INTERNAL LABOR MARKETS AND INVESTMENT IN CONGLOMERATES

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Abstract

The literature on conglomerates has focused on the misallocation of investments as the cause of the conglomerate discount. I study frictions in the internal labor market as a possible cause of misallocation of investments. Using detailed plant-level data, I document wage convergence in conglomerates: workersin low-wage industries collect higher-than-industry wages when the diversified rm is also present in high-wage industries (by 5.2%). I con rm this effect by exploiting a quasi-experiment involving the implementation of the NAFTA agreement that exogenously increases worker wages of exporting plants. I track the evolution of wages in non-exporting plants in diversi ed rms that also own exporting plants and nd a signi cant increase in wages of these plants relative to una liated non-exporting plants after the event. This pattern of wage convergence affects investments. Plants where workers collect higher-than-industry wages increase the capital-labor ratio in response to their higher labor cost -- and this response to higher wages is associated with higher investment in some divisions.

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I Introduction

Ever since Coase (1937) seminal paper on the nature of the firm, there has been a widespread interest in what determines the boundaries of firms and how these boundaries shape the resource allocation of firms. Much of the finance literature has focused on the effect of firms' boundaries on the allocation of investments.[1] Less attention has been paid to their effect on labor costs.[2] If firms' boundaries alter the compensation workers receive, "misallocation" of investments can be an optimal response to these altered wages. In this paper I study whether firms' boundaries affect wages and how investments respond. I show that diversified organizational form impacts the wages in internal labor markets: there is *wage convergence* in these firms, with workers in low-wage industries collecting higher-than-industry wages when the diversified firm is also present in high-wage industries. Moreover, I show that there are real consequences of this behavior, as it alters investment decisions of diversified firms.

There are several views on how wages might be set within firms. One view is that wages are set solely based on the marginal productivity of labor. Under this view, firm boundaries have no role in wage setting per se, other than through their impact on productivity. Alternatively, there are two broad arguments that suggest that firm boundaries could impact wage setting due to peer effects: those based on social interactions and those based on information acquisition.[3]

The first set of theories have in common the feature that wages of other workers enter directly as an argument in the utility function.[4] Using this framework Frank (1984) argues that high-paid workers derive "status" utility from being in the presence of low-paid workers and conversely low paid workers get a disutility from interacting with their high-wage colleagues.[5]

[1]There is a vast empirical literature that examines the nature of investments by conglomerates. For recent surveys, see Stein (2003) and Maksimovic and Phillips (2007).

[2]For more discussion see Zingales (2000). There is a small but growing empirical literature on labor, capital structure and financial constraints (e.g., Matsa (2010), Chen et al. (2011a), Benmelech et al. (2011), Simintzi et al. (2010)).

[3]In addition to the two mechanisms discussed here there is scientific research that suggests an evolutionary aspect toward maintaining equality. In particular, Brosnan and De Waal (2003) conduct a series of experiments to show that monkeys display a strong aversion to inequality.

[4]The idea of social interactions has also been explored in settings other than the labor market, for example in Becker (1991).

[5]This leads Frank (1985) to call for the importance of "Choosing the right pond". In pop culture this idea is present in the famous cartoons "Keeping up with the Joneses" (Momand (1920)) and in the recent Hollywood

This idea also gives rise to that of "fairness" of wages, presented in Akerlof and Yellen (1990).[6] Workers evaluate their wage relative to a benchmark and assess the fairness of their wage. Workers who perceive their wage as unfair may take actions of revenge or sabotage against the firm. Consequently, the firm may have an incentive to pay the workers a wage that they would perceive as fair, even if it differs from the marginal product of labor.

In the second group of theories, the wages of other workers don't enter directly in the utility function, but they may still provide information about the firm or the future of workers in the firm. Levin (2002), for instance, presents a model where the actions of the firm toward a group of employees can undermine the firm's reputation with everyone else. For example, some firms may be reluctant to lay off workers or reduce wages for a subgroup of employees in a downturn, as that could undermine the perception of job security or the wage expectations for the remaining workers.

The importance of wage equity inside firms is not just a theoretical possibility and is discussed in several news reports. For instance, a recent *Wall Street Journal* article reports auto workers trying to change a wage structure with two levels to a single level for everybody in the firm, arguing that doing so would increase fairness.[7] Similarly, the manager of Tennaco, which in the late 1980's acquired Houston Oil and Minerals Corporation, also expressed his desire for wage harmonization within his firm when he argued that "we have to ensure internal equity and apply the same standard of compensation to everyone" (see Milgrom and Roberts (1990) for more details).[8]

In my empirical analysis I seek to understand whether there is a systematic pressure for wage convergence inside firms and whether organizational form influences this behavior. Diversified firms provide a good laboratory to study the existence of peer effects on wages of workers. The reason is that a conglomerate's presence in different industries generates a natural dis-

movie *The Joneses*.

[6] Akerlof (1982) and Akerlof (1984) also mention the notion of fairness and the importance of social norms in determining wages. More recently Hart and Moore (2008) construct a model where contracts act as a way to establish reference points that determine the notion of fairness.

[7] "Some UAW Workers Seek End to Two-Tier Wages", *Wall Street Journal* August 13, 2011.

[8] Additionally, Bewley (1999) in his book *Why wages don't fall during a recession* has numerous quotes from executives describing the extreme importance of internal equity in the compensation structure of their firms.

persion in wages across workers in the firm, providing a setting where concerns for internal equity could be more pronounced. Additionally, the existence of comparable stand-alone firms provides a benchmark for what the wages ought to be if firm boundaries are not relevant.

Using detailed plant-level data from the US Census Bureau over the period 1977 to 2000, I provide evidence for wage convergence in conglomerates: workers in low-wage industries collect higher-than-industry wages when the diversified firm is also present in high-wage industries. In particular, workers in low-wage segments whose firm is present in high-wage segments collect a 5.2% premium relative to what would be expected if productivity were the sole determinant of wages. In contrast, a firm's presence in a low-wage industry does not display a clear pattern. Wages of workers in high-wage segments whose firm also employs low-wage workers are dragged down by at most 1.6%, although several specifications show no impact.

By decomposing the total compensation between wage and fringe benefits, I find that a key determinant of this premium is associated with the benefits component,[9] with workers in low-wage segments collecting a 10% higher benefit package when their firm also operates in high-wage segments.

While I include several controls in my specifications, it is difficult to rule out the possibility that unobservable aspects are affecting the results. I conduct several tests that together alleviate concerns that the relationship I establish is spurious. Specifically, I am able to account for plant-specific (time-invariant) unobservable characteristics by examining the dynamics of wages in plants whose ownership changes between firms with different wage levels. I observe that when plants move to a firm that pays higher wages to its employees in other divisions, the wages of workers in the acquired plant are kept constant, while the wages of workers whose plant is acquired by a lower-paying firm decrease after the acquisition.

Though my tests on dynamics of worker wages are suggestive of wage convergence in diversified firms, they are not conclusive. In particular, there might be time-varying unobservables that prompt firms to choose plants they buy or sell, which could be affecting my estimates.

[9] This is the component of compensation that contains bonuses, and other fringe benefits such as health insurance.

To alleviate such concerns, I exploit a quasi-experiment involving the implementation of the NAFTA agreement that exogenously increases worker wages of exporting plants.[10] I compare the evolution of wages of non-exporting plants ("treatment plants") in diversified firms that also own exporting plants with those of unaffiliated non-exporting plants ("control plants") after the event. Strikingly, though there are no differences in the wage patterns of treatment and control plants before the NAFTA event, there is a divergence in wages after the event.

Having established that diversified firms exhibit wage convergence, I next examine the consequences of this behavior on their investment. There is a dramatic change in the investment policy of diversified firms that exhibit wage convergence: plants with higher-paid workers tilt their investment policies toward a higher capital-labor ratio. This can be rationalized easily. The presence of peer effects in the wage structure of diversified firms creates a wedge between the price of labor in diversified and non-diversified firms. As an optimal response to this difference in input prices, diversified firms that are present in high-wage industries and pay higher wages to their workers in the low-wage segments tilt their input use in these plants away from the expensive labor toward the relatively cheaper capital. Importantly, the difference in input allocation leads to differences in investment levels for the plants of diversified firms relative to stand-alone ones. I show that the peer effects in wages account for a significant part of the lower sensitivity of investment to Tobin's Q in diversified firms relative to stand-alone firms (e.g., Ozbas and Scharfstein (2010) and Matvos and Seru (2011)) and results in "overinvestment" by diversified divisions in low-investment industries.

Finally, I explore some mechanisms that affect the strength of the wage convergence pattern in diversified firms. In particular, I use variation in labor unionization, geographic proximity of plants, level of centralization of the firm and product market competition to generate results that suggest that existence of firm-level rules and rent extraction, not social interactions, may be the main driver of the results. The fact that the strength of the wage conversion is related to labor market characteristics, such as the degree of labor unionization, also helps alleviate

[10] I discuss several reasons why the wages of exporting plants might have gone up after NAFTA in Section V.B.

concerns that frictions in internal *capital* markets are the driver of my findings on internal *labor* markets.

This paper connects several strands of literature in corporate finance and personnel economics. First and foremost it relates to the literature that studies corporate diversification. This literature has focused almost exclusively on value creation (Lang and Stulz (1994), Berger and Ofek (1995), Servaes (1996), Schoar (2002), Graham et al. (2002), Campa and Kedia (2002), Villalonga (2004b), Laeven and Levine (2007) and Custódio (2013)), allocation of capital (Stein (1997), Shin and Stulz (1998), Chevalier (2000), Rajan et al. (2000), Gertner et al. (2002), Matvos and Seru (2011), Stein (2002), Ozbas and Scharfstein (2010) and Duchin and Sosyura (2012)) and R&D productivity (Seru (2010)). My paper is also connected to the literature that studies the investment behavior of conglomerates and stand-alone firms using plant-level data (e.g., Villalonga (2004a), Schoar (2002), Maksimovic and Phillips (2002), Maksimovic and Phillips (2008) and Maksimovic et al. (2011)). More recently, in a related paper, Tate and Yang (2011) also study the internal labor markets of diversified firms. They examine the allocation of workers across different segments of conglomerates and present evidence of a "bright side" of internal labor markets, with workers facing lower costs of moving across divisions within diversified firms. My paper examines how internal labor markets in these firms shape the wage-setting process. In general, my paper differs from this literature by arguing that wage setting inside conglomerates may be important to assess previous results on investment behavior.

It is also related to the literature that studies the importance of internal labor markets as a determinant of the employment relation and wages. Baker and Holmstrom (1995) and Baker et al. (1994) show the existence of persistent cohort effects in wages, and Doeringer and Piore (1985) describe "ports of entry" into firms, indicating that once workers are inside the firm, the treatment they receive is substantially different than if they were outside. It has also been shown that the wages of workers depend crucially on the industry in which their firm operates (see e.g., Krueger and Summers (1988), Dickens and Katz (1987) and Murphy and

Topel (1990) for further discussion).[11] My paper confirms that internal labor markets allow workers to be partly shielded from the external labor markets and that the wages of workers depend on the industries in which their firm operates.

Finally, this paper contributes to the study of peer effects. Peer effects have been shown to be important determinants of happiness (Luttmer (2005)), of perks in firms (Rajan and Wulf (2006)), of executive compensation and investment (Shue (2011)) and of labor productivity and turnover (Pfeffer and Langton (1993), Pfeffer and Davis-Blake (1991), Card et al. (2010) and Bloom (1999)). My paper shows that the importance of peer effects to wages within firms is a pervasive phenomenon across sectors of the US economy with consequences for firm investment.

The remainder of the paper is organized as follows. In Section II, I describe the data and define the variables of interest. In Section III, I discuss the empirical design. Section IV presents the main empirical findings. In Section V, I present the implications of my findings on wage convergence for investment decisions. Section VI examines factors that affect the strength of wage convergence in diversified firms. Section VII concludes.

II Data and Variables

II.A Data Sources

In this section I discuss the various sources of data used in my analysis. The main source of data used in this paper is the US Census Bureau (henceforth Census), which provides clear advantages in studying questions involving corporate diversification relative to using the Compustat Segment files, due to the higher accuracy in firm reporting.[12] For the years 1977 to

[11] This puzzling fact was addressed in an article in the *Economist* magazine on May 28, 1998, entitled "Secretaries in Investment Banks Tend to Earn Far More than Secretaries in Hotels". My findings suggest that not only do secretaries in investment banks earn more than secretaries in hotels, but also that secretaries in hotels receive higher wages if their firm has an investment banking branch.

[12] Several papers (Lichtenberg (1991), Davis and Duhaime (1992), Denis et al. (1997), Hyland and Diltz (2002) and Harris (1998)) document a lack of accuracy in the Compustat reporting either because firms underreport the segments they are in, or because they use discretionary power in reporting changes to segments when no real change occurred. Due to these shortcomings, others have used Census data to study diversification in the

2000, I combine three data sets from the Census: the Longitudinal Business Database (LBD), the Census of Manufacturers (CMF) and the Annual Survey of Manufacturers (ASM).[13]

The LBD contains information on all private non-farm establishments in the United States that have at least one paid employee. For each establishment, there are data on the number of employees, payroll, geographic location, industry and firm. By virtue of the completeness of this data set, which encompasses about 7 million establishments per year, it is possible to build very accurate measures of geographic and industry diversification, and firm and division size. Unfortunately, the LBD does not contain information on productivity or investment that is crucial for my paper; thus I supplement it with two other Census data sets that have a higher level of detail.

For the years that end in 2 and 7 (the census years), the US Census Bureau conducts the Census of Manufacturers, which collects detailed information on virtually all establishments (also referred to as plants) in the manufacturing sector – SIC codes 2000 to 4000 – representing about 350,000 establishments per year. In the remaining years, the Census Bureau does not conduct a survey on all establishments in the manufacturing sector. Instead they collect information only on plants that have 250 or more employees and a random sample of the smaller establishments, through the Annual Survey of Manufacturers, which corresponds to roughly 50,000 establishments per year.[14] The main data items from the CMF and the ASM that I use in this paper are sales, value added, wages of production workers, number of workers, production worker hours, investment and book value of assets.[15]

The main sample used in the paper is constructed as follows: I take all the establishments in the LBD that have a positive number of employees, firm identifier and industry information. At this point I construct measures of corporate diversification, firm size, division size and firm wage level. These variables and their importance to this study will be discussed in detail later.

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past, such as Schoar (2002), Villalonga (2004a) and Maksimovic and Phillips (2002).

[13] I stop my analysis in 2000 due to the change in the Census industry classification from SIC into NAICS.

[14] Starting in 1999 the cutoff for inclusion with certainty in the ASM went from 250 to 500 employees.

[15] Unfortunately, the LBD, CMF and ASM data sets do not contain information about individual workers, and as such, in my tests I am not able to control for individual worker idiosyncracies. The battery of tests I perform alleviate the concerns that my results are driven by differences in characteristics of individual worker.

I then merge the yearly LBD files with the ASM and CMF using a unique plant identifier that is common to all three data sets. As is common in the literature that uses Census data, I exclude administrative records for which information is imputed (e.g., Foster et al. (2008)). Finally, I also exclude establishments with zero or negative value added and those that are present in the LBD but are not in the ASM or CMF. Thus, in the final sample only plants in the manufacturing sector for which I have information on productivity are included. The use of these three data sets combined gives me the opportunity to take advantage of the extensive plant-level information of the ASM and CMF combined with the accurate firm-level characteristics computed using the LBD.

To test different explanations for the results, I complement the main data with two additional data sets: the Auxiliary Establishment Survey and state-level data on labor unionization. The Auxiliary Establishment Survey (AUX) is a survey conducted by the Census Bureau in the census years in order to collect information on auxiliary facilities of manufacturing plants. So, for the years 1977, 1982 and 1987, I also have data on the importance of headquarters or firms' central offices. The state-level labor unionization data set is constructed using the Current Population Survey (CPS) conducted by the Bureau of Labor Statistics[16] for the years 1983 to 2000, and contains the percentage of manufacturing workers that are members of a labor union.

II.B Variable Description

This section contains the description of the main variables used in the empirical analysis. The first part of the paper analyzes wages in diversified firms, and as such, the main variable of interest and the dependent variable in the regressions is wages. In particular I study the wage per hour of production workers, which is constructed simply by dividing the total wages (including bonus and benefits) paid to production workers by plant and year, by hours of production workers at the plant level in that year. I chose production workers because these

[16]The labor unionization data set is available online at http://unionstats.gsu.edu/ and a description of it can be found in Hirsch and Macpherson (2002). This data is also used in Chen et al. (2011b) study of the impact of labor unionization on stock returns.

are the ones for whom an accurate measure of quantity (in this case number of hours) exists. To minimize the influence of outliers on the results, each year I winsorize the wages at the 1st and 99th percentiles.

I also create a variable that separates the benefits component of compensation from wage compensation. The variable *Benefits* is constructed by taking the total non-wage compensation and dividing by the hours of production workers. The non-wage compensation component includes bonuses and fringe benefits such as health insurance.

Using the wages of workers in stand-alone firms in the LBD, I classify industries (defined at the three-digit SIC level) into wage quintiles every year. Quintile 1 contains the industries with the lowest wages while quintile 5 contains industries with the highest wages. Notice that with this procedure I am able to classify all industries, not only those in the manufacturing sector, into one of the five wage quintiles. I then use this classification to construct measures of firm presence in these quintiles. For example, the variable $Present\ in\ q5_{ft}$ is a firm-level variable that takes the value of 1 if firm f owns at least one establishment in an industry that is in quintile 5 of wages in year t, and 0 otherwise. Similarly, the variable $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm is present in wage quintile 1 in year t, and takes the value of 0 otherwise.

In all my wage regressions I include labor productivity as an explanatory variable. I measure labor productivity as value added per hour of labor ($VA/hour$). This variable is constructed by taking the yearly value added for the plant and dividing it by the total number of production hours. Value added is equal to sales minus change in inventory minus material inputs minus energy. Another important explanatory variable in the analysis is size, since it is well established in the literature as a key determinant of wages (e.g., Brown and Medoff (1989) and Oi and Idson (1999)). I create 11 size controls that are included in all my regressions. The first five size controls are designed to control for the impact of firm size on wages, where size is measured as number of employees. I create firm-size quintiles every year to allow for a different impact of firm size on wages for the different firm-size quintiles. I use a similar procedure to construct five division-size controls. I sum firms' workers at the three-digit SIC level and, as before, allow the size controls to have different slopes by division-size quintile.[17] I also include a plant-size control, which is constructed as plant sales per year. Plant age in years is controlled for using the variable *Age*.

Next, a critical variable for my analysis is the extent of diversification of the firm. I construct two different measures of diversification. The first measure is $Divdummy_{ft}$, a dummy variable that takes the value of 1 if firm f is present in more than one three-digit SIC industry in year t. Alternatively, I construct $log(number\ of\ divisions)_{ft}$, the logarithm of the number of three-digit SIC industries in which the firm f is present in year t.[18]

To study the profitability of the plants under analysis I use the variable *Profit*, which is constructed by subtracting from sales the labor costs, the energy and material inputs and the rental cost of capital, and dividing by yearly sales.

Finally, in the analysis that examines the impact of internal labor markets on firm investment behavior, I use as dependent variables capital-labor ratio and investment. The capital-labor ratio (*K/L ratio*) is constructed by dividing book value of assets by total employees at the plant in a given year. Investment (*CAPX/Sales*) is constructed by dividing capital expenditures by sales for each plant every year.

III Empirical Strategy

In my empirical work I am interested in establishing the existence and importance of peer effects on the wages of workers in diversified firms and studying their impact on investment. In particular, if the attribute that drives peer effects in the wages of plant i is *peer*, I evaluate

[17]For robustness, I also construct size controls that measure the number of plants, instead of the number of employees.

[18]To conduct robustness checks I construct two other measures of corporate diversification. The HH_Plants_{ft} is defined as 1 minus the Herfindahl-Hirschman concentration index of establishments of firm f, in year t. It takes the value of 1 if the firm's establishments are all in the same three-digit SIC industry. And $HH\_Employees_{ft}$ is constructed as 1 minus the Herfindahl-Hirschman concentration index of employees of the firm in year t. It takes the value of 1 if all the firm's employees work in the same three-digit SIC industry. The results obtained using these measures are qualitatively similar to the ones reported in the paper and are available upon request.

the magnitude and statistical significance of β by estimating a regression of the form below:

$$Log(Wage/hour)_{ift} = \alpha + \beta \cdot peer_{ift} + X_{it}'\gamma + \epsilon_{it}$$

There are several challenges in interpreting β as the causal impact of peer effects on worker wages in plant i. First, there are several important factors that impact wages, such as labor productivity and firm size. Failing to control for these factors could bias β if the manner in which I expect peer effects to operationalize inside diversified firms is correlated with these factors. For example, finding that some firms pay higher wages to workers in otherwise low-wage industries could be driven by firms hiring more productive workers. To alleviate this concern I take advantage of the richness of the Census data and include a wide variety of controls (X) for labor productivity, size and plant age.

A second concern that may arise is the existence of unobservable time-invariant plant-specific characteristics that impact wages. For example, finding that a plant in a diversified firm pays higher wages to its workers relative to comparable stand alone-firms and that the wage difference is correlated with *peer* could be due to other facts not measured through the controls included in X. It might be that a plant had high wages even before it was a part of a diversified firm.[19] To address this concern, I track the wages of workers when ownership of plants changes between firms with different levels of wages.

A final issue in interpreting β as the causal impact of peer effects on wages is that plants may have been acquired by diversified firms for time-varying unobservable reasons that are correlated with worker wages. In other words, what I want to interpret as a treatment effect is in fact a selection effect. To circumvent this problem I will make use of a quasi-experiment that uses a drastic change in trade barriers to generate exogenous variation in wages of some of the plants of a diversified firm. I will then examine the evolution of wages in plants that are unaffected by the trade shock inside the same diversified firm, relative to similar plants of unaffected firms. Tracking the propagation of the shock toward the remaining plants of the

[19] This is a critique raised by Chevalier (2000) regarding the literature that evaluates the impact of conglomerates on their investment policies.

affected firm relative to plants owned by firms not exposed to the shock allows me to difference away selection considerations that could be biasing my estimates.

IV Main Results

IV.A Pattern of Wages in the Raw Data

I start my empirical analysis by showing the main patterns in the mean hourly wages of production workers in the manufacturing sector, in the absence of any controls. In Table I I present the mean hourly wage of production workers by wage quintile and type of firm. Each column is associated with a type of firm. The first column shows the wages of plants that belong to undiversified firms. The second column shows the same information for diversified firms only. Each row of Table I represents a different wage quintile, where quintile 1 indicates lowest wages and quintile 5 indicates highest wages. Note that the categorization of industries into quintiles is based on the wages of stand-alone firms only.

To understand how the firm's presence in high-wage industries relates to the wages in the low-wage segments, I sequentially eliminate all plants from the firms that have at least one establishment in the high-paying quintiles. In column 3 I exclude from the sample of diversified firms all establishments from firms that have at least one establishment in wage quintile 5. In column 4, I exclude all plants from firms that have establishments in wage quintiles 4 or 5. The same procedure is applied to the remaining columns, where I sequentially apply more restrictions on firms that are present in the sample. Each element of the table corresponds to the average hourly wage for production workers in the wage quintile and firm associated to that row and column. For example, the average hourly wage of production workers in the manufacturing sector who operate in an industry classified as wage quintile 2, in a firm that although diversified has no plant in wage quintile 5, is $10.83 (row 2 and column 3).

This table reveals two main patterns. First, when looking simply at wages in non-diversified firms relative to wages in diversified firms we observe that the latter are significantly higher.

This is similar to the results reported in Schoar (2002). Second, and more importantly, there is a positive relation between the wages of workers in plant i and the wages of workers in the other plants of the diversified firm. Workers in a diversified firm obtain a larger wage when that firm also has higher-paid workers. Columns 3 through 6 reveal a striking pattern. It is not simply corporate diversification that is associated with higher wages but diversification into high-paying sectors that leads to higher wages for the whole firm. The findings in this section, although suggestive, are univariate comparisons. I now evaluate these patterns more formally in a multivariate setting.

IV.B Multivariate Analysis

In this section I evaluate whether the patterns unveiled earlier are robust to the inclusion of several important controls such as size, age and productivity. Additionally, the industry and the geographic region in which plants operate can have an important impact on wages; for example, workers at some plants may have high wages because they are located in regions with high living costs. To exclude explanations such as these that rely on industry, state or year shocks, I include $Industry \times Year \times State$ fixed effects in the regressions.

I start by focusing on plants in wage quintiles 1 through 4 and measure the impact on the wages of workers in those industries if their firm also has workers in wage quintile 5. I do so by estimating regressions of the type:

$$Log(Wage/hour)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm is present in wage quintile 5. The set of controls X includes log(VA/hour), plant age, the 11 size controls and $Industry \times Year \times State$ fixed effects. Panel A of Table II presents the findings. Each of the two columns shows the coefficients for a specification where the control for degree of diversification is different. Column 1 includes simply a diversification dummy and column 2 uses as control for diversification the variable *log(number of divisions)*. The results show that a worker at a plant in wage quintiles 1 to 4 whose firm is present in the highest wage quintile collects a premium of up to 5.2%. Note that this estimate is relative to workers at plants in the same industry, year and state whose firm is not present in wage quintile 5 and after accounting for firm, segment, plant size, plant age and labor productivity.

Additionally, workers at diversified firms that are not present in the highest wage quintile also collect wages that are higher than those observed in stand-alone firms. The magnitude of this "premium" is not as large as the one associated with $\textit{Present in q5}_{ft}$. This pattern may also be due to the firm's presence in other high-wage quintiles. For example, the firm's presence in wage quintile 4 also has a positive impact on workers in wage quintiles 1 to 3.[20] We can also see that the productivity control is statistically significant: a 10% increase in productivity leads to a 2.5% increase in labor compensation.[21]

Next, I inspect the impact of low-wage workers on the wages of workers in the better-paid industries, and assess whether the peer effects have a symmetric impact on wages. I do so by estimating regressions of the form:

$$Log(Wage/hour)_{ift} = \alpha + \beta \cdot \textit{Present in q1}_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where $\textit{Present in q1}_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in the industries belonging to wage quintile 1. The set of controls X is the same as in the previous regressions. Note that here I focus my attention on the workers whose industry is in wage quintiles 2 to 5 and measure the impact of being employed by a firm that also owns establishments in industries in wage quintile 1. Panel B of Table II shows that workers whose firm is present in the lowest-wage quintile are affected by between 1.3% and -1.6% of their wage. Here the evidence is less conclusive than in Panel A, with the results depending

[20] When I estimate the regressions including a control for presence in wage quintile 4, the magnitude of the diversification measures is reduced.

[21] The fact that the wages do not grow one-to-one with productivity is not new to my study. This fact is discussed in Hutchens (1989) and in the *New York Times* article from January 12, 2013, "Our Economic Pickle", for example. Moreover, it is consistent with the notion that the blue-collar workers analyzed in this study do not capture a large share of the productivity gains (Atkinson et al. (2011)).

crucially on which diversification control is used.[22] As can be observed, the estimates on the diversification measures are large. This is because some firms in wage quintiles 2 to 4 are present in wage quintile 5 – which has a large positive impact on wages. When I include a control for the firm's presence in wage quintile 5, the magnitude of the diversification measures coefficients is greatly reduced. I also find that the estimate on labor productivity exhibits a positive and statistically significant coefficient.

I next conduct multivariate analysis of the benefits component of compensation, productivity and profitability of these plants. I conduct regressions of the type:

$$Log(Y)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

and,

$$Log(Y)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

In Table III the dependent variable is Log(Benefits). Panel A shows that workers in wage quintiles 1 to 4 whose firm is present in wage quintile 5 collect a benefit package that is 2.3 to 10% higher than workers in the same industry, state and year whose firm does not have a high-wage segment. As was the case for total compensation, the firm's presence in low-wage segments has an ambiguous impact on benefits. The results in Table III suggest that an important part of the wage conversion pattern may be attributable to the benefits component of compensation.

In Table IV, the dependent variable is Log(VA/hour). Panel A shows that a firm's presence in wage quintile 5 is associated with 8 to 12% higher productivity in their low-wage segments. On the other hand, Panel B shows that the firm's presence in wage quintile 1 has an ambiguous effect on productivity, with the choice of diversification control crucially affecting the results. Moreover, the results in this table show that diversification per se is associated with higher labor productivity.[23]

[22] I also estimate the regressions using as control for diversification the Herfindahl-Hirschman concentration index of sales and employees and find a zero impact.

[23] This is consistent with the results found by Schoar (2002).

Given the previous results that both labor compensation and productivity depend on the firm's organizational form, an important variable to analyze is profitability. Tables V and VI show the results obtained from estimating the previous specifications but with *Log(Profit)* as the dependent variable. Panel A of Table V shows that the firm's presence in high-wage segments is associated with about 3% higher profitability in their low-wage segments. That is, although labor compensation is higher for these plants, since productivity is also higher, these plants operate with higher profitability than the average plant in the same state, year and industry. Panel B of the same table shows that the firm's presence in low-wage segments is not associated with a difference in profitability for plants in high-wage segments.

Interestingly, when the productivity control *log(VA/hour)* is included in the regressions, the results on profitability change dramatically. In Panel A of Table VI we can observe that when conditioning on productivity, the firm's presence in a high-wage segment is associated with lower profitability. This suggests that plants that achieve high productivity without their firm being present in the high-wage segments tend to have higher profitability than those whose firm is. The evidence confirms that the wage convergence pattern inside conglomerates negatively impacts profitability, but this may still be a small price to pay for firms that chose to diversify as a means of increasing productivity.

Overall, the results in this section suggest that there are peer effects on wages. However, there seems to be an asymmetric pattern in these effects: low-wage workers get higher pay when their firm is present in high-wage industries, but the highest paid workers do not get harmed in the same proportion (if any) from working in a firm that also employs low-paid workers, suggesting that it may be easier for firms to overpay their workers than to offer subpar wages to employees.

IV.C Evidence from Changes in Plant Ownership

I now extend my empirical analysis to account for plant idiosyncracies. Plants could have unobservable characteristics that lead them to have higher or lower wages even in the absence of peer effects. I now turn to a setting where I am able to include plant fixed effects and track the evolution of wages when there are changes in plant ownership.

I divide the plants that change ownership into two subgroups. The first group includes plants that go to a firm where the wage level in its other segments is higher than was the case in the original firm. In this group I expect the peer effects to drive wages up. The second group includes plants that move to a firm where the workers in other segments are paid less than in the original firm, where I expect peer effects to drive the wages down. To avoid possible confounding effects I exclude from the sample plants that change firm more than once. I then conduct an event study on the wages of plants that change firm for which I have six consecutive years of data around the event (three years before and three years after). In order to account for any broad macroeconomic movements around these events, I compare the wage changes to a control group of plants that did not change ownership during the sample period.

To identify the subgroup of plants that change to a firm where the wage level of other workers is higher than in the original firm, I construct a dummy variable that takes the value of 1 if the plant moves to a new firm that has a level of wages in its remaining divisions higher than the level of wages in the other segments of the original firm. I call this variable *Firm wage H*. I then use a similar procedure to identify the plants that go to a firm where peer effects should bring wages down and construct the variable *Firm wage L*. Here I also construct the variable *After* that takes the value of 1 for the three years after the plant changes firm and 0 in the three years before. It also takes the value of 0 for plants that never change firm.

I use continuous measures of firm wages to classify the movement of plants into higher- or lower-paying firms, instead of the dummy variables of presence in wage quintiles 1 and 5, because the former provide a more accurate comparison of the level of wages in the original and acquiring firm.

My analysis involves estimating regressions of the type:

$$Log(Y)_{it} = \alpha + \beta_1 \cdot (After \times Firm\ wage\ H_{it}) + \beta_2 \cdot (After \times Firm\ wage\ L_{it}) + X_{it}'\gamma + \epsilon_{it}$$

In this case, X includes log(VA/hour), plant age, the 11 size controls, plant fixed effects and $Year \times Industry$ fixed effects. Since I include plant and $Year \times Industry$ fixed effects, the regression measures the impact on wages of workers at a plant moving to a higher- or lower-paying firm relative to wages at plants in the same industry that did not experience an ownership change event. Notice also that a plant that changes firm moves either to a higher- or a lower-paying firm, and as such I do not include the variable $After$ in the regression.

Table VII confirms the results from the previous sections regarding the existence of wage convergence inside firms. The difference in differences regression shows that when a plant moves to a lower-paying firm the wages of its workers tend to go down (by 2.3 %) relative to the wages of other plants in the same industry and time period that did not change firm. Conversely, when plants are acquired by firms whose wage level is higher than the original firm, the wages of production workers do not seem to be adjusted up in an economically or statistically significant manner. Plants that enjoy higher productivity growth also experience a larger wage increase. Moreover, when the firm becomes more highly diversified workers tend to collect higher wages.

In column 2, I analyze separately the benefits component of compensation around ownership change events, and find that the adjustments are more severe for this component than for total compensation. Workers whose plant went to a lower-paying firm suffer a downward adjustment of 5.3% in their benefit package, while those whose plant moves to a higher-paying firm see their benefits go down by 3.7%.

Column 3 shows that there does not seem to exist a significant increase in productivity of the acquired plants, both in the case where they are acquired by higher- and lower-paying firms. In column 4, where the dependent variable is Log(Profit), we observe that there is an increase in profitability for plants that are acquired by lower-paying firms and whose wages were adjusted downward, but not for those that are acquired by higher-paying firms, where such adjustment does not occur. These results suggest that renegotiation of labor contracts may be one of the main plant acquisition motives. It also suggests that it may be easier to renegotiate wages down when the plant is acquired by a lower-paying firm than when it is acquired by a higher-paying firm.

The dynamic pattern of wage convergence does not apply exclusively to changing plants. As a robustness check, I also study the evolution of wages for plants that never change firm during the sample period. Here I am able to measure how the wages in one plant depend on the evolution of wages in other segments of the firm. To do so, I estimate a regression of the form:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot \textit{Log(Firm wage)}_{it} + X'_{it}\gamma + \epsilon_{it}$$

By using the same set of controls X as in the previous regressions in this section, I am able to account for time-invariant plant-specific aspects that may affect wages. The variable *Firm wage* measures the level of wages in the other segments of the firm,[24] and as such changes in this variable occur for two main reasons: 1) changes in the segments in which the firm operates and 2) exogenous shocks to the wages of the other industries where the firm operates. The results in Table VIII show that the wages of plants that never change firm are also positively related to the wage changes in the other segments of the firm, confirming the importance of firm boundaries for the wage-setting process. The elasticity of the wages relative to the wages in other divisions of the firm is 0.023. While changes in productivity positively affect wages, the impact of increasing the degree of diversification does not have a statistically significant impact for these plants.

There is one caveat that is worth mentioning. I am not able to observe individual workers in my analysis. As a result, I don't know if, when a plant changes to a new firm, the same workers keep working in that plant or if the new firm replaces the workers of the acquired plant. Additionally, unlike in the previous section, here I am not able to include $State \times Year \times Industry$ fixed effects because it is computationally unfeasible.[25] Instead, I include

[24]Formally: $\textit{Firm wage}_{it} = \sum_{j \neq i} \frac{Wage/worker_{jt} \times \textit{Number of workers}_{jt}}{\sum_{j \neq i} \textit{Number of workers}_{jt}}$ for all establishments j that belong to the firm and do not operate in the same division as plant i.

[25]Giroud (forthcoming) and Bertrand and Mullainathan (2003) also faced similar dimensionality problems when using Census data.

Year × *2 digit SIC Industry* fixed effects.

In this subsection I find that the wage adjustment of plants that change ownership depends on the wage level of the acquiring firm relative to the original firm. Workers in plants that are acquired by lower-paying firms see their wages adjusted downward, while those that move to higher-paying firms do not suffer any wage adjustment. Moreover the wages of plants that do not change firm also depend positively on the evolution of wages in the other divisions of the firm. This wage pattern cannot be explained by changes in productivity or firm size. Neither can they be explained by shocks to industries to which plants belong because the regressions control for these factors.

V Evidence from a Quasi-Experiment

My analysis so far has shown a strong positive association between wages of workers across divisions of conglomerates that is not likely driven by plausible factors such as plant-specific time-invariant attributes. However, there could be other concerns that might bias my results. In particular, it might be that some unobservable makes firms with plants in low-wage industries acquire plants whose workers are overpaid. If that were the case, the results in the previous section would be due to selection and would not imply a causal relation. In this section I exploit a quasi-experiment that allows me to rule out such selection explanations.

I use the implementation of the North American Free Trade Agreement (NAFTA) as an exogenous source of variation in the wages of exporting plants. The thought experiment is as follows. Suppose there are two sets of non-exporting plants – those plants ("treatment") that are affiliated with a diversified firm that has exporting plants and those plants ("control") that are not affiliated with exporting plants. The experiment uses unaffiliated non-exporting plants as a control group to assess the counterfactual level of wages for treatment plants in the absence of the NAFTA shock. If the peer effects I documented earlier are operational, I expect the treatment plants in a diversified firm to respond to the exogenous wage change in exporting plants inside the firm boundaries. In other words, the identifying assumption is that in the absence of peer effects, the treatment group and the control group should have the same pattern of wages around the NAFTA event.

I use data from 1991 to 1996 to categorize plants into three groups. The first group contains plants that have strictly positive exports during the three years after NAFTA.[26] These are plants whose wages should be directly impacted by the NAFTA shock. I will examine if this is the case in the data in the "first-stage" analysis. Additionally, and because I am interested in studying how wages in one part of the firm affect the wages in the rest of the firm, I construct the treatment group, which includes plants that, despite being part of a non-exporting division, belong to a diversified firm that owns exporting plants in other segments.[27] The final group is the control group, which includes plants whose division has no exports and that belong to firms that, unlike the treatment group, do not have continuous exporting activity in the period 1994 to 1996. My analysis will then compare the evolution of wages in the treatment group relative to the control group. I now describe briefly the NAFTA agreement before describing my findings.

V.A NAFTA Agreement

The North American Free Trade Agreement is an agreement signed by the governments of Canada, Mexico and the United States of America creating a trade bloc in North America. The agreement came into force in January 1994. After being signed by the presidents of the United States and Mexico and the Canadian prime minister in December 1992, the agreement was ratified by the parliament or legislative branch of each of the three countries. January 1, 1994, brought the immediate elimination of tariffs on more than one-half of US imports from Mexico and more than one-third of US exports to Mexico. Within 10 years of the implementation of the agreement, all US-Mexico tariffs would be eliminated except for some US agricultural exports to Mexico that were to be phased out in 15 years. Most US-Canada

[26]The Census collects information on exports at the plant level.

[27]I require that plants belong to divisions that have zero exports for the period of 1994 to 1996, but whose firm has strictly positive exports in other divisions for the period 1994 to 1996, in order to be part of the treatment group.

trade was already duty free. NAFTA represents a major change in import and export barriers within the North America region that is exogenous to the network of plants owned by a firm. In my analysis I focus on three years before and after NAFTA came into effect (i.e., 1991-1993 as period before and 1994-1996 as period after).

V.B Impact on Wages of Exporting Plants

I first provide evidence that the NAFTA shock altered the wages of exporting plants.[28] This is a critical first step to establish, before I am able to trace the effects of this wage increase for treatment plants relative to control plants. In Panel A of Table IX I present the coefficients from estimating the following specification:

$$Log(Wage/hour_{it}) = \alpha + \beta_1 \cdot Exports + \beta_2 \cdot After + \beta_3 \cdot (After \times Exports) + X'_{it}\gamma + \epsilon_{it}$$

where *After* is a dummy variable that takes value 1 in the period after the NAFTA shock and 0 otherwise and *Exports* is a dummy variable that takes the value of 1 if the plant has strictly positive exports every year between 1994 and 1996. The coefficient of interest here is β_3, which measures how the degree of exposure to NAFTA (measured by exports) impacts wages. Since the identification exploits time-series variation, I also include the plants that belong to firms that never export during 1994 to 1996 to account for any macroeconomic trends. Therefore, the specification can be thought of as a difference in difference estimation of wages in exporting plants relative to unaffiliated non-exporting ones. As before, X includes log(VA/hour), plant age, the 11 size controls, plant fixed effects and $Year \times Industry$ fixed effects.

The first-stage analysis shows that plants that have positive exports see an increase in the worker wages after NAFTA relative to wages of workers in the control group. The effects are both statistically and economically significant. For instance, the estimates show an increase in wages of 2.2% for exporting plants relative to non-exporting ones after the NAFTA shock. In addition, plants that experience a larger productivity increase experience a larger wage increase.

[28] Consistent with results in Bernard and Jensen (1997) that also show increases in wages associated with exporting activity.

Moreover, the diversification measures are positive, although not statistically significant. I also depict the evolution of wages for the exporting plants versus those in non-exporting firms in Figure 1. The figure confirms that the workers of exporting plants saw a significant increase in their wages in the years 1994 through 1996 relative to workers in plants of firms that did not export in the three years after NAFTA, while the evolution of wages was very similar for both groups before 1994.

Note that it is not clear ex-ante whether the NAFTA agreement should increase or decrease the wages of exporting plants. On the one hand, because these plants face international trade competition from Mexico and Canada, there might be downward pressure on the wages. Alternatively, the agreement might provide access to new markets for exporting plants which helps the plants increase their profits and worker wages. Furthermore, NAFTA can act as a positive shock to the demand for labor and consequently to wages. The analysis suggests that the latter effect is dominant in the period of my analysis. For my subsequent analysis I am agnostic about the exact reasons for this wage increase in exporting plants. Rather I use this fact to assess the wage response in non-exporting plants of diversified firms with exporting plants that saw a wage increase for their workers after NAFTA.

V.C Wages in Treatment and Control Groups before NAFTA

Before establishing an effect on the treatment group relative to the control group after the NAFTA shock, I need to establish that there was no differential pattern in wages between the two sets of plants before the shock. I now show that this is indeed the case. Figure 2 shows the wage evolution of the treatment group relative to the control group. As is evident, for the periods before the shock (1991 to 1993), I find no statistical difference in the evolution of wages of the workers in the treatment group when compared with the wages of workers in the control group. Overall, this analysis suggests that the treatment and control groups are very comparable before the NAFTA shock.[29]

[29] This also ensures that other factors that were present throughout this period are not driving the results. For example, the informed reader may notice that the US Dollar was appreciating over the period 1994 to 1996 and that could have a role in determining my results. Since this pattern in the US Dollar was also present in

V.D Main Findings

I now show my main findings by estimating the following regression:

$$Log(Wage/hour_{it}) = \alpha + \beta_1 \cdot Firm\_Exp_{it} + \beta_2 \cdot After_{it} + \beta_3 \cdot (After_{it} \times Firm\_Exp_{it}) + X'_{it}\gamma + \epsilon_{it}$$

In this "second-stage" regression I include only plants in the treatment and control groups (i.e., all the plants included in this regression belong to segments that have zero exports for the period 1994 to 1996) and present the results in Panel B of Table IX. The coefficient of interest is β_3, which traces the potential effect of wage increases in exporting plants on wages of the treatment group. The control group serves as a counterfactual that accounts for macroeconomic and other factors that may also have changed around the NAFTA shock and impacted worker wages of non-exporting plants. The set of controls X are the same as the ones used in the regressions that measure the impact of NAFTA on exporting plants.[30]

As is evident, β_3 is positive and statistically significant. This implies that wages in the treatment group increased after the NAFTA shock when the wages of exporting plants inside the diversified firm increased. This is consistent with peer effects within the diversified firm being an important determinant of wages. As before, the plants that experienced larger growth in productivity also experienced larger wage growth. However, in this case the diversification measures are positive but statistically insignificant. This pattern of wages is visible in Figure 2 as well.

V.E Placebo and Other Tests

I conduct several auxiliary tests to confirm the robustness of my findings. The reader may worry that exporting firms may be superior to non exporting firms for unobservable reasons, such as managerial talent. Since my treatment group is selected based on exporting activity

the period 1991 to 1994 and we do not find differences in the evolution of wages in that period, it is hard to argue that my results are driven by the evolution of the Dollar.

[30]Notice that this set of controls means I am comparing plants in the control group that operate in the same industries as those in the treatment group.

what I am interpreting as a causal effect could in fact be a selection effect. In order to address this concern I conduct a placebo test by choosing an alternative period for the analysis (1985 to 1990 – the time period immediately before the one used for the main results). Table X presents the placebo test for this period and shows that there is no visible pattern in terms of changes in wages of exporting plants or non-exporting plants in diversified firms relative to unaffiliated non-exporting plants. These results confirm that exporting plants and non-exporting plants owned by exporting firms are not different from non-exporting plants owned by non-exporting firms in the absence of the NAFTA shock.

Another concern with the analysis may be that non-exporting plants in the firm may produce intermediate goods that serve as input to the exporting plants. As a result, these non-exporting plants could be *de facto* directly affected by the NAFTA shock. To alleviate such concerns, I rerun my second-stage regressions including only plants that have zero transfers to other plants in the firm. This is feasible since Census data allows me to see the interplant transfers within firms. The results are qualitatively and quantitatively similar to those reported before (see Table XI). This is not a surprise in light of Hortaçsu and Syverson (2009), who show that interplant transfers are small even for vertically integrated firms.

V.F Summary

The results in this section demonstrate that there are strong peer effects on wages inside diversified firms, which are unlikely to be driven by selection considerations. There are a few caveats to this analysis. First, information on exports is only available for the manufacturing sector, so there might be establishments outside of SIC sectors 20 to 40 that may have exporting activity but are excluded from my analysis. While this is a potential source of bias, my results could still be relevant if the exclusion affects treatment and control groups similarly. Second, the data do not provide any information on imports. As a result, I am able to use only exports to construct NAFTA exposure measures. Again, it is hard to envisage scenarios where this omission impacts treatment and control groups differently. Having established wage convergence in conglomerates, I now turn to the consequences of this behavior for firm investment.

VI Implications for Input Utilization and Investment

VI.A Capital-Labor Ratios

The wage convergence pattern documented in the first part of the paper implies the existence of a wedge between the wages of workers in diversified and non-diversified firms. Provided that capital and labor are not perfect complements in production, firms should exhibit some degree of substitutability between capital and labor. Thus, I expect that plants that remunerate their labor above market levels move away from the more expensive input and substitute toward capital. In addition, the opposite pattern should be observed at the other extreme. When plants underpay their workers they should move away from the relatively expensive capital input toward the cheap labor.

In my analysis I start by examining whether this pattern is present in the cross section of plants and subsequently assess whether these patterns persist when I observe plant ownership changes. Table XII, shows the coefficients from estimating the following regressions:

$$\textit{Log(K/L Ratio)}_{ift} = \alpha + \beta_1 \cdot \textit{Present in q5}_{ft} + \beta_2 + X_{it}'\gamma + \epsilon_{it}$$

and

$$\textit{Log(K/L Ratio)}_{ift} = \alpha + \beta_1 \cdot \textit{Present in q1}_{ft} + X_{it}'\gamma + \epsilon_{it}$$

The set of controls X includes plant age, the 11 size controls and $Industry \times Year \times State$ fixed effects. The results suggest that a presence in wage quintile 5 has a strong positive impact on the capital-labor ratios of plants. On the other hand, and just as was observed in my previous findings, the presence of the firm in the low-wage industries (as measured by the firm's presence in wage quintile 1) has an ambiguous impact on capital-labor ratios.

Next, I track the capital-labor ratios when there are plant ownership changes. I use the same specification used in the analysis of wages around firm ownership changes but replace the dependent variable from wages to capital-labor ratio. Column 1 of Table XIII shows that capital-labor ratios tend to decrease for all plants, particularly for those that are acquired by lower-paying firms where wages are adjusted downward. Columns 2 and 3 analyze the evolution of capital and labor for the same set of plants. Although the decrease in the work force is similar for all plants that change firm (again confirming that decreasing labor costs may be an important driver for acquisitions), the change in capital is stronger for plants that are acquired by lower-paying firms. Note that, as before, all these effects are relative to the control group of plants in the same industry and time period that did not change firm.

Overall, my results are consistent with firms making their input allocation decisions as an optimal response to input prices. In the next section I explore the implications of this behavior for the investment decisions of the firm.

VI.B Investment

I now explore whether differences in input allocation driven by wage convergence impact investment decisions of firms. In particular, I am interested in examining whether the differences in input allocation can help explain the difference in investment behavior between diversified and stand-alone firms documented in the literature. I start by estimating regressions of the form:

$$CAPX/Sales_{ift} = \alpha + \beta_1 \cdot Divdummy_{ft} + X'_{it}\gamma + \epsilon_{it}$$

where the vector X includes plant age, the 11 size controls and $Industry \times Year \times State$ fixed effects. Panel A of Table XIV starts in column 1 by confirming that the low investment segments in diversified firms tend to have higher investment levels relative to their stand-alone counterparts. Moreover, the first column of Panel B shows that diversified firms tend to invest less in high-investment segments than do comparable stand-alone firms. This pattern of investment has been extensively shown in the literature and has been referred to as "socialistic" investment or the "dark side" of internal capital markets (see for example Stein (1997) for a theoretical argument and Scharfstein (1998) for empirical evidence). In my analysis I try to evaluate how much of this deviation in investment between diversified and stand-alone firms can be explained by peer effects on wages.

In the second column of Panel A, I include the variable *Present in q5* $_{ft}$ and examine whether the plants where the wages tend to be higher than comparable plants also tend to have higher investment. The answer is affirmative. This is consistent with the analysis in the previous section where I showed that these firms tend to have higher use of capital. Strikingly, when the variable *Present in q5* $_{ft}$ is included, the diversification measures are no longer significant. Thus, it is not simply being diversified that leads to the result that diversified firms "overinvest" in low-growth industries. Rather, an important factor driving this result is the firms' presence in high-wage sectors and the consequent differential wage policy.

In the second column of Panel B, I include the variable *Present in q1* $_{ft}$ to understand how much of the "underinvestment" in high-growth industries by diversified firms is due to the peer effect phenomenon. I find that firm's presence in low-wage quintiles also has a negative impact on investment. However, even after controlling for presence in low-wage quintiles, the diversification measures still show a significant negative impact.

Finally, I also analyze whether my measures of firm presence in high- and low-wage quintiles are simply indicating dispersion in firms' investment opportunities. If that were the case, what I am interpreting as an effect of distortions in the internal labor market could instead be distortions in internal capital markets.[31] To address this concern in the third column of Panels A and B, I include in the regressions the variables *Present in Investment q1* and *Present in Investment q5*. These are dummy variables that take the value of 1 if the firm has at least one establishment in investment quintile 1 and 5 respectively. They control for the amplitude of investment opportunities the firm has.

The third column of Panel A shows that the inclusion of *Present in Investment q5* in the regression does not affect the coefficient associated with *Present in q5*. Furthermore, in the

[31]Since it has been found that distortions in internal capital markets may be related to the amplitude of investment opportunities the conglomerate has access to (Rajan et al. (2000)).

third column of Panel B the variable *Present in Investment q1* is included in the regression. It can be seen that the coefficient associated with *Present in q1* suffers only a small adjustment relative to the second column of Panel B. The results also show that despite amplitude in investment opportunities available to conglomerates being associated with distortions in their investment policies, a stronger determinant of the documented investment socialism pattern seems to be rooted in distortions originated in the internal labor markets of these firms.

The results presented in this section suggest that the peer effects phenomenon and upward convergence pattern in the wages of diversified firms may explain a large part of investment behavior documented in the literature. When firms operate in high-wage segments, they tend to pay higher wages to their workers in low-wage segments, and they also tend to invest more than comparable stand-alone plants. This largely accounts for the difference in investment policies between diversified and stand-alone firms in the low-investment industries. The results are weaker when examining the high-investment industries – even after taking into account the peer effect on wages phenomenon, diversified firms still tend to invest less than stand-alone firms. Overall, this section suggests that it is important to understand the functioning of internal labor markets in order to assess investment behavior in internal capital markets.

VII When Is Wage Convergence Stronger?

I have so far established that peer effects are an important determinant of wages inside conglomerates and that they impact the investment decisions of these firms. However, I have not yet analyzed how external factors affect their strength. I turn to this issue now. This section should help us understand which mechanisms are behind the wage convergence pattern. In the following subsections I analyze four factors that may affect the wage convergence in conglomerates: labor unionization, product market competition, geographical proximity of plants and the degree of centralization of firm decision making.

VII.A Unionization

The first aspect that might have an important role in driving the peer effects I documented is the degree of labor unionization.[32] To measure labor unionization I use the variable *Union* which is the share of manufacturing workers that are unionized by state and year.[33] The level of labor unionization can affect the degree of linkage in wages inside firms in several ways. First, it increases the degree of multilateral or firm-wide contracting, which could lead to more equalization in wages. Second, it may be a source of information about the wages in other parts of the firm and as such increase the salience of the wages of other workers in the firm. Third, it may be a source of bargaining power for workers and as such a way for them to extract a larger share of the total economic value created by the firm.

In Panel A of Table XV I test whether wages in plants in low-wage industries (wage quintiles 1 to 4) see a stronger response to the presence of the firm in the high-wage quintile if the plant is in a highly unionized state. In Panel B, I replace the variable $\textit{Present in q5}_{ft}$ by $\textit{Present in q1}_{ft}$ and explore the response to the other extreme of wages. I estimate regressions of the following form:

$$Log(Wage/hour)_{ift} = \alpha + \beta_1 \cdot \textit{Present in q5}_{ft} + \beta_2 \cdot Union + \beta_3 \cdot \textit{Present in q5}_{ft} \times Union + X'_{it}\gamma + \epsilon_{it}$$

The set of controls X includes log(VA/hour), plant age, the 11 size controls and $Industry \times Year \times State$ fixed effects. The results show that labor unionization makes low-wage workers more sensitive to the presence of high-wage workers in the firm. When the variables *Union* and the interaction of *Union* with $\textit{Present in q5}_{ft}$ are included in the regression the magnitude of β_1 goes down significantly, meaning that in low-unionized states the firm's presence in wage quintile 5 does not have as high of an impact. In the specification of column 2 the variable $\textit{Present in q5}_{ft}$ is not statistically significant, suggesting that the degree of unionization may

[32] The *WSJ* article quoted in the introduction about the pay of auto workers mentions the efforts of unions to achieve a flatter wage distribution.

[33] I also estimated the regressions using as a measure of unionization the share of workers in the manufacturing sector who are covered by a collective bargaining agreement, and the results are qualitatively similar.

be the source of the wage convergence observed in conglomerates. Furthermore, the coefficient associated with the interaction term is positive and significant. A 1 percentage point higher degree of labor unionization is associated with a 10 basis point increase in the hourly wage rate.

On the other hand, unionization does not impact the sensitivity of wages to peer effects for the high-wage workers. Thus, while the low-wage workers gain with unionization, high-wage workers don't seem to gain or lose. This can be observed in columns 3 and 4 of Table XV where the coefficient associated with the interaction of *Union* with *Present in q1* $_{ft}$ is economically small and statistically insignificant. The result that unionization has a stronger impact on the compensation of low-wage workers is not new in the literature (e.g., Card (1996)). As was the case in other sections, the coefficients associated with log(VA/hour) and the diversification measures are positive in all columns of the table.

VII.B Geographic Proximity

The theories that rely more heavily on social interactions depend crucially on workers being in contact with each other. To understand whether close contact to other workers is an important force behind my findings, I explore whether the dependence of worker wages becomes stronger when plants are geographically close. When the different plants of the firm are geographically close, there is a higher probability that workers interact with each other since they are more likely to live in the same neighborhood or share the same firm facilities, for example. In that sense, geographical proximity can serve as a measure of the degree of social interactions between workers of the firm.

To test whether geographic proximity is associated with a stronger wage convergence I estimate the following regression:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot \textit{Log(Wage In State)}_{it} + \beta_2 \cdot \textit{Log(Wage Out State)}_{it} + X'_{it}\gamma + \epsilon_{it}$$

Here I separate the firm's plants into two subgroups: one group consists of plants that are close to each other (within the same state) and the second group consists of the rest of the plants owned by the firm. The variable $Wage\ In\ State_{it}$ measures the wage level of the other establishments of the firm within state borders, while $Wage\ Out\ State_{it}$ contains information on the other plants of the firm outside of the state where plant i is located.[34] My tests examine whether the wages are more sensitive to wages in plants in the former group relative to the latter. As before, the set of controls X includes log(VA/hour), plant age, the 11 size controls and $Industry \times Year \times State$ fixed effects.

Table XVI shows the results. As is evident, more geographic proximity is not associated with a higher sensitivity of wages to the wages of other workers. In fact, if anything, worker wages are more sensitive to other workers who are physically far away than to those who are geographically close.[35]

VII.C Headquarters Importance

I next evaluate whether the strength of peer effects is related to the degree of centralization of the firm. More centralized decision making should be associated with the central offices taking actions that impact several different divisions of the firm, in contrast with decentralized decision making where the decisions in one division do not necessarily impact other divisions. If, for example, the central offices decide to cut benefits for workers in one division, the workers in other divisions may fear the cut will also extend to them in the future. While in the case of decentralized decision making, this fear should be less acute due to the fact that the policies applied in one division may not be transferable to the rest of the firm. If the documented wage convergence pattern is sustained as part of a multilateral contractual arrangement in the spirit of Levin (2002), then it should be stronger when rules are set by central offices.

To test this notion, I construct the variable HQ, which captures the importance of the headquarters in the firm by measuring the share of firm workers who are allocated to the

[34] Formally: $Wage\ In\ State_{it} = \sum_{j \neq i} \frac{Number\ of\ workers_{jt} \times Wage/worker_{jt}}{\sum_{j \neq i} Number\ of\ workers_{jt}}$, if plant j is in the same state as plant i. And $Wage\ Out\ State_{it} = \sum_{j \neq i} \frac{Number\ of\ workers_{jt} \times Wage/worker_{jt}}{\sum_{j \neq i} Number\ of\ workers_{jt}}$, if plant j is in a different state from plant i.

[35] In light of the results in Tate and Yang (2011), the increased internal mobility of workers within firms may make geographical proximity an irrelevant measure of social interactions.

auxiliary production establishments. I then run regressions of the form:

$$Log(Wage/hour)_{ift} = \alpha + \beta_1 \cdot Present\ in\ q5_{ft} + \beta_2 \cdot HQ + \beta_3 \cdot (Present\ in\ q5_{ft} \times HQ) + X'_{it}\gamma + \epsilon_{it}$$

Panel A of Table XVII shows the coefficients obtained from estimating this regression. In Panel B I present the coefficients when the variable *Present in q5* $_{ft}$ is replaced with the variable *Present in q1* $_{ft}$. The results show that a higher degree of centralization makes low-wage workers more sensitive to the presence of high-wage workers in the firm. Again there is an asymmetric effect since high-wage workers do not seem to be more sensitive to the presence of low-wage workers in the firm when there is more centralization.

VII.D Product Market Competition

Finally, I evaluate whether differing levels of competition faced by firms in the product market affect the strength of peer effects. If the pattern of wage convergence documented earlier is purely due to inefficient behavior by firms, one would expect competition to be a disciplinary device that would give less room for firms to pursue such wage policies.[36] To test the role of competition, I estimate regressions of the following form:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Present\ in\ q5_{ft} + \beta_2 \cdot (Present\ in\ q5_{ft} \times Comp) + X'_{it}\gamma + \epsilon_{it}$$

and,

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Present\ in\ q1_{ft} + \beta_2(\cdot Present\ in\ q1_{ft} \times Comp) + X'_{it}\gamma + \epsilon_{it}$$

Where the measure of competition *Comp* is the number of firms by three-digit SIC industry (in thousands). The results, reported in Table XVIII, show that competition does impact

[36] Using changes in the degree of import competition, Bertrand (2004) finds that internal labor markets lose importance in terms of shielding wages from the external market forces when firms operate in a more competitive environment.

the strength of the peer effects for workers in the low-wage industries. These workers do not receive as high a premium when their plant operates in a more competitive industry. However, competition does not seem to affect the wages of the high-paid workers. Furthermore, although statistically significant, competition is not economically important.

VII.E Discussion

The evidence from the regressions in this section suggests that social interactions between workers are not the primary driver for the results, since workers in plants that are physically close together do not seem to exhibit a greater tendency toward pay convergence than those that are far apart. On the other hand, intra-firm equity seems to arise primarily when there is a high degree of labor unionization, reduced competition and centralization of decision making. This suggests that a larger bargaining power and the decision by a firm to set rules that apply broadly to its work force and as such provide a high level of harmonization may be the primary drivers of my findings. The fact that unionization does not affect equally workers in the high- and low-wage segments also suggests that the ability to bargain may depend on the wages of others in the firm. The impact of competition on the results indicates that part of the convergence may be due to rent extraction by workers, although this effect is economically small.

The results in this section also alleviate the concern that the internal allocation of capital is the driver of the wage convergence in conglomerates, since the extent of wage convergence inside firms is strongly related to the degree of unionization, which is arguably a labor, not a capital, phenomenon.

VIII Conclusion

In this paper, I address an old question: what is the cost of bringing more activity into a firm? I present a new answer that suggests that an important source may be related to the way workers are paid. I examine the nature of worker wages inside diversified firms and document evidence for *wage convergence*. This pattern is asymmetric: workers in low-wage industries collect higher-than-industry wages (by 5.2%) when the diversified firm is also present in high-wage industries, but the reverse is not true. There is a dramatic change in investment policy of diversified firms that exhibit wage convergence: plants where workers collect higher than industry wages tilt investment policies toward a higher capital-labor ratio. In other words, plants with high-wage workers tend to shift their input use away from the expensive labor toward the relatively cheaper capital. This effect is large, and when one accounts for the investment needed to offset wage distortions, it is harder to find evidence of capital "misallocation" in conglomerates previously documented in the literature.

Most research in economics and finance has focused on examining investment behavior inside internal capital markets without regard to internal labor markets. My findings suggest that a firm may have to pay higher wages when it combines two different activities (as in a conglomerate) than when those activities are undertaken by separate firms. Moreover, I show that decisions taken by firms in their internal labor markets directly impact investment behavior of firms. Therefore, it may be critical to understand the functioning of internal labor markets in order to advance our assessment of what drives investment decisions inside firm boundaries.

It is important to note that while the pattern in wages I document can be thought of as a "dark side" of internal labor markets inside diversified firms, there may be a "bright side" to these markets too. One such mechanism is the possibility of allocating workers across divisions inside diversified firms, which allows for better matching between workers and industries, and consequently higher productivity. The recent work of Tate and Yang (2011) provides evidence supporting the existence of this bright side of internal labor markets.[37] Whether these are the only effects of internal labor markets and the only mechanism through which internal labor markets impact financial decisions of firms remains a fruitful area of future research.

[37] In addition there is anecdotal evidence that suggests this is an important consideration for several diversified firms. For example, General Electric advertises itself on its website as an excellent place to work due to the large number and diverse set of possible career paths: "GE is renowned for hiring exceptional people and giving them unparalleled opportunities to build their career and capabilities. There is simply no other company in the world with such a diverse set of businesses in which to work".

Table I: Hourly Wage Depending on Which Sectors the Firm is Present In

		Diversified				
Wage Quintile	Stand Alone	All	Not Present in q5	Not Present in q4 or q5	Not Present in q3 to q5	Not Present in q2 to q5
1	7.90	11.69	10.12	9.21	8.90	8.19
2	8.75	11.92	10.83	9.97	9.54	.
3	10.90	14.21	12.76	11.83	.	.
4	13.33	16.69	13.89	.	.	.
5	15.21	20.57	.	.	.	.
Total	12.58	16.62	12.77	10.71	9.43	8.19

Notes: This table shows the Average Hourly Wage for production workers in the Manufacturing Sector. Each row of the table is associated with a wage quintile. The wage quintiles are constructed by categorizing three-digit SIC industries based on the wages of workers in stand-alone firms, where quintile 1 represents the lowest-wage industries and quintile 5 the highest-wage industries. Once industries are placed in one of the five quintiles, this definition is applied to both diversified and non-diversified firms.

Each column of the table is associated with a type of firm. The first column contains wages for workers of stand alone firms, while the second column contains wages of workers from diversified firms. In column 3 are wages only for workers of firms that although diversified have no establishment in wage quintile 5. In column 4 the sample is further restricted to include only workers of diversified firms that are not present in wage quintiles 4 or 5. Column 5 contains workers of diversified firms that have no establishments in wage quintiles 3 to 5, and finally, column 6 contains the average hourly wage for workers of firms that are diversified within industries categorized as belonging to wage quintile 1.

Table II: Wage Convergence Multivariate Analysis - Firm's Presence in Wage Quintiles 1 and 5

	Panel A			Panel B		
Variable	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)
log(VA/hour)	0.341***	0.250***	0.249***	0.345***	0.244***	0.243***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Present in q5		0.052***	0.021***			
		(0.003)	(0.003)			
Present in q1					0.013***	-0.016***
					(0.004)	(0.004)
Divdummy		0.017***			0.048***	
		(0.002)			(0.002)	
log(number of divisions)			0.024***			0.032***
			(0.002)			(0.001)
Rounded N	1,600,000	1,600,000	1,600,000	2,000,000	2,000,000	2,000,000
R-squared	0.306	0.692	0.693	0.320	0.706	0.706
Size & Age Controls	No	Yes	Yes	No	Yes	Yes
State × Year × Industry FE	No	Yes	Yes	No	Yes	Yes

Notes: Panel A presents coefficients obtained by estimating regressions of the type:

$$Log(Wage/hour)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 2 and log(number of divisions) in column 3). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients obtained by estimating regressions of the type:

$$Log(Wage/hour)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 5 and log(number of divisions) in column 6). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. Panel B includes only plants that operate in wage quintiles 2 through 5.

In all columns the standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table III: Multivariate Analysis of Benefits - Firm's Presence in Wage Quintiles 1 and 5

	Panel A		Panel B	
Variable	Log(Benefits)	Log(Benefits)	Log(Benefits)	Log(Benefits)
log(VA/hour)	0.393***	0.392***	0.389***	0.386***
	(0.003)	(0.003)	(0.003)	(0.003)
Present in q5	0.099***	0.023***		
	(0.006)	(0.006)		
Present in q1			0.046***	-0.023***
			(0.008)	(0.007)
Divdummy	0.071***		0.124***	
	(0.005)		(0.004)	
log(number of divisions)		0.071***		0.080***
		(0.003)		(0.003)
Rounded N	1,600,000	1,600,000	2,000,000	2,000,000
R-squared	0.618	0.619	0.637	0.638
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients obtained by estimating regressions of the type:

$$Log(Benefits)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients obtained by estimating regressions of the type:

$$Log(Benefits)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. Panel B includes only plants that operate in wage quintiles 2 through 5.

In all columns the standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table IV: Multivariate Analysis of Productivity - Firm's Presence in Wage Quintiles 1 and 5

	Panel A		Panel B	
Variable	Log(VA/hour)	Log(VA/hour)	Log(VA/hour)	Log(VA/hour)
Present in q5	0.122***	0.087***		
	(0.008)	(0.008)		
Present in q1			0.053***	-0.027***
			(0.011)	(0.010)
Divdummy	0.147***		0.214***	
	(0.006)		(0.005)	
log(number of divisions)		0.079***		0.109***
		(0.004)		(0.003)
Rounded N	1,600,000	1,600,000	2,000,000	2,000,000
R-squared	0.344	0.345	0.376	0.377
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients obtained by estimating regressions of the type:

$$Log(VA/hour)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients obtained by estimating regressions of the type:

$$Log(VA/hour)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. Panel B includes only plants that operate in wage quintiles 2 through 5.

In all columns the standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table V: Multivariate Analysis Profit without Productivity Controls - Firm's Presence in Wage Quintiles 1 and 5

	Panel A		Panel B	
Variable	Log(Profit)	Log(Profit)	Log(Profit)	Log(Profit)
Present in q5	0.034***	0.027***		
	(0.008)	(0.007)		
Present in q1			0.008	-0.026**
			(0.011)	(0.010)
Divdummy	0.071***		0.096***	
	(0.006)		(0.004)	
log(number of divisions)		0.032***		0.047***
		(0.005)		(0.003)
Rounded N	1,200,000	1,200,000	1,600,000	1,600,000
R-squared	0.172	0.172	0.172	0.172
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients obtained by estimating regressions of the type:

$$Log(Profit)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients obtained by estimating regressions of the type:

$$Log(Profit)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. Panel B includes only plants that operate in wage quintiles 2 through 5.

In all columns the standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table VI: Multivariate Analysis Profit with Productivity Controls - Firm's Presence in Wage Quintiles 1 and 5

	Panel A		Panel B	
Variable	Log(Profit)	Log(Profit)	Log(Profit)	Log(Profit)
log(VA/hour)	0.506***	0.506***	0.486***	0.486***
	(0.003)	(0.003)	(0.003)	(0.003)
Present in q5	-0.026***	-0.017***		
	(0.006)	(0.006)		
Present in q1			-0.017**	-0.014
			(0.009)	(0.009)
Divdummy	-0.006		-0.011***	
	(0.005)		(0.004)	
log(number of divisions)		-0.008*		-0.005**
		(0.004)		(0.003)
Rounded N	1,200,000	1,200,000	1,600,000	1,600,000
R-squared	0.314	0.314	0.309	0.309
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients obtained by estimating regressions of the type:

$$Log(Profit)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients obtained by estimating regressions of the type:

$$Log(Profit)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. Panel B includes only plants that operate in wage quintiles 2 through 5.

In all columns the standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table VII: Plant Ownership Changes

Variable	Log(Wage/hour)	Log(Benefits)	Log(VA/hour)	Log(Profit)
After × Firm wage H	-0.002	-0.037***	-0.001	0.017
	(0.005)	(0.009)	(0.012)	(0.015)
After × Firm wage L	-0.023***	-0.053***	0.002	0.047***
	(0.006)	(0.013)	(0.015)	(0.018)
log(number of divisions)	0.006*	0.016**	0.009	0.008
	(0.003)	(0.006)	(0.008)	(0.008)
log(VA/hour)	0.176***	0.264***		
	(0.002)	(0.003)		
Rounded N	1,400,000	1,400,000	1400000	1,050,000
R-squared	0.887	0.861	0.743	0.566
Size & Age Controls	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes

Notes: Column 1 contains the coefficients from estimating the following regression:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot (After \times Industry\ wage\ H_{it}) + \beta_2 \cdot (After \times Industry\ wage\ L_{it}) + X'_{it}\gamma + \epsilon_{it}$$

Column 2 contains the coefficients from estimating the following regression:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot (After \times Firm\ wage\ H_{it}) + \beta_2 \cdot (After \times Firm\ wage\ L_{it}) + X'_{it}\gamma + \epsilon_{it}$$

In both columns, the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, plant fixed effects, Year × Industry fixed effects and *log(number of divisions)* as a measure of diversification. They include also a measure of wages at the three-digit SIC, state and year levels – the median wage of stand-alone firms by *State × Year × 3 digit SIC Industry*.
The regressions include plants that change firm once during the sample period, but excludes the cases in which both the acquiring and target firms are non-diversified. It also includes plants that never change firm as a control group. It analyzes the evolution of wages around plant ownership changes. The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table VIII: Wage Dynamics for Plants That Never Changed Firm

Variable	Log(Wage/hour)
Log(Firm Wage)	0.023***
	(0.004)
log(number of divisions)	0.009
	(0.006)
Log(VA/hour)	0.116***
	(0.003)
Rounded N	241,000
R-squared	0.866
Size & Age Controls	Yes
Industry × Year FE	Yes
Plant FE	Yes

Notes: Column 1 contains the coefficients from estimating the following regression:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot (Firm\ wage_{it}) + X'_{it}\gamma + \epsilon_{it}$$

The matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, plant fixed effects, Year × Industry fixed effects and *log(number of divisions)* as a measure of diversification. They include also a measure of wages at the three-digit SIC, state and year levels – the median wage of stand-alone firms by *State × Year × 3 digit SIC Industry.*

The regression includes only plants that never changed firm during the sample period. The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table IX: Exogenous Shock - The NAFTA Agreement

	Panel A		Panel B	
Variable	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)
After × Export	0.022***	0.022***		
	(0.005)	(0.005)		
After × Firm_Exp			0.014***	0.014***
			(0.005)	(0.005)
Divdummy		0.005		-0.001
		(0.009)		(0.009)
log(number of divisions)	0.004		0.005	
	(0.004)		(0.004)	
log(VA/hour)	0.108***	0.108***	0.077***	0.077***
	(0.005)	(0.005)	(0.004)	(0.004)
Rounded N	44,000	44,000	55,000	55,000
R-squared	0.910	0.910	0.894	0.894
Size & Age Controls	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes

Notes: The regression model used to compute the coefficients in Panel A is:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Exports + \beta_2 \cdot After + \beta_3 \cdot (After \times Exports) + X_{it}'\gamma + \epsilon_{it}$$

The sample used to estimate the coefficients in Panel A includes only years 1991 to 1996 and exporting plants (those that export continuously during 1994 to 1996) or plants owned by firms with zero exports (for all years after NAFTA). The variable Exports is a dummy variable that takes the value of 1 during the six years (1991-1996) if the firm exports for the three years after NAFTA and 0 otherwise. After is a dummy variable that takes the value 1 if the year is 1994, 1995 or 1996 and 0 otherwise.

The regression model used to compute the coefficients in Panel B is:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Firm\_Exp + \beta_2 \cdot After + \beta_3 \cdot (After \times Firm\_Exp) + X_{it}'\gamma + \epsilon_{it}$$

The sample used to estimate the coefficients in Panel B includes only years 1991 to 1996 and plants that belong to divisions with zero exports every year after NAFTA. The variable Firm_Exp is a dummy variable that takes the value of 1 during the six years (1991-1996) if the firm has strictly positive exports in all three years after NAFTA, and 0 otherwise.

In all columns, the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, plant fixed effects, Year × Industry fixed effects and Divdummy or log(number of divisions) as measures of diversification. It includes also a measure of wages at the three-digit SIC, state and year levels – the median wage of stand alone firms by *State × Year × 3 digit SIC Industry*.
The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table X: NAFTA - Placebo Test

	Panel A		Panel B	
Variable	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)
After × Export	0.007	0.008		
	(0.006)	(0.006)		
After × Firm_exp			0.004	0.005
			(0.005)	(0.005)
Divdummy		0.005		0.019**
		(0.008)		(0.008)
log(number of divisions)	0.010***		0.008*	
	(0.004)		(0.003)	
log(VA/hour)	0.103***	0.103***	0.069***	0.069***
	(0.005)	(0.005)	(0.004)	(0.004)
Rounded N	42,000	42,000	52,000	52,000
R-squared	0.891	0.891	0.880	0.880
Size & Age Controls	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes

Notes: The regression model used to compute the coefficients in Panel A is:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Exports + \beta_2 \cdot After + \beta_3 \cdot (After \times Exports) + X'_{it}\gamma + \epsilon_{it}$$

The sample used to estimate the coefficients in Panel A includes only years 1985 to 1990 and exporting plants (those that export continuously during 1988 to 1990) or plants owned by firms with zero exports (for all years after 1987). The variable Exports is a dummy variable that takes the value of 1 during the six years (1985-1990) if the firm exports for the three years after 1987, and 0 otherwise. After is a dummy variable that takes the value 1 if the year is 1988, 1989 or 1990, and 0 otherwise.

The regression model used to compute the coefficients in Panel B is:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Firm\_Exp + \beta_2 \cdot After + \beta_3 \cdot (After \times Firm\_Exp) + X'_{it}\gamma + \epsilon_{it}$$

The sample used to estimate the coefficients in Panel B includes only years 1985 to 1990 and plants that belong to divisions with zero exports every year after 1987. The variable Firm_Exp is a dummy variable that takes the value of 1 during the six years (1985-1990) if the firm has strictly positive exports in all three years after 1987, and 0 otherwise.

In all columns, the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, plant fixed effects, Year × Industry fixed effects and Divdummy or log(number of divisions) as measures of diversification. It includes also a measure of wages at the three-digit SIC, state and year levels – the median wage of stand-alone firms by *State × Year × 3 digit SIC Industry.*
The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XI: NAFTA - Plants with Zero Interplant Transfers

Variable	Log(Wage/hour)	Log(Wage/hour)
After × Firm_Exp	0.014**	0.014**
	(0.006)	(0.006)
Divdummy		-0.002
		(0.009)
log(number of divisions)	0.005	
	(0.004)	
log(VA/hour)	0.081***	0.081***
	(0.005)	(0.005)
Rounded N	42,000	42,000
R-squared	0.895	0.895
Size & Age Controls	Yes	Yes
Industry × Year FE	Yes	Yes
Plant FE	Yes	Yes

Notes: The regression model used to compute the coefficients is:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Firm\_Exp + \beta_2 \cdot After + \beta_3 \cdot (After \times Firm\_Exp) + X'_{it}\gamma + \epsilon_{it}$$

The sample used to estimate the coefficients includes only years 1991 to 1996 and plants that belong to divisions with zero exports every year after NAFTA and with zero interplant transfers. The variable Firm_Exp is a dummy variable that takes the value of 1 if the firm has strictly positive exports in all three years after NAFTA, and 0 otherwise.

The matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, plant fixed effects, Year × Industry fixed effects and Divdummy or log(number of divisions) as measures of diversification. It includes also a measure of wages at the three-digit SIC, state and year levels – the median wage of stand-alone firms by *State × Year × 3 digit SIC Industry*.

The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XII: Capital-Labor Ratio Multivariate Analysis - Firm's Presence in Wage Quintiles 1 and 5

	Panel A		Panel B	
Variable	Log(K/L ratio)	Log(K/L ratio)	Log(K/L ratio)	Log(K/L ratio)
Present in q5	0.207***	0.130***		
	(0.011)	(0.013)		
Present in q1			0.114***	-0.040***
			(0.016)	(0.014)
Divdummy	0.258***		0.360***	
	(0.007)		(0.007)	
log(number of divisions)		0.144***		0.187***
		(0.010)		(0.006)
Rounded N	950,000	950,000	1,200,000	1,200,000
R-squared	0.534	0.535	0.538	0.539
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients obtained by estimating regressions of the type:

$$Log(K/Lratio)_{ift} = \alpha + \beta \cdot Present\ in\ q5_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients obtained by estimating regressions of the type:

$$Log(K/Lratio)_{ift} = \alpha + \beta \cdot Present\ in\ q1_{ft} + X'_{ift}\gamma + \epsilon_{ift}$$

where the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. Panel B includes only plants that operate in wage quintiles 2 through 5.

In all columns the standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XIII: Evolution of Input Use around Plant Ownership Changes

Variable	Log(K/L ratio)	Log(Capital)	Log(Labor)
After × Firm wage H	-0.097***	-0.186***	-0.086***
	(0.019)	(0.021)	(0.012)
After × Firm wage L	-0.183***	-0.293***	-0.099***
	(0.027)	(0.028)	(0.014)
log(number of divisions)	0.063***	0.118***	0.054***
	(0.004)	(0.005)	(0.004)
Rounded N	950,000	950,000	950,000
R-squared	0.839	0.930	0.952
Size & Age Controls	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes

Notes: The table contains the coefficients from estimating the following regression:

$$Log(Y)_{it} = \alpha + \beta_1 \cdot (After \times Firm\ wage\ H_{it}) + \beta_2 \cdot (After \times Firm\ wage\ L_{it}) + X'_{it}\gamma + \epsilon_{it}$$

Where Y is K/L ratio in column 1, Capital in column 2 and Labor in column 3. The matrix of controls X includes the 11 size controls, plant age, plant fixed effects, Year × Industry fixed effects and *log(number of divisions)* as a measure of diversification. They include also a measure of wages at the three-digit SIC, state and year levels – the median wage of stand-alone firms by *State × Year × 3 digit SIC Industry.*
The regressions include plants that change firm once during the sample period, but excludes the cases in which both the acquiring and target firms are non-diversified. It also includes plants that never change firm as a control group. The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XIV: Wage Convergence Impact on Investment Behavior

	Panel A - Investment Quintile 1			Panel B - Investment Quintile 5		
Variable	CAPX/Sales	CAPX/Sales	CAPX/Sales	CAPX/Sales	CAPX/Sales	CAPX/Sales
Divdummy	0.092***	0.043	0.043	-0.197***	-0.171***	-0.143***
	(0.032)	(0.037)	0.037	(0.054)	(0.054)	0.055
Present in q5		0.098**	0.099**			
		(0.045)	0.047			
Present in q1					-0.199**	-0.168*
					(0.093)	(0.093)
Present in Investment q5			-0.004			
			0.063			
Present in Investment q1						-0.144*
						(0.081)
Rounded N	330,000	330,000	330,000	360,000	360,000	360,000
R-squared	0.131	0.131	0.131	0.106	0.106	0.106
Size & Age Controls	Yes	Yes	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Panel A contains the coefficients obtained from estimating the following regression model:

$$CAPX/Sales_{ift} = \alpha + \beta_1 \cdot Divdummy_{ft} + \beta_2 \cdot Present\ in\ q5_{ft} + X_{it}'\gamma + \epsilon_{it}$$

The dependent variable is Capital Expenditures divided by sales at the plant level. The regressions in columns 1 to 3 only include plants that operate in industries that belong to investment quintile 1. Furthermore columns 1 to 3 include plants in wage quintiles 1 to 4.

Panel B contains the coefficients obtained from estimating the following regression model:

$$CAPX/Sales_{ift} = \alpha + \beta_1 \cdot Divdummy_{ft} + \beta_2 \cdot Present\ in\ q1_{ft} + X_{it}'\gamma + \epsilon_{it}$$

Columns 4 to 6 include only plants that operate in industries that belong to investment quintile 5. Furthermore columns 4 to 6 include plants in wage quintiles 2 to 5.

The variable *Present in Investment q5* is a dummy variable that takes the value of 1 if the firm has at least one plant in investment quintile 5. *Present in Investment q1* is a dummy variable that takes the value of 1 if the firm has at least one plant in investment quintile 1.
Finally, the matrix of controls X includes the 11 size controls, plant age, State × Year × Industry fixed effects and Divdummy as measures of diversification. This table evaluates how much of the equalitarian investment pattern found in the literature is due to the wage convergence pattern found in this paper. The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XV: Labor Unionization and Wage Convergence

	Panel A		Panel B	
Variable	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)
Present in q5	0.027***	-0.000		
	(0.005)	(0.005)		
Present in q5 × Union	0.001***	0.001***		
	(0.000)	(0.000)		
Present in q1			0.005	-0.017**
			(0.008)	(0.008)
Present in q1 × Union			0.000	0.000
			(0.000)	(0.000)
Divdummy	0.005**		0.037***	
	(0.003)		(0.002)	
log(number of divisions)		0.018***		0.027***
		(0.002)		(0.002)
log(VA/hour)	0.248***	0.247***	0.242***	0.241***
	(0.002)	(0.002)	(0.002)	(0.002)
Rounded N	1,100,000	1,100,000	1,400,000	1,400,000
R-squared	0.575	0.576	0.594	0.595
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients from regressions of the type:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Present\ in\ q5_{ft} + \beta_2 \cdot (Present\ in\ q5_{ft} \times Union) + X'_{it}\gamma + \epsilon_{it}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. *Union* is the share of workers that belong to a labor union (on a scale of 0-100) by state. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients from regressions of the type:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Present\ in\ q1_{ft} + \beta_2 \cdot (Present\ in\ q1_{ft} \times Union) + X'_{it}\gamma + \epsilon_{it}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. *Union* is the share of workers that belong to a labor union (on a scale of 0-100) by state. Panel B includes only plants that operate in wage quintiles 2 through 5.

The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XVI: Geographic Proximity and Wage Convergence

Variable	Log(Wage/hour)
Log(Wage In State)	0.115***
	(0.004)
Log(Wage Out State)	0.171***
	(0.008)
log(number of divisions)	0.011***
	(0.002)
log(VA/hour)	0.150***
	(0.003)
Rounded N	620,000
R-squared	0.756
Size & Age Controls	Yes
State × Year × Industry FE	Yes

Notes: This table presents the coefficients obtained from estimating the following regression:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot \textit{Log(Wage In State)}_{it} + \beta_2 \cdot \textit{Log(Wage Out State)}_{it} + X'_{it}\gamma + \epsilon_{it}$$

where $\textit{Wage In State}_{it} = \sum_{j \neq i} \frac{Wage/worker_{jt} \times \textit{Number of workers}_{jt}}{\sum_{j \neq i} Numberofworkers_{jt}}$, if plant j is in the same state as plant i. And $\textit{Wage Out State}_{it} = \sum_{j \neq i} \frac{Wages/worker_{jt} \times \textit{Number of workers}_{jt}}{\sum_{j \neq i} Numberofworkers_{jt}}$, if plant j is in a different state from plant i. Additionally the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and log(number of divisions) as a measure of diversification. The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XVII: Headquarters Importance and Wage Convergence

	Panel A		Panel B	
Variable	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)
Present in q5	0.063***	0.039***		
	(0.007)	(0.008)		
Present in q5 × HQ	0.110***	0.118***		
	(0.039)	(0.040)		
Present in q1			0.003	-0.027***
			(0.007)	(0.008)
Present in q1 × HQ			0.034	0.039*
			(0.022)	(0.023)
HQ	-0.003	-0.003	-0.001	-0.000
	(0.003)	(0.003)	(0.002)	(0.003)
Divdummy	0.011		0.038**	
	(0.020)		(0.017)	
log(number of divisions)		0.019***		0.034***
		(0.004)		(0.004)
log(VA/hour)	0.168***	0.168***	0.164***	0.162***
	(0.004)	(0.004)	(0.003)	(0.003)
Rounded N	80,000	80,000	110,000	110,000
R-squared	0.713	0.713	0.714	0.716
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients from regressions of the type:

$$Log(Wage/hour)_{ift} = \alpha + \beta_1 \cdot Present\ in\ q5_{ft} + \beta_2 \cdot HQ + \beta_3 \cdot (Present\ in\ q5_{ft} \times HQ) + X'_{it}\gamma + \epsilon_{it}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. HQ is the share of workers that work in the auxiliary production facilities of the firm. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients from regressions of the type:

$$Log(Wage/hour)_{ift} = \alpha + \beta_1 \cdot Present\ in\ q1_{ft} + \beta_2 \cdot HQ + \beta_3 \cdot (Present\ in\ q1_{ft} \times HQ) + X'_{it}\gamma + \epsilon_{it}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. HQ is the share of workers that work in the auxiliary production facilities of the firm. Panel B includes only plants that operate in wage quintiles 2 through 5.

The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

Table XVIII: Product Market Competition and Wage Convergence

	Panel A		Panel B	
Variable	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)	Log(Wage/hour)
Present in q5	0.057***	0.027***		
	(0.003)	(0.003)		
Present in q5 × Comp	-0.004***	-0.003***		
	(0.001)	(0.001)		
Present in q1			0.013***	-0.015***
			(0.004)	(0.004)
Present in q1 × Comp			-0.000	-0.002
			(0.001)	(0.001)
Divdummy	0.019***		0.048***	
	(0.002)		(0.002)	
log(number of divisions)		0.024***		0.032***
		(0.002)		(0.001)
log(VA/hour)	0.250***	0.249***	0.244***	0.243***
	(0.002)	(0.002)	(0.002)	(0.002)
Rounded N	1,600,000	1,600,000	2,000,000	2,000,000
R-squared	0.692	0.693	0.706	0.706
Size & Age Controls	Yes	Yes	Yes	Yes
State × Year × Industry FE	Yes	Yes	Yes	Yes

Notes: Panel A presents coefficients from regressions of the type:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Present\ in\ q5_{ft} + \beta_2 \cdot (Present\ in\ q5_{ft} \times Comp) + X'_{it}\gamma + \epsilon_{it}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 1 and log(number of divisions) in column 2). $Present\ in\ q5_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 5. *Comp* is the number of firms by three-digit SIC industry, in thousands. Panel A includes only plants that operate in wage quintiles 1 through 4.

Panel B presents coefficients from regressions of the type:

$$Log(Wage/hour)_{it} = \alpha + \beta_1 \cdot Present\ in\ q1_{ft} + \beta_2 \cdot (Present\ in\ q1_{ft} \times Comp) + X'_{it}\gamma + \epsilon_{it}$$

where the matrix of controls X includes $log(VA/hour)$, the 11 size controls, plant age, State × Year × Industry fixed effects and a measure of diversification (Divdummy in column 3 and log(number of divisions) in column 4). $Present\ in\ q1_{ft}$ is a dummy variable that takes the value of 1 if the firm has at least one establishment in wage quintile 1. *Comp* is the number of firms by three-digit SIC industry, in thousands. Panel B includes only plants that operate in wage quintiles 2 through 5.

The standard errors in parentheses are clustered by firm. Statistical significance at 1%, 5% and 10% is marked with ***, ** and * respectively.

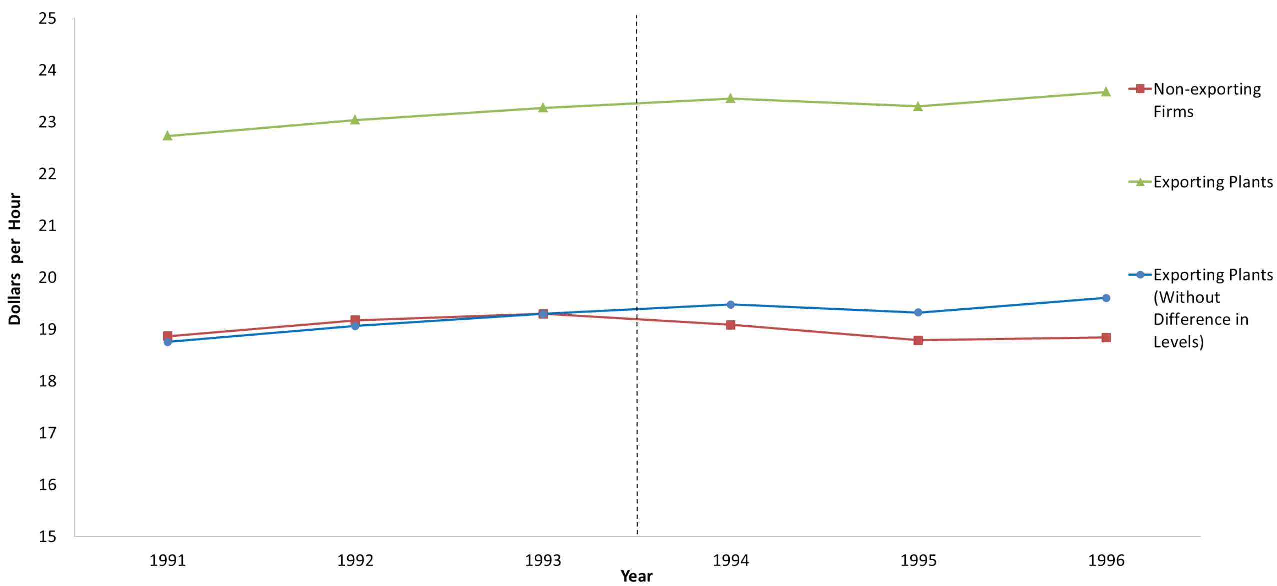

Figure 1: First Stage - Evolution of Wages around NAFTA: Exporting Plants vs. Non-Exporting Plants

Notes: This figure shows the evolution of wages of plants that export in all three years after NAFTA (1994, 1995 and 1996) versus those that belong to firms that do not export in any of the years 1994 to 1996.
All wages were de-trended using the average growth rate of the wages of firms that had zero exports. The triangle marker series (green line) shows the evolution of wages for the exporting firms, while the square marker series (red line) shows the evolution of wages for the plants that belong to the non exporting firms. The dot marker (blue line) shows the evolution of wages for the exporting plants when the level of wages between the two groups is eliminated.

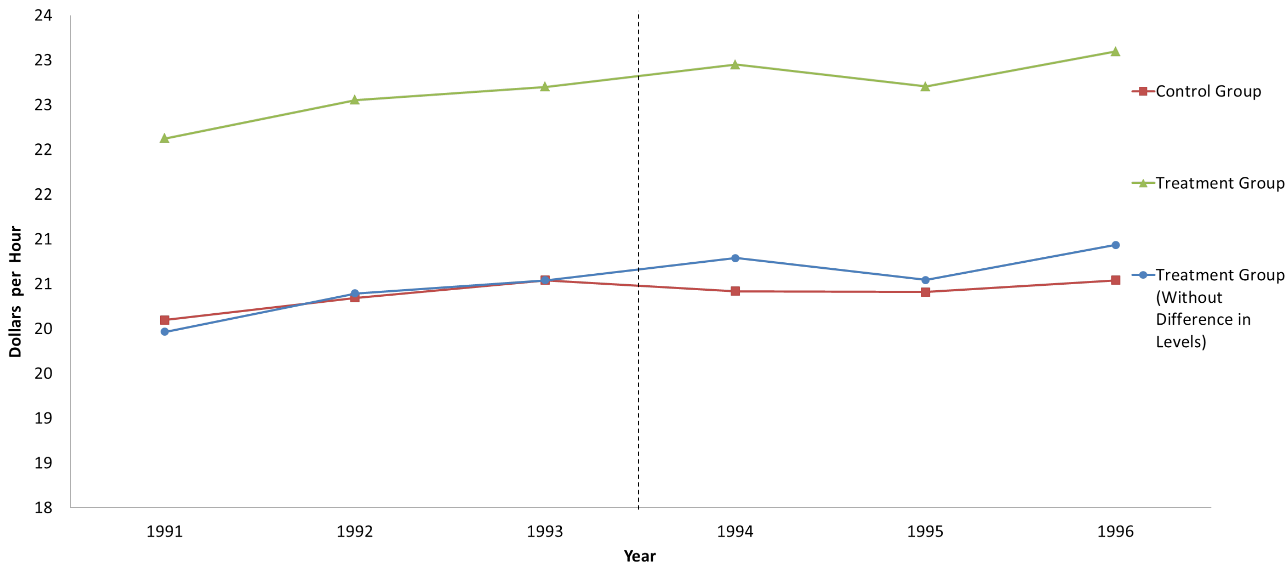

Figure 2: Second Stage - Evolution of Wages around NAFTA: Treatment vs. Control

Notes: This figure shows the evolution of wages of plants that belong to divisions that have zero exports for each of the years 1994 to 1996. Within this group, some belong to firms that exported throughout the period 1994 to 1996 and others don't.

All wages were de-trended using the average growth rate of the wages of firms that had zero exports. The triangle marker series (green line) shows the evolution of wages for plants owned by the exporting firms, while the square marker series (red line) shows the evolution of wages for the plants that belong to firms that did not export continuously from 1994 to 1996. The dot marker (blue line) shows the evolution of wages for the treatment group when the level of wages between the two groups is eliminated.

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