The Relative Importance of Employer and Employee Effects on Compensation: A Comparison of France and the United States

by

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Abstract

Using individual data on compensation, matched with establishment and firm data on performance and inputs, we compare the French and American pay systems. The compensation measures are decomposed into components related to measured individual characteristics, establishment/enterprise effects, and a residual. In France, the compensation outcomes are more compressed than in the United States. For France individual characteristics and establishment effects explain more of the variability in compensation outcomes than in the United States. The observable and unobservable components of compensation are identically correlated in the two countries. The relations among compensation components (individual and establishment) and firm performance outcomes (value-added per worker, sales per worker and profit per unit of capital) exhibit some important similarities and differences between the countries. Higher paid workers, either because of individual characteristics or establishment effects, are employed in firms that are more productive. Higher pay due to enterprise heterogeneity is associated with higher profitability in France but lower profitability in the United States.

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1. Introduction

In this paper, we examine the relation between compensation structure, inputs to production and performance (as measured by sales, value added and profits) at the firm level. To perform this task, we use two comparable matched employer-employee data sets for France and the United States. As Willis (1986) and Rosen (1986) noted more than a decade ago, progress in studying these relations requires the use of matched data. This paper is the first direct international comparison of the relation between employer-level measures of compensation and the productivity and profitability of the business.

Although broadly representative samples of workers and firms are not widely available in the US, there have now been numerous studies attempting to relate firm performance measures to the design of the human resource management system, generally, and the compensation system, specifically. Using detailed matched longitudinal data representative of both workers and firms, Abowd, Kramarz and Margolis (1999, henceforth AKM) address these questions for France and Abowd, Finer and Kramarz (1999, henceforth AFK) address them for the State of Washington in the US. Working with matched data on workers and firms from all states in the US, which are dynamically representative of the firms but only a cross-section of the workers, Troske (1998) and Bayard, Hellerstein, Neumark and Troske (1998) have also launched a research program to study these questions.

In this paper we make a detailed comparison of French and American compensation structure and its relation to firm performance measures. Both of our data sources provide detailed information on individual employees, more than was available in AKM and AFK, as well as on the establishments and enterprises for which they work. We study a simple linear structure for compensation in which the logarithm of annualized total compensation is related to measured individual characteristics, an establishment or enterprise effect and a statistical residual. Even though we are able to estimate statistical establishment and enterprise effects, we cannot separately identify the part of this effect that is due to unobservable individual heterogeneity versus unobservable employer heterogeneity (establishments or enterprises) with these data.

We then relate the estimated enterprise effect and the estimated effect of measured characteristics on compensation to a variety of outcome and input measures for the firms. As far as we are aware, this is the first time that firm-specific components of individual compensation have been related to productivity and profits in the employing firm for the US The combination of individual characteristics and establishment effects explains more of the French (employer-reported) wage data than of the American (employee-reported) data. Individual characteristics and establishment effects are comparably correlated in both countries. Both components of individual compensation terms are generally significant in the performance and input regressions, although they occasionally have opposite signs, further reinforcing the idea that one needs to control for them separately. Both the measured individual characteristic component of wages and the enterprise-average establishment effect component are significantly related to enterprise productivity (value-added or sales per worker). The components of compensation provide

important explanatory power for the enterprise measures of inputs and performance in France whereas the industry effects have most of the explanatory power in the United States.

The next section describes our statistical models. Section 3 describes the data sources. Section 4 discusses the results of the analysis of individual data. Section 5 considers the relative importance of observed characteristics and establishment effects. Section 6 analyses the enterprise-level data. Section 7 concludes.

2. Statistical Methods and Model

The basic model for individual compensation follows AKM. We let:

$$\ln(w_{it}) = x_{it}\beta + \alpha_i + \phi_{J(i,t)} + \varepsilon_{it} \tag{1}$$

where w_{it} is annual compensation, x_{it} is a vector of observable individual characteristics, α_i is person-effect representing unobservable individual heterogeneity, $\phi_{J(i,t)}$ is an establishment effect representing unobservable establishment heterogeneity, ε_{it} is the statistical error, *i* indexes individuals, *t* indexes time and the function J(*i*,*t*) indicates that individual *i* is employed at firm *j* during year *t*. Because our data consist of cross-sectional samples of French and American workers matched to their employing establishments, we cannot directly estimate the effects α_i and $\phi_{J(i,t)}$. Instead, we estimate a single, unrestricted, establishment effect for each establishment *j*, which may be interpreted as:

$$\psi_{J(i,t)} \equiv \alpha_j + \phi_{J(i,t)} \tag{2}$$

where α_j is the average of α_i over all individuals employed at firm *j* during year *t*, and $\psi_{J(i,t)}$ is the name given to the estimated establishment effect shown in equation (2).[1] In addition to the estimated establishment effect $\hat{\psi}_j$, we calculate the average predicted wage in the firm, given the individual characteristics of the employees. Denote this average by $\bar{x}_j\hat{\beta}$.

Using data from a sample of enterprises (firms), we analyze productivity using two measures: value-added per worker and sales per worker. We analyze profitability using operating income as a proportion of total assets. Denote each of these firm-level variables as q_k, where *k* denotes the enterprise that owns a group of establishments *j*. Aggregating $\hat{\psi}_j$ and $\bar{x}_j\hat{\beta}$ to the enterprise level, again indexed by *k*, the firm-level analysis can be expressed as:

$$q_k = \gamma_0 + (\bar{x}_k\hat{\beta})\gamma_1 + \hat{\psi}_k\gamma_2 + \delta_k + \nu_k \tag{3}$$

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[1] Equation (2) is exact when all the components of equation (1) are mutually orthogonal. For the general case, see AKM (1999).

where $\gamma_0, \gamma_1,$ and γ_2 are parameters to be estimated, δ_k is a fixed industry effect, and ν_k is a statistical error term. In addition to the output measures listed above, we also use equation (3) to model the log of employment, log of capital, log capital/employment and the ratio of skilled workers to total employment.

3. Data Sources

In this section we provide a description of the basic analysis samples used for each country. For France, the basic individual data and the link to the establishment were collected in the "Enquête sur la structure des salaires" (INSEE, 1986, 1992), called the ESS hereafter. The French firm-level data (enterprise units) were drawn from the "Echantillon d'entreprises" (INSEE, 1990a-1990e), which is a continuing research sample of firms based on the annual census of business enterprises called the "Bénéfices industriels et commerciaux," a survey that is also used in the French national income and product accounts. For the United States, the individual data, and the link to the establishment and enterprise data, are contained in the Worker-Establishment Characteristic Database (WECD), which is documented in Troske (1998). The underlying sample of establishments is the "Longitudinal Research Database" (LRD) (see McGuckin and Pascoe 1988 and Center for Economic Studies 1992), which is a longitudinal sample of manufacturing establishments based on data from the Annual Survey of Manufactures (ASM) and the Census of Manufacturers (CM).

3.1. Main Surveys

The ESS was run in 1986 and again in 1992. It is a two-stage sample of French employees. In the first stage, establishments or firms, depending on the industry, were sampled with probabilities related to their size. In the second stage, employees were sampled from the selected establishments. The 1986 employee sample is very large because a large fraction of the employees in the sampled establishments was surveyed. The 1992 employee sample is smaller because a smaller fraction of the employees was surveyed in each sampled establishment. In the 1986 survey, extensive information concerning the methods of payment and the design of the compensation system is available; however, there are not many variables that describe the employee's demographic and educational characteristics. In the 1992 survey, information on the employee's education is available. To maximize comparability with the US data, we retained only manufacturing establishments and the individuals employed by those establishments for the firm performance and input analysis performed on our French data.

The American individual data, the WECD, links information for a subset of individuals responding to the long form of the 1990 Decennial Census of Population with information about their employers in the LRD. Long-form Census of Population respondents report the location of their employer in the prior week and the type of business or industry in which they work. The Census Bureau then assigns a code for the location of the employer, corresponding to a unique city block for densely populated areas, or corresponding to a unique place for sparsely populated areas. The Census Bureau also classifies workers into industries using Census industry codes so that respondents can be assigned to a unique industry-location cell. In addition, the Census Bureau maintains a complete list of all establishments operating in the US in a given year, along with location and industry information for these establishments that is similar to the data

available for workers. Thus, it is possible to assign all establishments in the US to an industry-location cell. The WECD is constructed by first selecting all manufacturing establishments in operation in 1990 that are unique in an industry-location cell. Next, all workers who are located in an industry-location cell with a unique establishment are matched to that establishment. The procedure has some limitations, in particular, it over-represents workers in industries with large establishments (because these establishments are more likely to be the only establishment in the industry-location cell) and workers in urban areas (due to the finer geographic detail for these establishments). The Center for Economic Studies has created a set of ex post weights designed to render the WECD representative of manufacturing employment in 1990.

To obtain data on a worker's employer, the WECD data must be matched to the plant-level data in the LRD. The LRD is a compilation of plant responses to the ASM and CM. The CM is conducted in years ending in a two or a seven, while the ASM is conducted in all other years for a sample of plants. The LRD contains plant data from every CM since 1963 and every ASM since 1971. To construct the establishment data, we match the worker data to data from the 1987 CM. To construct the enterprise data, we aggregate the 1987 and 1992 CM establishment-level data for all establishments that are part of the same firm, and then average over these data.[2]

For both samples we retain only the full-time, full-year employees. For the French data, full-time employment is a legal status directly coded in the basic survey and full-year status means that the employee worked at least 30 weeks in the corresponding year. For the US data, we retain workers who report usually working 30 hours a week who report working at least 30 weeks in the corresponding year.[3]

3.2. Variable Definitions: Individual Measures

We defined all of the measured individual characteristics in a manner that maximized the comparability of the two countries' data. In this subsection we discuss each of these variables in turn.

For the French data, potential experience is defined differently for the 1986 and 1992 surveys. In 1986, because education is not measured, we defined potential experience as age minus 18. In 1992, we used the reported education level and data on the average age at school-leaving (Table 14 in CEREQ-DEP-INSEE 1990) to calculate potential experience as age minus age at school-leaving. In the US data, potential experience is defined as age minus years of schooling minus 6.

Because we do not have any educational data in the 1986 French data and because many French data analyses use occupational categories instead of education in wage equations, we

[2] Both the 1987 and 1992 CM data contain information on auxiliary establishment and central administrative offices which allows us to include data for these establishments when we construct the enterprise data. Establishments that fail between 1992 and 1987 are given the value of the variable in 1987.

[3] In addition, in the US data we drop workers whose actual wage is more than 5 standard deviations from their predicted wage based on a standard wage regression, and who work in plants who report either zero capital equipment, zero employment or negative value added in 1987.

defined a set of five occupational codes that are comparable across the French and US samples. The US occupations are a recode of the Census Occupational Categories that appear in the 1990 public use microdata files. The French occupations are a recode of the Profession et Catégorie Socioprofessionelle (PCS) codes common to all INSEE surveys. For both countries the resulting categories are (1) professional or managerial, (2) technical or supervisory, (3) other white collar occupations, (4) skilled blue collar, and (5) unskilled blue collar.

When education was available in the French data (1992), we defined a set of five indicators that correspond, approximately, to grade school, high school, some college, college degree, and post-graduate degree. For the French data, the educational variables are based exclusively on degree attainment. For the US data, the educational data are based on years completed and degree attainment, *i.e.* a high school graduate has 12 years of school and the appropriate diploma.

Metropolitan residence is defined for the French sample only and measures residence in the Ile-de-France (metropolitan Paris) region.

The dependent variable at the individual level is a measure of the full-time equivalent annual wage rate. For the French sample, total annualized compensation is directly reported in 1986, using INSEE definitions of the annual salary, and is defined as 12 times the October full-time salary in 1992. For the American sample, the annual wage rate is 52 times the estimated weekly full-time salary based on the reported total earnings and number of weeks worked in the previous year questions on the census long form. Both annual wage rates are employee gross salaries (before deductions for employee payroll or income taxes).

3.3. Variable Definitions: Enterprise/Establishment Measures

Our measures of enterprise-level outcomes for the French sample are based on the firm's annual accounting statement used for estimates of the national income and product accounts. We measure value-added per employee, sales per employee and operating income as a fraction of total assets. The variables are discussed in detail in AKM. The American enterprise-level data are based upon an aggregation of all the establishments belonging to the same firm in the Census of Manufactures (1987). Establishments that are out of scope for the Census were included in the aggregation; however, in the calculation of value-added and sales at the enterprise level, we made no correction for inter-establishment trading within the firm. The variable definitions are contained in CES 1992.

Summary statistics for all of the individual data appear in Appendix Table A. Summary statistics for the enterprise-level variables appear in Appendix Table B.

4. Analysis of the Individual Data

Table 1 presents the results of the individual data analysis for both years of French data and for two different specifications using the American data, in order to maximize comparability between the two analyses. Both specifications are shown using males as the reference sex but with all effects except the establishment effects fully interacted with sex. With or without the

education variables, the individual characteristics plus the establishment effects explain about 20% more of the variation in annual wage rates for the French sample as compared to the American one. Occupational differentials are more important for the French whereas educational differentials are more important for the Americans.

Table 1
Least Squares Estimates of the Determinants of Annual Wages, Including Establishment Effects

	France, 1986		*US, 1990*		*France, 1992*		*US, 1990*	
Independent Variable	***Coeff.***	***Std.Er.***	***Coeff.***	***Std.Er.***	***Coeff.***	***Std.Er.***	***Coeff.***	***Coeff.***
Potential labor force experience	0.03984	(0.00057)	0.07823	(0.00167)	0.06905	(0.00261)	0.08322	(0.00162)
Quadratic experience term	-0.00135	(0.00003)	-0.00317	(0.00012)	-0.00402	(0.00024)	-0.00342	(0.00011)
Cubic experience term	0.00002	(0.00000)	0.00006	(0.00000)	0.00011	(0.00001)	0.00007	(0.00000)
Quartic experience term	-9.4E-08	(0.0E+00)	-4.0E-07	(3.0E-08)	-1.2E-06	(1.0E-07)	-4.7E-07	(3.0E-08)
Professional or managerial occupation	0.95153	(0.00183)	0.53208	(0.00349)	0.76038	(0.00897)	0.35895	(0.00402)
Technical or supervisory occupation	0.41703	(0.00143)	0.25611	(0.00384)	0.40100	(0.00722)	0.20566	(0.00379)
Other white collar occupation	0.14681	(0.00228)	-0.01879	(0.00473)	0.16926	(0.01056)	-0.03918	(0.00460)
Skilled blue collar occupation	0.16983	(0.00132)	0.09065	(0.00346)	0.15497	(0.00665)	0.08343	(0.00336)
Lives in a metropolitan statistical area	0.02042	(0.00349)						
Grade school education					-0.33845	(0.00879)	-0.52605	(0.00752)
High school education					-0.25560	(0.00882)	-0.40418	(0.00702)
Some college education					-0.20046	(0.00876)	-0.33405	(0.00685)
Completed college					-0.06366	(0.01566)	-0.12255	(0.00688)
Female	-0.06857	(0.00513)	-0.04504	(0.01277)	0.05186	(0.02416)	-0.07750	(0.01890)
Female-labor force experience interaction	-0.01149	(0.00089)	-0.02119	(0.00274)	-0.04722	(0.00381)	-0.01649	(0.00267)
Female-quadratic experience interaction	0.00055	(0.00005)	0.00043	(0.00019)	0.00373	(0.00031)	0.00031	(0.00019)
Female-cubic experience interaction	-0.00001	(0.00000)	0.00000	(0.00001)	-0.00012	(0.00001)	0.00000	(0.00000)
Female-quartic experience interaction	6.1E-08	(1.0E-08)	-4.7E-09	(5.0E-08)	1.2E-06	(1.1E-07)	1.8E-08	(4.0E-08)
Female-professional occupation interaction	-0.07875	(0.00453)	-0.15620	(0.00632)	-0.04880	(0.01609)	-0.08649	(0.00710)
Female-technical occupation interaction	0.00589	(0.00299)	0.03075	(0.00837)	-0.00615	(0.01136)	0.03714	(0.00827)
Female-other white collar interaction	0.05108	(0.00297)	0.03883	(0.00657)	0.03261	(0.01312)	0.04556	(0.00648)
Female-skilled blue collar interaction	-0.01565	(0.00368)	-0.05461	(0.00819)	-0.04531	(0.01021)	-0.04301	(0.00795)
Female-metropolitan area interaction	-0.00525	(0.00247)						
Female-grade school interaction					-0.00061	(0.02129)	0.04110	(0.01582)
Female-high school interaction					-0.01601	(0.02128)	-0.00867	(0.01509)
Female-some college interaction					0.02531	(0.02109)	-0.01871	(0.01494)
Female-completed college interaction					-0.06204	(0.02852)	-0.02167	(0.01537)
R^2	0.729		0.592		0.817		0.617	
Standard error of equation	0.961		0.373		4.738		0.362	
Error degrees of freedom	388,272		149,000		23,920		148,992	
Model degrees of freedom	10,027		7,575		2,023		7,583	

Sources: Authors' calculations based upon the Enquête Structure des Salaires (France, 1986 1992) and Worker-Establishment Characteristics Database (US, 1990).
Notes: All equations include a complete set of establishment effects. All included variables are shown in the table.

To facilitate comparisons between the French and American analyses, we graphed the experience effects relative to the starting wage. Figure 1 shows this relation for males in France and the US while Figure 2 shows the relation for females. The American profile is steeper and never turns down for men, while for women it flattens out at around 22 years of potential experience. In France, the experience profile for men reaches a peak at around 35 years of potential experience then turns down, while the peak for women occurs four years earlier.

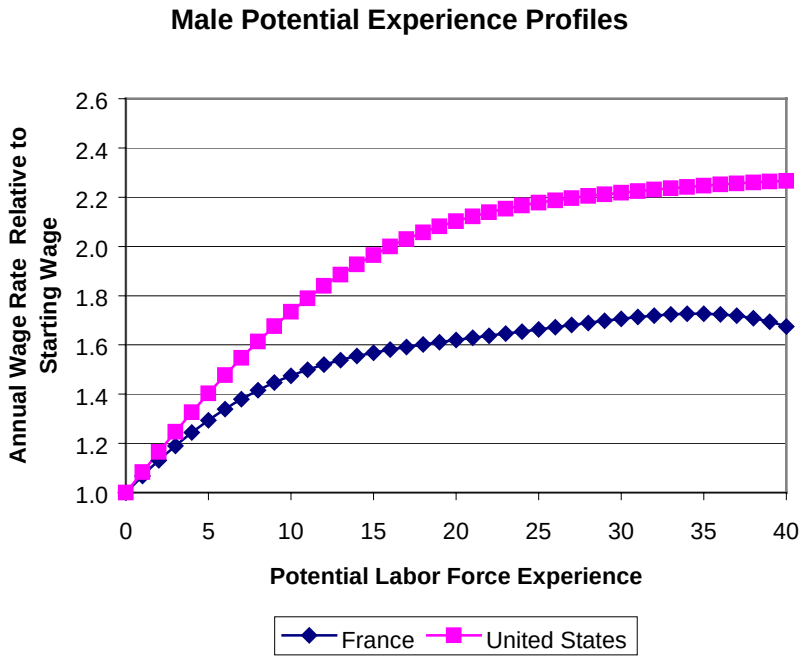

Figure 1

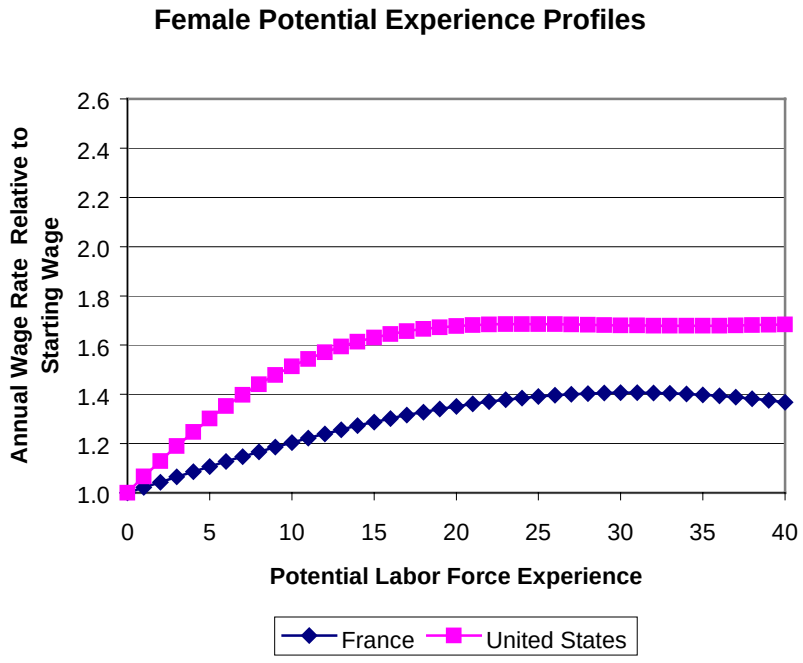

Figure 2

The results of the analyses in Table 1 were used to compute sets of predicted wages given the individual characteristics ($x_i\hat{\beta}$) and estimated establishment effects ($\hat{\psi}_j$) for each individual

in each sample. These components of the individual's compensation, computed separately for each specification, were used to determine the statistical importance of individual characteristics, establishment effects and the residual.

5. The Relative Importance of Observed Characteristics and Establishment Effects

Table 2 shows the sample means, standard deviations and correlations for the components of individual compensation for each of five different specifications of equation (1), those reported in Table 1 plus one additional specification (France, 1992 without education) for comparison purposes.

Table 2
Correlation Among the Components of Individual Compensation

			Correlation with			
	Mean	Std.Dev.	Log annual wage rate	Individual charac-teristics	Establish-ment effect	Residual
France, 1992, w/ education						
Log annual wage rate	11.8275	0.4142	1.0000	0.8081	0.5658	0.4397
Individual characteristics	0.3977	0.2970	0.8081	1.0000	0.2320	-0.0038
Establishment effect	11.4298	0.1655	0.5658	0.2320	1.0000	0.0000
Residual	0.0000	0.1832	0.4397	-0.0038	0.0000	1.0000
US, 1990, w/ education						
Log annual wage rate	10.1743	0.5443	1.0000	0.6417	0.5995	0.6025
Individual characteristics	0.3321	0.2975	0.6417	1.0000	0.2636	-0.0400
Establishment effect	9.8423	0.2479	0.5995	0.2636	1.0000	0.0000
Residual	0.0000	0.3399	0.6025	-0.0400	0.0000	1.0000
France, 1992, w/out education						
Log annual wage rate	11.8275	0.4142	1.0000	0.7912	0.5807	0.4569
Individual characteristics	0.6369	0.2873	0.7912	1.0000	0.2375	-0.0028
Establishment effect	11.1906	0.1723	0.5807	0.2375	1.0000	0.0000
Residual	0.0000	0.1901	0.4569	-0.0028	0.0000	1.0000
France, 1986, w/out education						
Log annual wage rate	11.4823	0.4728	1.0000	0.7814	0.5481	0.5223
Individual characteristics	0.5321	0.3206	0.7814	1.0000	0.2524	0.0176
Establishment effect	10.9475	0.1766	0.5481	0.2524	1.0000	0.0065
Residual	0.0027	0.2402	0.5223	0.0176	0.0065	1.0000
US, 1990, w/out education						
Log annual wage rate	10.1743	0.5443	1.0000	0.5983	0.6103	0.6273
Individual characteristics	0.6720	0.2715	0.5983	1.0000	0.2418	-0.0294
Establishment effect	9.5023	0.2665	0.6103	0.2418	1.0000	0.0000
Residual	0.0000	0.3495	0.6273	-0.0294	0.0000	1.0000

Sources: Authors' calculations based upon the regression analysis shown in Table 1.

The table shows that, with or without controls for education, the establishment effects are comparable to the individual characteristics in terms of their contribution to the variation of annual wage rates. As explained in equation (2), the establishment effect consists of a combination of the average individual effect within the establishment and the true establishment

effect.[4] Since we cannot isolate the individual component α_i, we cannot attribute the importance of the estimated establishment effects in this paper to either the individual or establishment component shown in equation (2). However, it is interesting to note how similar the French and American results are. In addition to the similarity of the relative importance of the individual characteristics and establishment effects, the table also shows that the degree of correlation between the two components is very similar across the two countries.

Finally, it should be noted that observable individual characteristics and unobservable establishment effects on compensation explain less of the variance in log annual wages in the US than in France. In particular, the difference in the correlations is due to the observable individual characteristics. In general, the addition of education as an explanatory variable (where possible) increases the correlation of the observables with log earnings by 0.02. Overall, we explain about twice as much of the variation in log wages in France than in the United States with our observable characteristics and establishment effects.

6. Analysis of Enterprise Data

Table 3 shows the results of relating the average predicted wage and establishment effect in each firm to productivity measures: log value-added per worker and log sales per worker. The table also shows the results of relating these same variables to the profitability of the enterprise measured as operating income divided by total assets. For France, we observe that firms employing workers with high average predicted wage rates, $\frac{\sum_{i\in\{J(i)=j\}} x_i\hat{\beta}}{N_j}$ where N_j is the number of workers employed in firm *j*, employ more productive workers but have lower profitability.[5] In the United States, firms with high average predicted wage rates also employ more productive workers but there is no relation to profits. Firms having high average establishment effects, $\hat{\psi}_j$, also employ more productive workers in both countries. The relation between establishment effects and profitability, however, are not the same. In France, firms with higher average establishment effects are more profitable, while in the Unites States such firms are less profitable.

[4] AKM found that the individual effect in longitudinal the French data was much more important than the firm effect for explaining annual compensation.

[5] The standard errors reported for the enterprise-level regressions in Tables 3 and 4 have not been corrected for the presence of estimated regressors.

Table 3
Estimated Relations between Compensation Structure and Firm Performance

Dependent variable	*France*		*United States*	
Independent variables	***Coeff.***	***Std. Err.***	***Coeff.***	***Std. Err.***
log(Value-Added/Employees)				
Average predicted wage in firm	0.8178	(0.0839)	0.2524	(0.0363)
Avg. Establishment effect in wage eq.	1.1566	(0.1033)	0.4533	(0.0204)
log(Sales/Employees)				
Average predicted wage in firm	0.9304	(0.1515)	0.3429	(0.0441)
Avg. Establishment effect in wage eq.	1.4280	(0.1865)	0.5050	(0.0248)
Operating Income/Capital				
Average predicted wage in firm	-0.0844	(0.0200)	-0.0029	(0.0476)
Avg. Establishment effect in wage eq.	0.0976	(0.0247)	-0.2048	(0.0268)

Sources: Authors' calculations based upon the results reported in Tables 1 and 2 and the additional sources: Bénéfices industriels et commerciaux (1989-1994) and Census of Manufactures (US 1987, 1992).

Consider a firm that has optimized profit, thereby choosing the optimal level of employment L^*. Then, the simplest competitive model yields

$$\pi^* = \mathrm{f}(L^*) - wL^*$$

where π^* is the optimized level of profits, f(.) is the production function, L^* is the optimized level of employment, and *w* is the wage rate. Hence, profits should be negatively related to wages, as expressed in Hotelling's (1932) lemma. Now, rewrite the wage as is usually done in a rent-sharing model.

$$\pi^* = \mathrm{f}(L^*) - \left(x\beta + \alpha + \gamma \frac{QR^*}{L^*} \right) L^*$$

where QR^* denotes the maximized quasi-rent that is split according to parameter γ. In the notation of equation (2), $\phi_j = \gamma_j \frac{QR_j^*}{L_j^*}$. Once more, in this type of situation both components of the wage (as estimated above) are negatively related to profit.

Finally assume some productivity effect of the firm specific part of the compensation (as measured by ϕ in the model), as implied by an efficiency wage model. Then, one can write the above equation as follows

$$\pi^* = \left(1 + \mathrm{g}(\phi)\right) \mathrm{f}(L^*) - \left(x\beta + \alpha + \phi\right) L^*$$

in which the g(.) function represents the increased productivity due to efficiency wage effects. Now, notice the relation between profitability and the second component of our wage

decomposition can be either positive or negative depending on which effect dominates (efficiency wage effect or rent-sharing effect). In the context of this simple model, table 3 implies that the efficiency wage effect dominates in France while there is no clear deviation from competitive labor market predictions in the United States.

For all the measures, the estimated effects are larger in France than in the United States. In addition, the French numbers in table 3 are comparable to the French estimates in AKM. For the US, the estimates presented in this paper are unique.

Table 4 shows the relation between the estimated components of compensation and the log of employment, the log of capital, the log of the capital-labor ratio and the share of skilled workers in employment. Once again, the effects of the components of compensation on the various input measures are much larger in France than in the United States. Furthermore, whereas the sign of the estimated relation between the average establishment effects and the dependent variables are the same in both countries when significant, the two components of compensation due to observable individual characteristics occasionally enter in opposite directions.

Table 4
Estimated Relations between Compensation Structure and Input Choices

Dependent variable	***France***		***United States***	
Independent variables	***Coeff.***	***Std. Err.***	***Coeff.***	***Std. Err.***
log(Employees)				
Average predicted wage in firm	1.1030	(0.4021)	-0.4855	(0.1301)
Avg. Establishment effect in wage eq.	4.5875	(0.4950)	0.2231	(0.0733)
log(Capital)				
Average predicted wage in firm	2.2903	(0.5102)	-0.1828	(0.1536)
Avg. Establishment effect in wage eq.	6.7509	(0.6281)	0.8378	(0.0865)
log(Capital/Employees)				
Average predicted wage in firm	1.1874	(0.2003)	0.3027	(0.0604)
Avg. Establishment effect in wage eq.	2.1634	(0.2465)	0.6147	(0.0340)
Most Skilled Workers/Employees				
Average predicted wage in firm	0.5723	(0.0314)	0.1244	(0.0144)
Avg. Establishment effect in wage eq.	0.0410	(0.0365)	-0.0362	(0.0081)

Sources: Authors' calculations based upon the results reported in Tables 1 and 2 and the additional sources: Bénéfices industriels et commerciaux (1989-1994) and Census of Manufactures (US 1987, 1992). For France the ratio of most skilled workers to total employees is based on engineers, technicians and managers. For the US the ratio is based on nonproduction and supervisory personnel.

Tables 3 and 4 both display the same striking feature: even though the standard deviations of the variables are roughly similar in France and in the US, the coefficients estimated on the French data are much larger than those estimated for the US. Table 5 allows us to assess the origin of these large differences in magnitude. Table 5 presents the R-square and the share of the

explained sum of squares that comes from industry effects for every enterprise regression and both countries.

Table 5
Explanatory Power of Industry Effects and Included Regressors

Dependent Variable	*Industry Effects SS/Explained SS*		*R-Squared*	
	France	United States	France	United States
log(Value-Added/Employees)	0.1240	0.7229	0.6152	0.3062
log(Sales/Employees)	0.3819	0.7803	0.4867	0.3320
Operating Income/Capital	0.5102	0.9024	0.1557	0.1092
log(Employees)	0.3333	0.9487	0.4355	0.0701
log(Capital)	0.2999	0.8005	0.5147	0.1268
log(Capital/Employees)	0.2794	0.8474	0.5102	0.3411
Most Skilled Workers/Employees	0.1779	0.9283	0.6854	0.1860

Notes: See tables 3 and 4.

The components of compensation and industry effects explain a much larger fraction of the variance in the performance and input measures in France than in the US. But, while most of the explanatory power in the US comes from industry effects, most of the explanatory power in France comes from the components of compensation. Put differently, in the US, the compensation design only weakly affects firm-level outcomes or input structure; but industry affiliation has a much greater role. In France, industry effects are much less important. These phenomena are common to all of our analyzed variables and are consistent with results found elsewhere in the literature.[6] The reasons for these strong differences, certainly due to different institutions, are not immediately obvious and constitute an important agenda for future research in order to understand labor market outcomes in these two countries.

7. Conclusion

We have conducted parallel analyses of American and French individual wage data linked to the employing establishment. In our analysis, we are able to estimate an establishment effect that is a combination of the average individual effect within the establishment and the true establishment effect. We show that the American and French results share many features:

- similar estimated coefficients in the individual wage analysis with establishment-effects;
- similar importance attached to the individual characteristics vis-à-vis the establishment effects in explaining annual wage rates;
- higher productivity but not higher profitability in firms with higher paid workers, in relation to the individual characteristics or to the establishment effects.

[6] Krueger and Summers (1987) show that inter-industry wage differentials are much larger in the US than in France. Abowd, Finer, Kramarz, and Roux (1997), show that interfirm mobility is very strongly related to industries—both origin and destination—but is only poorly related to the age of the workers in the United States, while the exact opposite holds for France.

The use of linked employer-employee data to perform detailed international comparisons of labor markets is a relatively new research area.[7] Different comparisons illuminate different aspects of employment and wage outcomes. We have focused on establishment and enterprise effects on wage determination—both observable and unobservable. In this context, we found an important role for unobservable establishment heterogeneity in the wage determination process for both France and the United States, even though we are not able to distinguish between the part of the establishment effect that is due to individual versus employer heterogeneity. Furthermore, we documented important and statistically significant relations between both the observable and unobservable components of compensation on firm level outcomes and input measures. Our interpretation of these effects provides some scope for neoclassical demand theoretic explanations as well as for rent-sharing and efficiency wage explanations. It is worth stressing that the careful, standardized international comparison is responsible for the variability in the interpretation of the results. The consequences of the differences in the labor market institutions between France and the United States must be investigated in more detail in order to provide a more complete and general interpretation of the role of employer compensation heterogeneity in labor market outcomes.

[7] Abowd and Kramarz (1999) discuss about 125 such studies, most done on a single country. Of these, virtually all were conducted in the 1990s and more than half were still in working paper format.

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Appendix Table A
Summary Statistics for the Samples of Individual Data

	France		*United States*	
Variable	***Mean***	***Standard Deviation***	***Mean***	***Standard Deviation***
Log annual wages	11.83	0.41	10.33	1.32
Potential labor force experience	20.19	9.99	23.23	28.76
Quadratic experience (/100)	5.07	4.25	6.63	14.40
Cubic experience (/1,000)	14.35	16.41	21.37	65.51
Quartic experience (/10,000)	43.80	63.91	74.85	303.09
Professional or managerial occupation	0.12		0.17	
Technical or supervisory occupation	0.27		0.11	
Other white collar occupation	0.09		0.12	
Skilled blue collar occupation	0.42		0.17	
Unskilled blue collar occupation	0.09		0.42	
Grade school education	0.75		0.16	
High school education	0.11		0.42	
Some college education	0.08		0.27	
Completed college	0.01		0.11	
Graduate school	0.05		0.04	
Lives in a metropolitan statistical area	0.17		0.88	
Female	0.25		0.24	
Female-labor force experience interaction	4.95	9.94	5.24	28.58
Female-quadratic experience interaction	1.23	3.01	1.49	10.12
Female-cubic experience interaction	3.47	10.28	4.88	40.77
Female-quartic experience interaction	10.60	38.99	17.48	179.49
Female-professional occupation interaction	0.02		0.04	
Female-technical occupation interaction	0.05		0.02	
Female-other white collar interaction	0.07		0.06	
Female-skilled blue collar interaction	0.07		0.02	
Female-unskilled blue collar interaction	0.04		0.10	
Female-grade school interaction	0.19		0.04	
Female-high school interaction	0.03		0.11	
Female-some college interaction	0.02		0.06	
Female-completed college interaction	0.00		0.02	
Female-graduate school interaction	0.01		0.01	
Female-metropolitan area interaction	0.06		0.20	

Sources: Authors' calculations based upon the Enquête Structure des Salaires (France, 1992) and Worker-Establishment Characteristics Database (US, 1990).
Notes: All regression variables from table 1 are shown in the table. Summary statistics for France include only data for 1992. The French sample size is 26,091. The U.S. sample size is 156,576.

Appendix Table B
Weighted Summary Statistics for Samples of Enterprise Data

	France		*United States*	
Variable Name	***Mean***	***Standard Deviation***	***Mean***	***Standard Deviation***
Log value added per employee	4.83	0.61	3.66	0.46
Log sales per employee	5.89	0.96	4.24	0.57
Operating income/total assets	0.12	0.10	0.75	0.54
Log total employees	5.44	2.43	3.68	1.43
Log total assets	10.90	3.32	6.75	1.75
Log total assets per employee	5.46	1.30	3.07	0.79
Skilled workers per employee	0.26	0.23	0.30	0.17
Average predicted wage in firm	0.69	0.28	0.31	0.16
Establishment effect in wage equation	11.00	0.22	9.66	0.28

Sources: Authors' calculations based upon the results reported in Tables 1 and 2 and the additional sources: Bénéfices industriels et commerciaux (1989-1994) and Census of Manufactures (US 1987, 1992). The French sample size is 464 enterprises. The U.S. sample size is 5,096 enterprises.