} * u_{kt}$ are about two thirds smaller in absolute value for the low leverage firms. Similarly, the reduction in wage cohort effects is large and significant in high leverage firms and not statistically significant among the low leverage firms. Because standard errors are large, I cannot reject that the high and low leverage coefficients are identical at a reasonable level of significance.

Interestingly, the results in Table 7 also reveal that the impact of import competition on wage levels is very different for the two types of industries.[41] Only the highly leveraged industries seem to

[41] There is limited empirical work on the link between capital structure and wages. Moreover, the existing work is subject to serious identification problems. Nickell and Wadhwani (1989) use a panel of U.K. manufacturing firms and find a negative correlation between wages and debt-to-equity ratio. Hanka (1997) use a sample of COMPUSTAT firms. He also finds a negative correlation between wages and various measures of debt.

experience a drop in wage following increased trade openness. This is especially striking in the CPS regressions (column 1 versus column 2). The comparison of the coefficients on imp_{jt} in columns 5 and 6 suggest a similar finding for the PSID but are too imprecisely estimated to be conclusive.

Table 8 duplicates the message of Table 7. The main difference is in the PSID regressions where it is difficult to find any difference between high and low leverage industries for the coefficient on $imp_{jt} * u_{kt}$. However, the difference between high and low leverage groups with respect to the starting unemployment rate is more striking in Table 8 than it is in Table 7.

My findings in this section are closest in spirit to those of Chevalier and Scharfstein (1997). Chevalier and Scharfstein study the link between capital market imperfections and the countercyclicality of markups. They argue that liquidity constraints prevent firms from choosing prices that maximize the discounted value of profits. They consider a product market where consumers have "switching costs." In such a market, firms may want to keep prices low in the short run in order to build market shares. During economic downturns, financially constrained firms face strictly positive default probabilities. They are then relatively less willing to invest in building market shares because they may never be able to reap the full benefits of their investment. Chevalier and Scharfstein provide empirical support for their theory. They show that, during recessions, highly liquidity constrained supermarkets raise their price relative to less constrained supermarkets. In a similar spirit, I show that when import penetration is high, highly leveraged industries shield their workers relatively less from the external labor market than less leveraged industries do. One interpretation for this finding is that, akin to Chevalier and Scharfstein's model, financially constrained industries are less willing to invest in building long-term relationships with their workers when import penetration is high because they may never be able to reap the future benefits of a good reputation.

5.5 Alternative Mechanisms

The results in Sections 5.4 and 5.3 are consistent with the mechanisms outlined in Section 2. Two other mechanisms seem able to explain, under some additional assumptions, the link between capital structure, corporate performance and the use of shielding agreements in the employment relationship. Shleifer and Summers (1988) develop a model where workers make firm-specific human capital investments and managers sign implicit contracts to compensate workers for their investments. Clearly, the firm-specific investments lead to a classic time-consistency problem. Shleifer and Summers argue that incumbent managers are more inclined to honor the implicit contracts than owners are. The managers have a "preference" for not breaching the trust of their workers. In the context of their model, one could reinterpret the findings of Section 5.4 and 5.3 in the following way. Greater product market competition reduces the room for discretion in managerial decision. Consequently, managers become more likely to maximize short-term profits and less likely to honor the implicit agreements. There are two implicit assumptions in this reasoning. First, product market competition must be negatively correlated with managerial discretion. As I mentioned earlier, the sign of this correlation is an unsettled theoretical and empirical issue. Second, a given shock to competition must have a stronger impact on the discretion level of the more liquidity-constrained industries. Again, whether this assumption holds will depend on the particular model of managerial discretion one adopts.

The behavioral economics literature also supports models of wage setting where workers are shielded from outside labor market conditions. Authors in the behavioral field have proposed the idea that managers do not cut wages in periods of high unemployment for fairness reasons. Kahneman, Knetsch and Thaler (1986) develop a framework to help think about the determinants

of fairness judgments. A central concept in their framework is a principle of "dual entitlement" in a "reference transaction." Applied to the labor market, this principle means that, in the wage setting process, workers have a reference wage and firms have a reference profit. Those two references characterize the terms of the transaction. Firms are not allowed to raise profits by violating the entitlement of workers to their reference wage. Only if the reference profit is threatened can the firm set new terms for the transaction and reduce wages below the reference point. An implication of this principle is that, under "fair" wage setting, wages will be unsensitive to an excess supply of labor as long as the firm's profitability is sufficiently high. However, when rents go down below the reference level, workers agree to let wages become more flexible. The fairness model of Kahneman, Knetsch and Thaler (1986) does not account for a principal finding of this paper: It makes no direct prediction about the sensitivity of wages to the unemployment rate at the time of job start.

6 Summary and Conclusion

As Baker and Holmstrom (1995) note, there currently exist too many theories and too few facts about internal labor markets. And indeed, empirical regularities are difficult to generate in the absence of data sets containing personnel information for a panel of representative firms. This study has demonstrated that some insights can nevertheless be gained about the functioning of internal labor markets, and more precisely the wage setting process within these markets, even without such ideal data sets. Specifically, I have shown that exogenous shocks to foreign competition modify cohort effects in wages. Such shocks change the sensitivity of current wages to the current unemployment rate as well as the sensitivity of wages to the unemployment rate prevailing at the time the worker was hired. I have also shown that these changes are stronger among more

financially-constrained industries than among less constrained ones.

These findings are consistent with the theory that the financial pressures caused by tougher competition alter firms' preferences for sheltering workers' wages. If the risks of financial distress generated by tougher competition can be minimized by not insuring workers, firms may ex ante opt for more wage flexibility. Alternatively, lower rents and the ensuing higher default probability may decrease employers' ex post cost of reneging on previous commitments to their workers and thereby reduce the set of time-consistent wage setting institutions. Hence, while I have established that corporate variables mediate the link between competition in the product market and changes in the employment relationship, this research project falls short of assessing whether these changes are efficient for firms (as implied by the ex-ante story) or whether they are not (as implied by the ex-post story). Future research should examine these efficiency issues in greater detail.

Because it concentrates on the impact of foreign competition, this paper is also of direct interest to the policymakers that have asked how the globalization of the U.S. economy has affected its labor market. A vast research effort has already been devoted to establishing the link between the broader opening to trade and the rise in income inequality. The results in this paper indicate that globalization might lead to other labor market changes that cannot be summarized by simple shifts in the demand for labor. Globalization may be changing the nature of the employment contract.

Finally, the findings of this study imply that one should be cautious when regarding the regulation of labor markets as the main explanation for the higher level of wage rigidity in Europe. European countries differ from the U.S. not only in their labor market policies but also, for example, in how they organize product markets or assist firms in financial distress. I have shown that such non-labor market differences may play an important role in the determination of the wage setting process. Achieving more labor market flexibility might thus require more than just getting rid of

institutional constraints in the labor market.

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TABLE 1

Descriptive Statistics: CPS Individual Level Data Means and Standard Deviations[a]

Sample:	All		Male		Non-Union Male	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Variable:						
Import Penetration	.099	.084	.093	.077	.091	.076
Female	.329	.470	—	—	—	—
Age	38.296	12.489	38.543	12.488	37.620	12.633
Years of Experience	20.146	13.057	20.224	12.999	18.921	12.948
Years of Education	12.152	2.685	12.321	2.768	12.702	2.893
Union	.272	.445	.314	.464	—	—
Wage	9.119	5.237	10.292	5.583	10.401	6.250
Log Wage	2.080	.502	2.211	.486	2.193	.540
Unemployment Rate	6.735	1.993	6.785	2.010	6.657	1.979
Log Unemployment Rate	1.864	.299	1.871	.298	1.852	.300
$\frac{\text{Op. Income After Dep.}}{\text{Total Assets}}$	.112	.043	.108	.044	.109	.043
Common Stock return	.086	.234	.085	.237	.079	.231
$\frac{\text{Total Equity}}{\text{Total Liabilities}}$ in 1976	1.265	.473	1.244	.485	1.277	.489
Net Leverage in 1976	.428	.091	.432	.092	.426	.094
Sample Size	130567		87615		60110	

[a]Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). Details of the construction and definition of variables are contained in Section 4 and Appendix B. All corporate variables are industry means constructed from COMPUSTAT.
2. When required, variables are deflated by the CPI (1982-1984=100).

TABLE 2

Descriptive Statistics: PSID Individual Level Data
Means and Standard Deviations[a]

Sample:	All		Male		Non-Union Male	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Variable:						
Import Penetration	.107	.091	.098	.083	.094	.080
Female	.285	.451	–	–	–	–
Age	34.680	9.484	34.616	9.250	34.338	9.318
Years of Experience	15.577	10.177	16.388	9.919	15.898	9.953
Months of Tenure with Present Employer	74.345	60.570	78.136	62.117	70.014	59.456
Years of Education	12.103	2.480	12.229	2.518	12.440	2.666
Union	.237	.425	.278	.448	–	–
Wage	8.271	4.371	9.124	4.467	8.931	4.921
Log Wage	2.000	.469	2.111	.442	2.069	.478
Unemployment Rate	7.061	2.132	7.020	2.126	6.850	2.035
Log Unemployment Rate	1.910	.298	1.905	.297	1.881	.293
Log U.R. at Job Start	1.869	.308	1.868	.315	1.875	.308
$\frac{\text{Op. Income After Dep.}}{\text{Total Assets}}$	.101	.047	.095	.046	.096	.045
Common Stock Return	.108	.265	.100	.260	.090	.258
$\frac{\text{Total Equity}}{\text{Total Liabilities}}$ in 1981	1.133	.502	1.140	.453	1.185	.463
Sample Size	10026		7132		5122	

[a]Notes:

1. Data is composed of manufacturing workers in PSID over 1981-1992. Details of the construction and definition of variables are contained in Section 4 and Appendix B. All corporate variables are industry means constructed from COMPUSTAT.
2. When required, variables are deflated by the CPI (1982-1984=100).

TABLE 3

Effect of Product Market Competition on the Elasticity of Current Wage to Current Unemployment[a]

Dependent Variable: Log(w_{ijkt})

Specification:	IV					
Import Penetration is:	Current			3-year Average		
Sample:	All	Male	Non-Union Male	All	Male	Non-Union Male
	(1)	(2)	(3)	(4)	(5)	(6)
Import Penetration (imp_{jt})	-.788 (.300)	-.765 (.378)	-.826 (.430)	-.900 (.349)	-.926 (.437)	-.994 (.502)
Log Unemployment Rate (u_{kt})	-.036 (.008)	-.049 (.009)	-.049 (.010)	-.036 (.008)	-.049 (.009)	-.049 (.010)
$impjt * u_{kt}$	**-.215 (.093)**	**-.293 (.114)**	**-.328 (.142)**	**-.178 (.085)**	**-.259 (.105)**	**-.298 (.133)**
χ^2-statistic, test that imp_{jt} and $imp_{jt} * u_{kt}$ are exogenous ($prob > \chi^2$-stat)	13.795 (.001)	10.867 (.004)	8.708 (.013)	14.066 (.001)	11.939 (.003)	8.846 (.012)
Sample Size	130567	87615	60110	130567	87615	60110
Specification:	OLS					
Import Penetration is:	Current			3-year Average		
Sample:	All	Male	Non-Union Male	All	Male	Non-Union Male
	(7)	(8)	(9)	(10)	(11)	(12)
Import Penetration (imp_{jt})	.021 (.056)	.189 (.075)	.111 (.089)	.033 (.057)	.237 (.078)	.173 (.092)
Log Unemployment Rate (u_{kt})	-.036 (.007)	-.051 (.008)	-.049 (.010)	-.036 (.007)	-.051 (.008)	-.049 (.010)
$impjt * u_{kt}$	**.043 (.051)**	**-.009 (.070)**	**.025 (.087)**	**.043 (.049)**	**-.012 (.067)**	**.029 (.083)**
Adjusted R^2	.487	.435	.491	.487	.435	.491
Sample Size	130567	87615	60110	130567	87615	60110

[a]Notes: See next page.

Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). In columns 1 to 3 and 7 to 9, imp_{jt} measures current import penetration. In columns 4 to 6 and 10 to 12, imp_{jt} is the average of current, one year-lead and two-year lead import penetration.
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. Both import penetration and the log unemployment rate have been demeaned.
3. Covariates included in each regression are 51 state dummies, 16 year dummies and 62 industry dummies. Additional covariates included in each regression are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy and interactions for the four experience terms with the female dummy.
4. In the IV specifications (columns 1 to 6), both import penetration and the interaction of import penetration with the log unemployment rate are instrumented. The instruments are current and one-year lagged exchange rate indices and the interaction of these indices with the log unemployment rate.
5. Standard errors are in parentheses except that the number in parentheses below the χ^2-statistic is a p-value. They are corrected to allow for group effects within state-industry-year cells.

TABLE 4

Effect of Product Market Competition on the Elasticity of Current Wage to Current Unemployment: Specification Checks [a]

Dependent Variable: Log(w_{ijkt})

Specification:	IV				
	(1)	(2)	(3)	(4)	(5)
Import Penetration (imp_{jt})	-.694 (.298)	-.795 (.300)	-.782 (.300)	-.788 (.300)	-.759 (.296)
Log Unemployment Rate (u_{kt})	-.036 (.007)	-.037 (.008)	-.036 (.008)	-.035 (.008)	-.036 (.007)
$impjt * u_{kt}$	**-.204 (.091)**	**-.215 (.093)**	**-.213 (.093)**	**-.214 (.093)**	**-.205 (.092)**
Education*Year Dummies	Yes	No	No	No	No
Union*Year Dummies	No	Yes	No	No	No
Non-White*Year Dummies	No	No	Yes	No	No
Experience*Year Dummies	No	No	No	Yes	No
Female*Year Dummies	No	No	No	No	Yes
Sample Size	130567	130567	130567	130567	130567

[a]Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). imp_{jt} measures current import penetration.
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. Both import penetration and the log unemployment rate have been demeaned.
3. Covariates included in each regression are 51 state dummies, 16 year dummies and 62 industry dummies. Additional covariates included in each regression are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy and interactions for the four experience terms with the female dummy.
4. In each specification, both import penetration and the interaction of import penetration with the log unemployment rate are instrumented. The instruments are current and one-year lagged exchange rate indices and the interaction of these indices with the log unemployment rate.
5. Standard errors are in parentheses. They are corrected to allow for group effects within state-industry-year cells.

TABLE 5

Effect of Product Market Competition on the Elasticity of Current Wage to Unemployment at the Start of Tenure[a]

Dependent Variable: Log(w_{ijkt})

Specification:	IV					
Import Penetration is:	Current			3-year Average		
Sample:	All	Male	Non-Union Male	All	Male	Non-Union Male
	(1)	(2)	(3)	(4)	(5)	(6)
Import Penetration (imp_{jt})	-.464 (.316)	-.469 (.387)	-.562 (.487)	-.502 (.352)	-.518 (.446)	-.557 (.487)
Log Unemployment Rate (u_{kt})	.029 (.018)	.019 (.020)	.005 (.024)	.024 (.019)	.014 (.021)	-.000 (.025)
$impjt * u_{kt}$	**-.373 (.172)**	**-.490 (.205)**	**-.396 (.311)**	**-.297 (.149)**	**-.408 (.183)**	**-.243 (.252)**
Log U. R. at Tenure Start (us_{ikt})	-.057 (.017)	-.069 (.020)	-.068 (.025)	-.058 (.017)	-.069 (.020)	-.069 (.026)
$impjt * us_{ikt}$	**.391 (.200)**	**.423 (.204)**	**.319 (.312)**	**.310 (.175)**	**.334 (.183)**	**.132 (.287)**
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	10026	7132	5122	10026	7132	5122
Specification:	OLS					
Import Penetration is:	Current			3-year Average		
Sample:	All	Male	Non-Union Male	All	Male	Non-Union Male
	(7)	(8)	(9)	(10)	(11)	(12)
Import Penetration (imp_{jt})	-.432 (.129)	.069 (.170)	-.040 (.213)	-.055 (.050)	.060 (.070)	.034 (.079)
Log Unemployment Rate (u_{kt})	.030 (.018)	.023 (.020)	.006 (.024)	.033 (.018)	.023 (.020)	.006 (.024)
$impjt * u_{kt}$	**-.069 (.102)**	**-.158 (.131)**	**-.215 (.176)**	**.074 (.090)**	**-.120 (.119)**	**-.109 (.147)**
Log U. R. at Tenure Start (us_{ikt})	-.057 (.017)	-.069 (.020)	-.067 (.026)	-.057 (.017)	-.068 (.020)	-.067 (.025)
$impjt * us_{ikt}$	**.412 (.122)**	**.577 (.153)**	**.333 (.230)**	**.234 (.082)**	**.371 (.111)**	**.214 (.136)**
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	.911	.903	.915	.911	.902	.915
Sample Size	10026	7132	5122	10026	7132	5122

[a]Notes: see next page.

Notes:

1. Data is composed of a panel manufacturing workers over 1981-1992 (source: PSID). In columns 1 to 3 and 7 to 9, imp_{jt} measures current import penetration. In columns 4 to 6 and 10 to 12, imp_{jt} is the average of current, one year-lead and two-year lead import penetration.
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. Import penetration, the log current unemployment and the log unemployment rate at tenure start have been demeaned.
3. Covariates included in each regression are 51 state dummies, 12 year dummies and 65 industry dummies for the full sample, 59 for the sample of males and 57 for the sample of non-union males. Additional covariates included in each regression are age, tenure with present employer, an union dummy, a quartic in experience, and interactions for the four experience terms with a female dummy.
4. In each IV specification (columns 1 to 6), import penetration and the interactions of import penetration with the current log unemployment rate and the log unemployment rate at tenure start are instrumented. The instruments are the current exchange rate index and the interactions of this index with the current log unemployment rate and the log unemployment rate at tenure start.
5. Standard errors are in parentheses. They are corrected to allow for group effects within state-industry-year cells.

TABLE 6

Effect of Accounting and Stock Market Returns on the Elasticity of Current Wage to Current Unemployment[a]

Dependent Variable:Log(w_{ijkt})

Specification:	IV			OLS		
Corporate Return is:	Current Operating (1)	3-year Av. Operating (2)	Current Stock Market (3)	Current Operating (4)	3-year Av. Operating (5)	Current Stock Market (6)
Corporate Return (ret_{jt})	.524 (.465)	.640 (.588)	.556 (.308)	-.236 (.046)	-.273 (.056)	-.009 (.008)
Log U. R. (u_{kt})	-.038 (.008)	-.043 (.008)	-.025 (.014)	-.037 (.008)	-.036 (.007)	-.036 (.007)
$retjt * u_{kt}$	**2.308 (.727)**	**2.825 (.973)**	**1.246 (.818)**	**-.116 (.093)**	**-.081 (.099)**	**.046 (.019)**
Adjusted R^2	–	–	–	.487	.487	.487
Sample Size	130567	130567	130567	130567	130567	130567

[a]Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). In columns 1 and 4, ret_{jt} measures the current operating income to total assets ratio for industry j. In columns 2 and 5, ret_{jt} is the average of current, one year-lead and two-year lead operating income to total assets ratios. In columns 3 and 6, ret_{jt} measures current stock market return.
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. Both corporate return and the log unemployment rate have been demeaned.
3. Covariates included in each regression are 51 state dummies, 16 year dummies and 62 industry dummies. Additional covariates included in each regression are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy and interactions for the four experience terms with the female dummy.
4. In the IV specifications (columns 1 to 3), both corporate return and the interaction of corporate return with the log unemployment rate are instrumented. The instruments are current and one-year lagged exchange rate indices and the interaction of these indices with the log unemployment rate.
5. Standard errors are in parentheses. They are corrected to allow for group effects within state-industry-year cells.

TABLE 7

Effect of Product Market Competition on Wage-Unemployment Elasticities For High Leverage vs. Low Leverage Industries Leverage Measure is Debt-to-Equity[a]

Dependent Variable: Log(w_{ijkt})

Specification:	IV		OLS		IV		OLS	
Leverage is:	High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Import Penetration ($impj_t$)	-3.820 (.766)	.128 (.284)	-.054 (.079)	.190 (.068)	-2.408 (1.975)	-.320 (.341)	-.410 (.179)	-.394 (.201)
Log Unemployment Rate (u_{kt})	-.029 (.014)	-.042 (.010)	-.027 (.011)	-.042 (.010)	-.016 (.032)	.045 (.029)	.006 (.024)	.043 (.029)
$impjt * u_{kt}$	**-.343 (.149)**	**-.123 (.114)**	**.068 (.077)**	**.027 (.068)**	**-.934 (.447)**	**-.277 (.370)**	**-.266 (.140)**	**-.172 (.191)**
Log U. R. at Tenure Start (us_{ikt})	—	—	—	—	-.044 (.023)	-.068 (.025)	-.045 (.023)	-.068 (.025)
$impjt * us_{ikt}$	—	—	—	—	**.676 (.284)**	**.440 (.373)**	**.448 (.193)**	**.215 (.285)**
Adjusted R^2	—	—	.524	.457	—	—	.927	.909
Sample Size	61717	68850	61717	68850	4811	5215	4811	5215

[a]Notes:

1. Data in columns 1 to 4 is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). Data in columns 5 to 8 is composed of a panel manufacturing workers over 1981-1992 (source: PSID).
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. Both import penetration and the log unemployment rate have been demeaned. "High Leverage Industries" are industries which have a debt to equity ratio above median in a base year (1976 for the CPS sample and 1981 for the PSID sample).
3. Covariates included in each regression are 51 state dummies and 16 year dummies. Columns 1 to 4 have 31 industry fixed effects; columns 5 and 7 have 33 industry fixed effects; columns 6 and 8 have 32 industry fixed effects. Additional covariates included in regressions 1 to 4 are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy and interactions for the four experience terms with the female dummy; additional covariates in columns 5 to 8 are age, tenure with present employer, an union dummy, a quartic in experience, and interactions for the four experience terms with a female dummy.
4. In columns 1 and 2, both import penetration and the interaction of import penetration with the log unemployment rate are instrumented. The instruments are current and one-year lagged exchange rate indices and the interaction of these indices with the log unemployment rate. In columns 5 and 6, import penetration and the interactions of import penetration with both the current log unemployment rate and the log unemployment rate at tenure start are instrumented. The instruments are the current exchange rate index and the interactions of this index with the current log unemployment rate and the log unemployment rate at tenure start.
5. Standard errors are in parentheses. They are corrected to allow for group effects within state-industry-year cells.

TABLE 8

Effect of Product Market Competition on Wage-Unemployment Elasticities For High Leverage vs. Low Leverage Industries Leverage Measure is Net Leverage [a]

Dependent Variable: Log(w_{ijkt})

Specification:	IV		OLS		IV		OLS	
Leverage is:	High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Import Penetration (imp_{jt})	-3.902 (.772)	.108 (.282)	-.049 (.079)	.183 (.067)	-1.469 (1.413)	-.450 (.357)	-.310 (.187)	-.397 (.192)
Log Unemployment Rate (u_{kt})	-.034 (.014)	-.035 (.010)	-.033 (.011)	-.036 (.010)	-.014 (.030)	.043 (.028)	-.002 (.025)	.043 (.028)
$impjt * u_{kt}$	**-.350 (.148)**	**-.135 (.113)**	**.060 (.076)**	**.039 (.068)**	**-.636 (.442)**	**-.580 (.324)**	**-.232 (.144)**	**-.148 (.182)**
Log U. R. at Tenure Start (us_{ikt})	—	—	—	—	-.064 (.024)	-.048 (.026)	-.065 (.023)	-.048 (.026)
$impjt * us_{ikt}$	—	—	—	—	**.831 (.308)**	**.229 (.418)**	**.555 (.195)**	**.343 (.268)**
Adjusted R^2	—	—	.525	.456	—	—	.923	.907
Sample Size	62223	68344	62223	68344	4891	5083	4891	5083

[a] Notes:

1. Data in columns 1 to 4 is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). Data in columns 5 to 8 is composed of a panel manufacturing workers over 1981-1992 (source: PSID).
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. Both import penetration and the log unemployment rate have been demeaned. "High Leverage Industries" are industries which have a net leverage above median in a base year (1976 for the CPS sample and 1981 for the PSID sample).
3. Covariates included in each regression are 51 state dummies and 16 year dummies. Columns 1 to 4 have 31 industry fixed effects; columns 5 and 7 have 33 industry fixed effects; columns 6 and 8 have 32 industry fixed effects. Additional covariates included in regressions 1 to 4 are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy and interactions for the four experience terms with the female dummy; additional covariates in columns 5 to 8 are age, tenure with present employer, an union dummy, a quartic in experience, and interactions for the four experience terms with a female dummy.
4. In columns 1 and 2, both import penetration and the interaction of import penetration with the log unemployment rate are instrumented. The instruments are current and one-year lagged exchange rate indices and the interaction of these indices with the log unemployment rate. In columns 5 and 6, import penetration and the interactions of import penetration with both the current log unemployment rate and the log unemployment rate at tenure start are instrumented. The instruments are the current exchange rate index and the interactions of this index with the current log unemployment rate and the log unemployment rate at tenure start.
5. Standard errors are in parentheses. They are corrected to allow for group effects within state-industry-year cells.

Appendix A: Simultaneous Equations Issues

My empirical strategy is basically equivalent to estimating a differences-in-differences regression. Consider for example equation (1). Assume for simplicity that imp_{jt} can only take two values: imp_H and imp_L, with $imp_H > imp_L$.

Then estimating equation (1) is equivalent to estimating the two following equations:

$$log(w_{iHkt}) = a_H\, u_{kt} + b_H + d_k + e_t + g_H\, D_i + \psi_{iHkt} \quad \text{if } imp_{jt} = imp_H \tag{3}$$

and

$$log(w_{iLkt}) = a_L\, u_{kt} + b_L + d_k + e_t + g_L\, D_i + \psi_{iLkt} \quad \text{if } imp_{jt} = imp_L \tag{4}$$

The coefficient c on the interaction term $u_{kt} * imp_{jt}$ in equation (1) is given by the difference between a_H and a_L: $\hat{c} = \hat{a}_H - \hat{a}_L$.

Each of these two equations above is subject to a standard identification problem. Indeed, each of these equations is a reduced form equation derived from a system of two equations: a labor demand curve and a labor supply or wage-setting curve. Simplifying notations, the system of equations associated with each of the two equations is given by:

$$w_q - z_q + a_q\, u = \nu_{S_q} \tag{5}$$

$$w_q - y_q - m_q\, u = \nu_{D_q} \tag{6}$$

where $q = \{H, L\}$, $a, m > 0$. The first equation traces the wage setting curve (or labor supply curve), the second equation traces the labor demand curve. ν_S and ν_D are disturbance terms. Assume that $E(\nu_{D_q}) = E(\nu_{S_q}) = 0$, $var(\nu_S) = E(\nu_{S_q}^2) = \sigma_{SS_q}$, $var(\nu_D) = E(\nu_{D_q}^2) = \sigma_{DD_q}$ and $cov(\nu_{D_q}, \nu_{S_q}) = \sigma_{SD_q}$.

I am ultimately interested in estimating the slope of the wage setting curve, a_q, under different levels of product market competition (H and L). What happens if one estimates equations (3) and (4) ignoring the simultaneous equations issue? One can easily show that $\hat{a}_q$ will be given by:

$$\hat{a}_q = \frac{\sigma_{DD_q}}{\sigma_{SS_q} + \sigma_{DD_q}}\, a_q - \frac{\sigma_{SS_q}}{\sigma_{SS_q} + \sigma_{DD_q}}\, m_q \tag{7}$$

What are sufficient conditions under which $\hat{a}_H - \hat{a}_L = a_H - a_L$ (the exact difference in the slope of the wage setting curve between high and low competition is estimated) or, at least, $sign(\hat{a}_H - \hat{a}_L) = sign(a_H - a_L)$ (the qualitative difference in the slope of the wage setting curve between high and low competition is correctly estimated)?

Consider first the case where, for every level of product market competition, all the variation in unemployment rate is driven by demand shocks: $\sigma_{SS_H} = \sigma_{SS_L} = 0$. In that case, the exact quantitative change in the slope of the wage setting curve is estimated. Note that, in the estimation of a standard wage curve (e.g. Blanchflower and Oswald (1994), Card (1995), Blanchard and Katz

(1997)), the identifying assumption is in fact also that $\sigma_{SS} = 0$. Hence, this first case delivers an unbiased estimate of the effect of product market competition on the slope of the wage setting curve and does not rely on more restrictive assumptions than the ones required for the proper estimation of a standard wage curve.

If the standard wage curve is not correctly identified ($\sigma_{SS} > 0$), my estimation strategy will still deliver a correct assessment of the qualitative change in the slope of the wage curve if the variance of both supply and demand shocks is unchanged with product market competition and the slope of the labor demand curve is also unchanged with product market competition: $\sigma_{SS_H} = \sigma_{SS_L}$, $\sigma_{DD_H} = \sigma_{DD_L}$ and $m_H = m_L$. The most questionable equality in this second set of identification assumptions is probably the third one. Most of the economic literature on the effect of trade on labor markets has typically modeled an increase in trade openness with a shift down in the domestic labor demand curve (see Katz and Murphy (1992) and Borjas and Ramey (1995)). Under these models, the restrictions implied by the three equalities above are quite reasonable and one can assume that the qualitative change in the slope of the wage-setting curve is correctly estimated. However, some authors have recently suggested that one of the main effects of globalization might have been to flatten the domestic labor demand curve by increasing the degree of substituability between goods (Rodrik (1997) and Leamer (1996)). There is as yet little empirical evidence in support of this theory. Using industry-level data, Slaughter (1997) finds no evidence of a link between labor demand elasticities and trade-exposure measures.

Appendix B: Data

Individual-Level Data

CPS Extract

The CPS extract covers all the manufacturing workers in the May CPSs from 1976 to 1981 and a random subset of all the manufacturing workers in the MORGs of the CPS over the period 1983-1992. I randomly draw 30% of the entire set within an industry-state-year cell, thereby maintaining the proportion of each industry-state-year cell. The extract does not cover years prior to 1976 because it is matched to a COMPUSTAT extract which starts in 1976. The wage data is the log deflated hourly wage, where wage is defined as usual weekly earnings over usual number of hours of work per week. Wages are deflated using the Consumer Price Index (1982-1984=100). I exclude any observation for which the deflated hourly wage is less than 1 or more than 100 and impute earnings for the top-coded weekly earnings prior to 1989 following Katz and Murphy (1992). For 1992, the education variable is made consistent with the prior definition. I impute years of work experience as age minus years of education minus 6. If the imputation comes out negative, experience is reset to zero.

PSID Data Set

The PSID sample is drawn from the PSID's 1992 cross-year family and individual files. Because of the unavailability of a detailed industry code before 1981, the data set covers the period 1981-1992. I extract information for male heads as well as for their female wives. The wage measure is the deflated hourly wage for hourly paid workers and the deflated salary (defined in hourly terms) for salaried workers. I do not use the information collected on preceding calendar year annual labor income and hours of work as those are subject to serious recall biases. I exclude any observation for which the deflated hourly wage is less than 1 and more than 100.

In order to compute the unemployment rate at the time of job start, I first consider the length of tenure with the present employer. I then compute the approximate year at which the worker started working with her present employer. I assume that employment with the present employer started in the same state as it takes place now. Because I use state-level unemployment rate and state-level unemployment rates are only available since 1970, the data set excludes jobs that started prior to 1970.

Trade Variables

Each of the individual-level data sets is merged by industry and year with the import penetration and real exchange rate index variables and by state and year with the log unemployment rate. The import penetration variable is computed at the industry level and is constructed from the NBER Trade Database (Feenstra (1996)). It is defined as the ratio of imports over imports plus domestic production in each year. Imports are c.i.f. (cost, insurance, freight) valued. The real exchange rate index is computed at the industry level. It is defined as the weighted average of the log real exchange rates of importing countries. The weights are the share of each foreign country's import in total imports in a base period (1981-1982). Real exchange rates are nominal exchange rates (expressed in foreign currency per dollar) multiplied by U.S. CPI and divided by the foreign country CPI. Nominal exchange rates and foreign CPI's are from the International Financial Statistics of the International Monetary Fund. I use a concordance between the SIC-72 code (in which the trade data are expressed) and the Census of Population industry classification code to link the import penetration and exchange rate variables to the wage variables.

Unemployment Variable

The log unemployment rate is defined at the state level. From 1978 to 1993, it is taken from Local Area Unemployment Statistics of the Bureau of Labor Statistics. Prior to 1978, the state unemployment rates were provided by Lawrence Katz (Blanchard and Katz (1992)). The unemployment rate is the unemployment rate for the civilian noninstitutional labor force.

Corporate Variables: COMPUSTAT

For most of analysis, the CPS data is matched to a panel of industry-level corporate variables. The corporate variables are computed from COMPUSTAT. COMPUSTAT reports financial statement variables for more than 7500 corporations established in the U.S. since 1976. The data are drawn from shareholders' reports, 10-K and 10-Q reports and consists of large companies with substantial public ownership. The industry corporate variables are weighted industry averages of the firm-level variables. Each firm's weight in a given year is defined as the firm's total assets to total industry assets in that year. I use a concordance between the SIC-72 code and the Census of Population industry classification code to merge the financial variables with the CPS labor data. From COMPUSTAT, I compute corporate and stock market return measures as well as leverage measures. Stock market return is defined as the logarithm of shareholder wealth minus the logarithm of shareholder wealth in the previous year, which equals the rate of return received by the firm's shareholders, including price appreciation and dividends. As a measure of accounting return, I use the ratio of operating income after depreciation over total assets. I construct two different leverage measures: (1) total debt to total equity and (2) net leverage, which is the ratio of total debt minus cash and other short-term investments to total debt minus cash and other short-term investments plus total equity.

APPENDIX C

Basic Wage Curves[a]

Dependent Variable: Log(w_{ijkt})

Specification:	OLS					
Data Set:	CPS			PSID		
Sample:	All	Male	Non-Union Male	All	Male	Non-Union Male
	(1)	(2)	(3)	(4)	(5)	(6)
Log U. R. (u_{kt})	-.036	-.050	-.049	.030	.020	.004
	(.010)	(.011)	(.012)	(.020)	(.020)	(.023)
Log U. R. at Tenure Start (us_{kt})	—	—	—	-.054	-.067	-.068
	(.010)	(.011)	(.012)	(.016)	(.020)	(.027)
Adjusted R^2	.487	.435	.491	.910	.902	.915
Sample Size	130567	87615	60110	10026	7132	5122

[a]Notes:

1. Data in columns 1 to 3 is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS). Data in columns 4 to 6 is composed of a panel manufacturing workers over 1981-1992 (source: PSID).
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. The log unemployment rate has been demeaned.
3. Covariates included in each regression are 51 state dummies and 16 year dummies. Columns 1 to 3 have 62 industry fixed effects; columns 4 to 6 have 65 industry fixed effects. Additional covariates included in regressions 1 to 3 are education, a quartic in experience, an union dummy, a non-white dummy, a female dummy and interactions for the four experience terms with the female dummy; additional covariates in columns 4 to 6 are age, tenure with present employer, an union dummy, a quartic in experience, and interactions for the four experience terms with a female dummy.
4. Standard errors are in parentheses. They are corrected to allow for group effects within state-year cells.

APPENDIX D

Effect of Product Market Competition on the Elasticity of Current Wage to Current Unemployment: First-Stage Regressions for Regression (4) of Table 3[a]

	(1)	(2)
Dependent Variable:	imp_{jt}	$imp_{jt} * u_{kt}$
xr_{jt}	.068	.028
	(.017)	(.012)
$xr_{jt} * u_{kt}$	-.054	.252
	(.028)	(.055)
$xr_{j(t-1)}$	-.004	.028
	(.020)	(.012)
$xr_{j(t-1)} * u_{kt}$	.036	-.122
	(.026)	(.055)
u_{kt}	.005	-.036
	(.002)	(.002)
experience*1000	-.531	.210
	(.130)	(.064)
experience^2*1000	.030	-.012
	(.009)	(.005)
experience^3*10^7	-6.130	2.590
	(2.160)	(1.230)
experience^4*10^7	.044	-.018
	(.018)	(.010)
female*1000	-4.523	1.644
	(.951)	(.494)
female*exp*1000	.618	-.293
	(.182)	(.128)
female*exp^2*1000	-.026	.016
	(.012)	(.010)
female*exp^3*10^7	3.370	-3.450
	(3.100)	(2.860)
female*exp^4*10^7	-.010	.024
	(-.028)	(.027)
years of education*1000	-.061	.041
	(.044)	(.031)
unionized*1000	-.482	.429
	(.221)	(.174)
non-white*1000	.498	.105
	(.275)	(.207)
F-statistic, test that instruments jointly equal 0 (prob> F-stat)	9.30 (.000)	149.19 (.000)
Adjusted R^2	.921	.432

[a]Notes: See next page.

Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS) (*sample size: 130567*).
2. Variables are defined in Section 4 and Appendix B. The dependent variables are import penetration (imp_{jt}) in column 1 and the interaction of import penetration with the log unemployment rate ($imp_j t * u_k t$) in column 2. imp_{jt} is the average of current, one-year lead and two-year lead import penetration. xr_{jt} is the exchange rate index for industry j in year t. Both imp_{jt} and u_{kt} have been demeaned.
3. Additional covariates included in each regression are 51 state dummies, 16 year dummies and 62 industry dummies.
4. Standard errors are in parentheses except that the number in parentheses below the F-statistic is a p-value. Standard errors are corrected to allow for group effects within industry-year and state-industry-year cells.

APPENDIX E

Effect of Product Market Competition on the Elasticity of Current Wage to Current Unemployment: Full Results for Regression (4) of Table 3[a]

Dependent Variable: $Log(w_{ijkt})$

imp_{jt}	-.900
	(.349)
u_{kt}	-.036
	(.008)
$imp_{jt} * u_{kt}$	-.178
	(.085)
experience	.068
	(.002)
experience^2*1000	-2.734
	(.123)
experience^3*1000	.052
	(.003)
experience^4*10^7	-3.820
	(-.348)
female	-.071
	(.009)
female*exp	-.019
	(.002)
female*exp^2*1000	.398
	(.194)
female*exp^3*1000	-.005
	(.006)
female*exp^4*10^7	.520
	(.552)
years of education	.074
	(.001)
unionized	.059
	(.003)
non-white	-.122
	(.003)

[a]Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS) (*sample size: 130567*).
2. Variables are defined in Section 4 and Appendix B. The dependent variable is the log deflated hourly wage. imp_{jt} measures current import penetration. Both import penetration and the log unemployment rate have been demeaned.
3. Other covariates included in each regression are 51 state dummies, 16 year dummies and 62 industry dummies.
4. Standard errors are in parentheses. They are corrected to allow for group effects within state-industry-year cells.

APPENDIX F

Effect of Stock Market Returns on the Elasticity of Current Wage to Current Unemployment: First-Stage Regressions for Regression (3) of Table 6[a]

	(1)	(2)
Dependent Variable:	ret_{jt}	$ret_{jt} * u_{kt}$
xr_{jt}	-.107	-.011
	(.061)	(.015)
$xr_{jt} * u_{kt}$	-.288	.093
	(.163)	(.075)
$xr_{j(t-1)}$	.006	.022
	(.066)	(.016)
$xr_{j(t-1)} * u_{kt}$	.187	-.052
	(.160)	(.073)
u_{kt}	.030	-.022
	(.013)	(.005)
experience*1000	.110	.044
	(.794)	(.217)
experience^2*1000	.013	-.007
	(.060)	(.016)
experience^3*10^7	-6.260	2.540
	(16.300)	(4.400)
experience^4*10^7	.064	-.026
	(.145)	(.040)
female*1000	2.999	-.166
	(4.179)	(1.399)
female*exp*1000	-.509	.207
	(1.073)	(.349)
female*exp^2*1000	.011	-.014
	(.081)	(.026)
female*exp^3*10^7	1.110	2.230
	(22.100)	(7.290)
female*exp^4*10^7	-.029	-.002
	(.197)	(.066)
years of education*1000	.166	.015
	(.276)	(.090)
unionized*1000	-.749	.358
	(1.705)	(.553)
non-white*1000	1.068	1.171
	(.002)	(.661)
F-statistic, test that instruments jointly equal 0 (prob> F-stat)	17.61 (.000)	10.03 (.000)
Adjusted R^2	.367	.142

[a]Notes: See next page.

Notes:

1. Data is composed of a random subsample of manufacturing workers over 1976-1981 (source: May CPS) and 1983-1992 (source: MORG CPS) (*sample size: 130567*).
2. Variables are defined in Section 4 and Appendix B. ret_{jt} is the average industry stock market return. xr_{jt} is the exchange rate index for industry j in year t. Both ret_{jt} and u_{kt} have been demeaned.
3. Additional covariates included in each regression are 51 state dummies, 16 year dummies and 62 industry dummies.
4. Standard errors are in parentheses except that the number in parentheses below the F-statistic is a p-value. Standard errors are corrected to allow for group effects within industry-year and state-industry-year cells.