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Inter-Industry Wage Differentials in Ireland

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Abstract: This paper investigates inter-industry wage differentials in Ireland, taking advantage of access to a dataset that is uniquely suitable for this purpose, the 1996 Structure of Earnings Survey. This allows us to measure not simply overall differentials in the average wage across sectors, but also the extent to which these are associated with a range of employee, job, employer and sectoral characteristics. The results show that there are substantial differences in earnings across industrial sectors in Ireland, predominantly but not only reflecting differences in measured human capital of workers and attributes of their jobs. While unobserved individual and job characteristics may underpin the remaining differentials, efficiency wage or rent-sharing could also be playing a role. Including a range of firm and sectoral characteristics relevant to the latter does not markedly alter the scale of inter-industry differentials, but firm fixed effects seem important. The dispersion of wages across industries, controlling for observed employee, job and employer characteristics, is quite high in Ireland compared to other industrialised countries.

I INTRODUCTION

Wage differentials between industrial sectors have long fascinated economists, representing as they do empirical regularities in search of theoretical explanation. The study of these differentials internationally has been reinvigorated following Krueger and Summers' (1988) use of data for the USA to demonstrate the existence of pay differentials between workers with the same observable characteristics and working conditions. This has been followed by numerous studies for other countries, some attempts to account for the observed differences across them, while debate continues about the role of unobserved individual and job characteristics versus alternative theoretical perspectives drawing on for example efficiency wage or rent-seeking frameworks.

Here we examine inter-industry wage differentials in Ireland in a cross-section context, taking advantage of access to a dataset that is uniquely

suitable for this purpose, namely the Structure of Earnings Survey carried out in 1996. This allows us first to measure overall differentials in the average wage across sectors. We then look at the extent to which these are associated with a range of employee and job characteristics, and the scale of the remaining differentials. The role of employer and sectoral characteristics are then investigated. We put these results for Ireland into comparative perspective, discussing the relationship which has been posited between the scale of inter-industry wage dispersion and the degree of corporatism in a country. Finally, we open up an investigation of firm-specific versus sectoral wage differentials.

II THEORETICAL AND EMPIRICAL BACKGROUND

The existence of persistent and systematic wage differentials between industrial sectors has been known for many years. Going back to the seminal US work by Slichter (1950) and Dunlop (1957). Differences in average wages across industries could of course reflect differences in the composition of their workforces in terms of skills and productivity. However, in more recent years a wide range of studies in different countries have found that workers with comparable measured characteristics associated with productivity – notably education and experience – earn different wages depending on the industry in which they are employed. Moreover, this pattern of wage differentials across industries has been found to be highly stable over time, so transitory differences in demand across industries cannot be the explanation. Furthermore, the pattern is very similar across industrialised countries, in that the same industries seem to be high-versus low-paying ones having controlled for measured worker characteristics (see for example Krueger and Summers, 1987).

This empirical regularity clearly poses a challenge to labour market theory. According to the simplest neo-classical competitive model of wage determination, two individuals with the same productive capabilities should have the same marginal productivity and thus receive the same wage, irrespective of the industry in which they are working. It has long been recognised that wage differentials between identical individuals could persist in equilibrium because higher wages would be needed to compensate workers for less attractive non-wage attributes of particular jobs, such as unpleasant or even hazardous working conditions. In other words, the standard competitive theory of wage-setting recognises that there may have to be compensating differentials between jobs with different non-wage attributes that enter into the employee's or potential employee's utility function.

However, job or industry characteristics which do not directly affect the utility of workers should not have a systematic effect on wages. There should still be no difference between industries with employees with identical individual characteristics and working conditions.

Whether this is consistent with what one finds empirically continues to be hotly contested. The extent to which observed differentials might in fact be attributable to differences between individuals and to compensating differentials has been very hard to assess. This reflects the difficulty in adequately measuring all the characteristics of individuals and jobs that might be relevant. As far as job characteristics are concerned, aspects such as flexibility of hours, health hazards and commuting costs are hard to capture, while the difficulties in adequately capturing individual worker attributes such as ability and motivation are a constant theme in labour economics more broadly. So conceivably, it could be a concentration of workers with the greatest unobserved productive abilities, and/or of unmeasured attractive job attributes, that produces higher wages in particular industries.

This is where Krueger and Summers' (1988) contribution was particularly influential. They employed cross-sectional US data with information about the attributes of individuals and their jobs, and also longitudinal data which allowed them to analyse individual fixed effects. In terms of job characteristics, they had data on for example shift work, presence of health hazards, commuting time, whether overtime was a choice, and whether physical work conditions were pleasant. They found that including these did not reduce measured industry effects on earnings, indeed if anything it increased them. Analysis of two longitudinal datasets also found substantial industry effects for workers who change jobs, which they saw as evidence against unmeasured labour quality being the main explanation for inter-industry differentials.

Since then, inter-industry wage differentials have been analysed in a range of other industrialised countries. This growing literature includes Arai, Ballot and Skalli (1996) for France; Hartog, Leuven and Teulings (1997) for the Netherlands; Lucifora (1993) for Italy; Ferro-Luzzi (1994) for Switzerland; Vainiomaki and Laaksonen (1995) for Finland and Rycx (2002) for Belgium. All have found significant differentials across industry having controlled in detail for the characteristics of the workforce and (though less comprehensively than Krueger and Summers) for some aspects of the job.

A number of theoretical explanations have been advanced for the persistence of "true" underlying differentials, over and above worker and job characteristics. Krueger and Summers among others point to efficiency wage models, which hypothesise that worker productivity is a positive function of wages. By raising wages firms can reduce shirking, and their incentive to do

so depends on how poorly they are able to directly monitor and control effort/shirking. Bulow and Summers (1986) then argue that the ability to monitor shirking is likely to differ across sectors, leading to wage differentials across those sectors. What is more difficult to explain on this basis is the cross-country variation in the magnitude of inter-industry wage differentials.

Rent-sharing offers another, related theoretical perspective. This suggests that firms in profitable sectors may be in a position to share rents with their workers, giving rise to wage differentials between them and less profitable sectors of the economy. Heterogeneity across sectors in the bargaining power of unions and their ability to extract a greater share could then also have a role, or firms in profitability sectors might indeed be willing to share rents for efficiency wage reasons. The rent-sharing perspective has the interesting implication that the scale of inter-industry differentials may depend on the nature of wage-bargaining institutions in the country, and on the extent of corporatism in particular. This is because in corporatist countries, it is argued, there is less scope for sharing of rents at local level since labour contracts are negotiated at a higher level. As Teulings and Hartog (1998) put it, in corporatist economies local rent sharing is suppressed, voluntarily, because of the virtue of stable contracts (p. 163). As we shall see, they present some empirical evidence to support the notion that inter-industry differentials are indeed narrower in corporatist countries.

While the investigation of such theoretical explanations for why similar individuals in similar jobs might be rewarded differently in different industries goes on, other studies have argued from within the strictly competitive framework that unobserved differences in abilities and jobs in fact account for much of the explanation for inter-industry differentials. Murphy and Topel (1987), for example, emphasise that workers may value stable earnings, in which case industries with more unstable jobs may have to pay more. Goux and Maurin's (1999) study using longitudinal earnings data for France infers the importance of unmeasured ability across individuals by focusing on those switching industries. In contrast to Krueger and Summers, they find that inter-industry wage differentials for such workers are very much less than in cross-sectional data. They argue that this difference probably arises because Krueger and Summers in their longitudinal analysis use a highly aggregated industrial breakdown distinguishing only seven sectors, Goux and Maurin, by contrast, were able to distinguish 99 industries, and demonstrate that aggregating these and repeating their analysis of job switchers did indeed lead to much higher inter-industry differentials.

Interestingly, while Goux and Maurin discount the importance of "true" inter-industry wage effects, they explore and find substantial differences across firms in France. They find that the average differential in wages paid

to the same worker by two different firms is in the range 20-30 per cent, and that most of this is within rather than between industries. Within a given industry wages rise with firm size and capital intensity. They thus see modest inter-industry differentials as reflecting cyclical factors, while arguing that inter-firm differences are compatible with efficiency wage models whereby larger firms find monitoring more costly or more capital-intensive ones are particularly anxious to retain workers with high levels of firm-specific human capital.

Against that background, this paper examines inter-industry wage differentials in Ireland with a cross-sectional dataset that has some particularly attractive features for analysis of this topic. We first measure overall differentials in hourly wages across sectors, and then assess the extent to which these are associated with a range of observed employee and job characteristics. While we cannot assess how plausibly the remaining differences are attributed to unobserved individual and job characteristics, we can carry out some investigation of the potential for employer and sectoral characteristics to be important. In the light of Goux and Maurin's emphasis on inter-firm differences, we also exploit the unique potential of the data available to us – covering a number of employees for each firm – to investigate firm effects. Finally, we put our results on inter-industry differentials for Ireland into comparative perspective, constituting as they do another observation on the relationship between inter-industry wage dispersion and the degree of corporatism.

III DATA

Analyses of the determinants of individual earnings are most often based on data from household surveys. Such data allows standard human capital/Mincer wage equations to be estimated, which often include not only the employee's age, gender, education and experience as explanatory variables but also a limited number of sectoral dummy variables for the broad industrial sector in which he or she is working. However, the relatively small sample size in such surveys means that they do not offer the most satisfactory basis on which to study inter-industry wage differentials in any depth. In the Irish case, recent studies of this type based on the ESRI's 1987 household survey, the Living in Ireland Survey, or the Household Budget Survey include Callan and Reilly (1993); Hughes and Nolan (1997); Barrett, Callan and Nolan (1999a,b); Callan and Harmon (1999); Denny and Harmon (2001); Barrett, Fitz Gerald and Nolan (2002) and Callan *et al.* (2003).

There is however another source of data, much more suitable to the

investigation of wages across industries (and firms) at micro-level, namely the Structure of Earnings Survey which has been carried out by the Central Statistics Office on an occasional basis. This involves interviewing a large sample of establishments, and obtaining information on a large number of their employees. The 1996 survey is the most recent one currently available[1] and has data on 39,105 employees in 2,701 firms. This includes the pay, age, gender, and education of a random sample of one-fifth of their employees, and certain characteristics of their jobs such as the nature of the contract. Information obtained about the firm includes number of employees, whether it is privately owned, the nature of the pay bargaining regime, and, crucially for our purpose, the detailed Nomenclature of Economic Activities in the European Union (NACE) sector in which it is categorised. The survey includes only establishments with at least 10 workers, and in only certain sectors of the economy, namely NACE sectors C, D, E, G, H and J – Mining and Quarrying, Manufacturing, Electricity, Gas and Water Supply, Wholesale and Retail Trade, Hotels and Restaurants, and Financial Intermediation. So differentials across the whole economy cannot be studied, but in the sectors covered the analysis can be at a much lower level of aggregation than is allowed by household surveys. In our analysis we will be distinguishing 34 sub-sectors within the industries covered.

This very valuable data source for Ireland has not been used for micro-analysis until now because – like many of the corresponding datasets for other EU countries – it has not been made available for that purpose due to concerns about confidentiality of firm-based information.[2] However, an exploratory project involving a network of researchers and official statistical agencies has been facilitated in developing and using a remote data access system designed specifically for the 1995 (or thereabouts) European Structure of Earnings Survey (ESES) data.[3] This enables statistical analysis to be carried out on the micro-data, enormously increasing the research potential.

IV METHODOLOGY

We now set out the methodology we employ to derive inter-industry wage differentials from this dataset for Ireland, adopting the approach employed in recent studies such as Rycx (2002).

[1] A further survey has been carried out in 2002.

[2] Some quite detailed tabulated results for Ireland and other EU countries have been produced by Eurostat in their New Chronos web-based publication outlet.

[3] This Pay, Inequalities and Economic Performance (PIEP) project is co-ordinated by David Marsden (LSE), and involves the Central Statistics Office and ESRI. The data access system is designed to ensure that confidentiality is protected absolutely, with researchers never having direct access to the data and only certain statistical procedures being permitted.

(a) The Wage Equation

The general framework for analysis of inter-industry wage differentials is given by a standard Mincer (1974) wage equation. This involves estimating a semi-logarithmic form of the wage equation based on the following specification:

$$\ln w_i = \alpha + \sum_{j=1}^{J} \beta_j X_{j,i} + \sum_{k=1}^{K} \psi_k Y_{k,i} + \sum_{l=1}^{L} \delta_l Z_{l,i} + \varepsilon_i \quad (1)$$

where w_i is the gross hourly wage of an individual for i = 1, …. , N; X represents a vector of individual characteristics of the workers and their job; Y is a set of industry dummy variables; and Z is a vector of firm characteristics; α is the constant, β, ψ, and δ are the parameters to be estimated and ε_i is the error term.

(b) Gross Wage Differentials

The first stage of the analysis is the derivation of "raw" or "gross" inter-industry wage differentials, which do not take account of employee characteristics or job/employer conditions. For this purpose we include from Equation (1) only the constant and sectoral dummies, and estimate the co-efficients $\hat{\alpha}$ and $\hat{\psi}_k$ (k = *1, …, K*). To obtain the wage of the average worker in sector k ($\hat{w}_k$), we add $\hat{\alpha}$ and $\hat{\psi}_k$. The wage of the average worker in the reference sector is, $\hat{w}_{K+1} = \hat{\alpha}$. The average wage of the average worker in the economy is obtained by taking the average of the wage of the workers in all sectors ($\hat{w}_K$, k = 1, …, K) and weighting by the sectoral employment shares ($\bar{p}_k$), i.e. $\omega = \alpha + \sum_{k=1}^{K+1} \bar{p}_k \hat{w}_k$. The wage differential between the average worker in sector k, and the average worker in the economy is subsequently derived as:

$$d_k = \hat{w}_k - \omega, (k = 1, \ldots, K{+}1). \quad (2)$$

the wage differential in log points.

(c) Inter-Industry Wage Differentials Controlling for Individual and Employer Characteristics

In order to obtain "net" inter-industry wage differentials having controlled for other factors, we now estimate the wage equation using the sectoral dummies but also individual and employer characteristics. In this case, the constant no longer refers to the wage of the average worker in the reference

sector so we now calculate the average wage differential of all the sectors compared to the reference, as the product of the weighted employment share by the estimated sector co-efficients:

$$\pi = \sum_{k=1}^{K} \bar{p}_k \, \hat{\psi}_k. \tag{3}$$

The differentials are then calculated as the sector co-efficient less the average wage:

$$d_k = \hat{\psi}_k - \pi \tag{4}$$

and for the omitted sector, the differential is the average wage in Equation (3):

$$d_{K+1} = -\pi, \text{ where } k=1,\ldots K. \tag{5}$$

In testing hypotheses about the inter-industry wage differentials, we use standard errors which are adjusted to apply to these differentials rather than the original industry coefficients, calculated following the approach suggested by Zanchi (1998).[4]

(d) Transformation of Differentials in Log Points to Percentage Points

The inter-industry wage differentials calculated from Equations (2) and (4) are expressed in log point form. As Reilly and Zanchi (2003) pointed out, most studies (including Krueger and Summers, 1998) interpret these as the percentage effect of industry k affiliation on wages, but this is incorrect because the form of the wage equation is semi-logarithmic. So to obtain differences in percentage terms between the wage of the average worker in sector k, (λ_k) and the wage of the average worker in the economy (ρ), we must look at Equation (1) in terms of its anti-logs and the following transformation is required:

[4] Zanchi (1998) proposes the following transformation:
In estimating Equation (1) by OLS, the variance covariance matrix is obtained and then transformed as follows:

$$\text{var}(\hat{\delta}) = (Z - es')\,\text{var}(\hat{\psi}^*)(Z - es')',$$

where e is a vector of ones, and s represents employment shares of the first K industries. The square roots of the diagonal elements of this equation are the correct estimates of the standard errors of inter-industry wage differentials. Reilly and Zanchi (2003) show that if the unadjusted least squares errors are used none of the parameters estimated by Krueger and Summers (1988) are significant, whereas when they correct the standard errors some are significant.

$$\nu_k = (\lambda_k - \rho)/\rho \text{ for } k = 1, \ldots K{+}1 \tag{6}$$

where $\lambda_k = \exp(\hat{\alpha}) \exp(\hat{\psi}_k)$, $\lambda_{K+1} = \exp(\hat{\alpha})$, and $\rho = \sum_{k=1}^{K+1} \bar{p}_k \lambda_k$. Equation 6 provides wage differentials for each sector in percentage terms, and ρ is the percentage differential for the omitted sector. When we include additional variables such as individual and employer characteristics into the wage equation, this transformation becomes:

$$\nu_k = [(\exp(\hat{\psi}_k) - 1) - G] \text{ for } k = 1, \ldots K{+}1 \tag{7}$$

where $\nu_{K+1} = -G$ and $G = \sum_{k=1}^{K} \bar{p}_k [\exp(\hat{\psi}_k) - 1]$.

(e) Overall Dispersion of Wages Across Industries

Having estimated the differentials between industrial sectors, the overall variability in industry wages can be measured by the standard deviation of the inter-industry differentials (Teulings and Hartog, 1998). We follow Walsh (1999) in focusing on the employment-weighted standard deviation of wage differentials:

$$SD = \left(\sum_{i=1}^{n} \frac{n_i}{N} d^2 \right)^{-2},$$

where d represents the industry wage differential. This gives the typical deviation in wages associated with changing industry (in percentage terms).[5]

This standard deviation can be adjusted to allow for least squares sampling error, following Krueger and Summers (1998), because the standard deviation of the estimate $\hat{\beta}$ is an upwardly biased estimate of the standard deviation of β. The standard deviation is now calculated as:

$$SD(d_k) = \left[\sum_{k=1}^{K+1} \bar{p}_k (d_k - \sum_{k=1}^{K} d_k /K + 1)^2 - \sum_{k=1}^{K} \text{var}(d_k)/K + 1 \right]^{-2}$$

This standard deviation is adjusted for the average variance in industry differentials. It does not account for covariances among the ε_i, and slightly underestimates the standard deviation, but Krueger and Summers (1998)

[5] For example, Walsh (1999) estimated a figure of 15 per cent based on US data, which means that the industry differentials predict that a worker changing industries would typically expect a wage change of 15 per cent, other things being equal.

state that accounting for covariance terms increases the standard deviation only marginally, and on investigation we also found that to be the case with our data for Ireland.[6]

V DEFINITION OF THE VARIABLES

We now describe the variables from the Structure of Earnings Survey 1996 employed in our analysis. The wage variable is central: we focus on gross hourly wage, calculated by dividing reported weekly gross pay (including annual bonuses and shift premia where present) by hours paid. The explanatory variables relating to individual and job characteristics are as follows:

- gender,
- highest level of education achieved,
- number of years working with the present employer,
- potential prior work experience,[7]
- number of hours of work paid in the week (since there may be a relationship between part-time working and hourly earnings),
- dummy variable indicating presence of additional paid hours of overtime,
- occupation (distinguishing 21 categories),
- dummy variables indicating permanent versus temporary contract versus apprentice,
- dummy variable indicating whether the individual supervises other workers, and
- dummy variables indicating the presence of an annual bonus, of a premium for overtime working, and of shift work premiums.

The vector of firm characteristics comprises

- the size of the establishment, in terms of number of employees,
- the type of financial control (state versus private), and

[6] We followed the approach of Rycx (2003), and computed the weighted adjusted standard deviation of d_k as:

$$WASD(d_k) = \left[\sum_{k=1}^{K+1} \hat{p}_k \, (d_k - \sum_{k=1}^{K} d_k/K + 1)^2 - \sum_{k=1}^{K} \mathrm{var}(d_k)/K + 1 + \sum_{k=1}^{K}\sum_{l=1}^{L} Cov(d_k, d_l)/(K+1)^2\right]^{-2}$$

[7] This is derived as age minus 5 years schooling minus tenure in the current job.

- the nature of the wage bargaining regime, distinguishing those reporting that they were covered by national wage agreement only versus other firms.[8]

[Table A1 in the Appendix gives an overall picture of the sample in terms of means for these variables – available at www.esr.ie].

VI ESTIMATION RESULTS

We now present our estimation results, starting with the wage equation itself and moving on to the inter-industry wage differentials to be derived from it.

(a) The Wage Equation

In order to study wage differentials before and after controlling for a range of employee, job and employer characteristics, we estimate a variety of wage equations:

(1) A model with only the constant and sectoral dummies (i.e. the Y vector from Equation 1);
(2) A model including only employee and job characteristics (i.e. the X vector from Equation 1),
(3) A model including employee and job characteristics and sectoral dummies (X and Y vectors), and
(4) the full wage equation described in Equation (1) including employee, job, sectoral and firm characteristics (X, Y and Z).

We will use the results for Model (1) to derive gross inter-industry wage differentials. Comparing Model (2) with Model (3) will show how much the sectoral dummies add to overall explanatory power when one has already controlled for employee and job characteristics, and the results from Model (3) can be used to derive inter-industry differentials having controlled for those characteristics. Finally, Model (4) will allow us to see how much difference incorporation of some employer characteristics into the analysis makes to the results, both in terms of explanatory power and the inter-industry differentials themselves.

In Table 1 we compare the explanatory power of these models in terms of the (adjusted) R^2. We see that whereas sectoral dummies accounted for 23 per cent of the variance in hourly wages, employee and job characteristics without

[8] The question in the Structure of Earnings Survey allows firms to report that they were covered by national level agreement, by industry or establishment level agreement, or by "other", and more than one of these boxes could be ticked. There is some difficulty interpreting these responses in the Irish institutional context, and we simply distinguish those who ticked only the national level agreement from those who (as well or instead) ticked one of the other response categories.

any sectoral dummies account for 64.5 per cent of the total variance. When we add employee and job characteristics to the sectoral dummies the explained variance increases from 23 per cent to 6 per cent – variation in these characteristics across sectors plays a major role in the overall variation in wages across them. When we then also add firm characteristics we see only a marginal further increase, to 69 per cent.

Table 1: *Explanatory Power of Alternative Wage Equations, Structure of Earnings Survey, Ireland 1996*

Characteristics	R^2
Sector dummies only	0.2284
Employee and job characteristics only	0.6465
Employee and job characteristics + sector dummies	0.6825
Employee and job characteristics + sector dummies + firm characteristics	0.6902

Table 2 shows the estimated coefficients from the OLS regression of log hourly wages on the full set of explanatory variables, and also the implied impact on wages in percentage terms ($\exp^{\beta} - 1$) compared with the reference category. (Because of the large sample size almost all the variables are statistically significant at the customary levels, so we identify the ones that are *not* significant by bold type.) The results show as expected increasing returns to education. Compared to those with only a primary education, those who are educated to lower second level display a wage gap of 12 per cent, and those completing second level have a wage premium of 25 per cent on average. This gap is 67 per cent for those with a third-level education and 95 per cent for those who obtained a postgraduate degree. As also expected, women are paid wages 15 per cent lower then men *ceteris paribus*.

The relationship between wages and prior (potential) experience shows that initially the return to an additional year of experience is quite low, but the higher order terms show it increasing as additional years of experience are added. Tenure with the current employer shows the same relationship. Individuals who supervise others have a wage differential of over 17 per cent, while those on a limited term contract have wages 8 per cent lower than those on permanent contracts, and trainees and apprentices have wages 21 per cent less on average. Looking at occupational status, we see that managers and professionals received wages 30-40 per cent higher than the reference category, clerical workers. Managers of small enterprises receive slightly more, while corporate managers get wages 98 per cent higher than the reference group. We focus on differentials between industrial sectors in the next section.

Table 2: *Estimation Results for Full Wage Equation, Structure of Earnings Survey, Ireland 1996*

	Co-efficient	*Standard Error*	*Percentage Effect*
Constant	0.8074	0.0248	
Education			
Primary or no degree 0-6	(reference)		
Lower secondary 9 yrs	0.1129	0.0077	12.0
General upper secondary 12 yrs	0.2269	0.0078	25.5
Higher non-university short type 14 yrs	0.3538	0.0097	42.4
University and non-university higher	0.5134	0.0121	67.1
Post-graduate degree	0.6657	0.0192	94.6
Prior experience			
Number of years	0.0369	0.0011	3.8
Years squared/10^2	–0.1447	0.0069	–13.5
Years cubed/10^3	0.0176	0.0012	1.8
Tenure in the company			
Number of years	0.0341	0.0006	3.5
Years Squared/10^2	–0.0535	0.0019	–5.2
Dummy=1 if individual has no seniority	–0.0731	0.0065	–7.0
Sex			
Male	(reference)		
Female	–0.1648	0.0041	–15.2
Occupation			
Office clerks	(reference)		
Corporate managers	0.6851	0.0133	98.4
Managers of small enterprises	0.385	0.0107	47.0
Physical, mathematic and engineer science professionals	0.3104	0.0138	36.4
Life science and health professionals	0.2449	0.0532	27.7
Other professionals	0.3388	0.0129	40.3
Physical and engineer science associate professionals	0.109	0.0114	11.5
Life science and health associate professionals	0.1501	0.035	16.2
Other associate professionals	0.2521	0.0107	28.7
Customer services clerk	**0.0089**	**0.0098**	0.9
Personal and protective services workers	–0.1198	0.0104	–11.3
Models, salesperson and demonstrators	–0.0985	0.0087	–9.4
Extraction and building trading workers	–0.1006	0.0233	–9.6
Metal, machinery and related trades workers	–0.0468	0.01	–4.6
Precision, handicraft, printing workers	**–0.0064**	**0.0147**	**–**0.6
Other craft and related trades workers	–0.0846	0.0094	–8.1
Stationary plant and related operators	–0.0936	0.0102	–8.9
Machine operators and assemblers	–0.1146	0.0074	–10.8
Drivers and mobile plant operators	–0.1431	0.012	–13.3
sales and services elementary occupations	–0.2498	0.0099	–22.1
labourers in mining, construction, manufacturing and transport	–0.1909	0.0099	–17.4

Table 2: *Estimation Results for Full Wage Equation, Structure of Earnings Survey, Ireland 1996 (contd.)*

	Co-efficient	*Standard Error*	*Percentage Effect*
Supervises the work of his or her co-workers			
Yes	0.1581	0.0059	17.1
Hours			
Log of hours paid, including overtime paid	0.0333	0.0056	3.4
Overtime paid			
Yes	0.0175	0.0045	1.8
Contract			
Unlimited -term employment contract	(reference)		
Limited-term employment contract	–0.0082	0.0086	–0.8
Other employment contract	–0.2354	0.0101	–21.0
Premium shift work?			
Yes	0.1442	0.0055	15.5
Bonus annual paid?			
Yes	0.3012	0.0042	35.1
Size of the establishment			
Ln size (no of workers)	0.0406	0.0015	4.1
Level of wage bargaining			
National only	(reference)		
Other	–0.0106	0.004	–1.1
Public owned enterprise			
Yes	–0.0318	0.0144	–2.2
Sector			
Retail Trade; repair of personal, household goods n52	(reference)		
Mining or Coal and Lignite n10	0.2406	0.0349	27.2
Mining of Metal Ores (n13)	0.8129	0.0592	125.4
Other Mining and Quarrying (n14)	0.0703	0.0224	7.3
Manufacture of Food Products, Beverages (n15)	0.1408	0.0089	15.1
Manufacture of Tobacco Products (n16)	0.449	0.0338	56.7
Manufacture of Textiles (n17)	0.0713	0.013	7.4
Manufacture of Wearing Apparel (n18)	0.0917	0.0134	9.6
Manufacture of Leather, Leather products (ndc)	0.0549	0.0271	5.6
Manufacture of Wood, Wood Products (ndd)	0.087	0.0168	9.1
Manufacture of Pulp, Paper, Paper Products (n21)	0.2851	0.016	33.0
Publishing, printing and reproduction of recorded media (n22)	0.3493	0.0111	41.8
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	0.6246	0.0529	86.7
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	0.2822	0.0105	32.6
Manufacture of Rubber and Plastic Products (ndh)	0.1356	0.0124	14.5
Manufacture of Other Non-Metallic Mineral			

Table 2: *Estimation Results for Full Wage Equation, Structure of Earnings Survey, Ireland 1996 (contd.)*

	Co-efficient	*Standard Error*	*Percentage Effect*
Products (ndi)	0.1873	0.0134	20.6
Manufacture of Basic Metals (n27)	0.2759	0.0248	31.8
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	0.1431	0.0117	15.4
Machinery of Machinery and Equipment n.e.c. (ndk)	0.1535	0.0116	16.6
Manufacture of Office Machinery and Computers (n30)	0.1605	0.0135	17.4
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	0.1598	0.0128	17.3
Manufacture of radio, television and communication equipment and apparatus (n32)	0.1999	0.0151	22.1
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	0.1735	0.0123	18.9
Manufacture of motor vehicles, trailers and semi-trailers (n34)	0.0803	0.0176	8.4
Manufacture of Other Transport Equipment (n35)	0.1559	0.0202	16.9
Manufacture of furniture (n36)	0.0828	0.0123	8.6
Recycling (n37)	0.3187	0.1028	37.5
Electricity, Gas, Steam and hot water supply(n40)	0.2561	0.0206	29.2
Collection, purification and distribution of water (n41)	0.1618	0.0257	17.6
Sale, maintenance and repair of motor vehicles (n50)	0.1185	0.0136	12.6
Wholesale Trade & commission trade (n51)	0.2384	0.009	26.9
Hotels and Restaurants (nh)	0.0204	0.0092	2.1
Financial Intermediation (n65)	0.3647	0.0113	44.0
Insurance and Pension Funding (n66)	0.4415	0.0136	55.5
R2	0.6902		
N obs	36,515		

Note: All coefficients are significant at the 5 per cent level of significance with the exception of those shown in bold.

(b) Inter-industry Wage Differentials

In Table 3 we now present the inter-industry wage differentials in percentage terms derived from the estimated coefficients in three different wage equations. The first column gives the gross differentials (derived from the estimated equation including the sectoral dummies only – shown in Appendix Table 2, available at www.esr.ie). The second shows the net differentials controlling for employee and job characteristics (derived from the estimated equation also shown in Appendix Table 2). The final column shows

the net wage differentials derived from the full wage equation including in addition firm characteristics (which we saw in Table 1). The corresponding differentials in log points, which is what has more often been reported in other studies, are also shown in Appendix Table 3 [see www.esr.ie].

Table 3: *Inter-Industry Wage Differentials in Ireland, in Percentage Terms, 1996*

	Only Sector Dummies in Wage Equation	*Sector Dummies, Employee and Job Attributes*	*Sector Dummies, Employee and Firm Attributes*
Sector			
Retail Trade; repair of personal and household goods n52	–0.3043	–0.1753	–0.1968
Mining or Coal and Lignite n10	0.3276	0.1570	0.0752
Mining of Metal Ores (n13)	1.5319	1.2452	1.0576
Other Mining and Quarrying (n14)	**–0.0821**	–0.1189	–0.1240
Manufacture of Food Products and Beverages (n15)	**–0.0444**	–0.0322	–0.0456
Manufacture of Tobacco Products (n16)	0.6733	0.3754	0.3699
Manufacture of Textiles (n17)	–0.1617	–0.1309	–0.1229
Manufacture of Wearing Apparel (n18)	–0.3221	–0.0876	–0.1008
Manufacture of Leather and Leather products (ndc)	–0.3116	**–0.1520**	–0.1404
Manufacture of Wood and Wood Products (ndd)	–0.1741	–0.1322	–0.1059
Manufacture of Pulp, Paper and Paper Products (n21)	0.0294	0.1069	0.1331
Publishing, printing and reproduction of recorded media (n22)	0.2324	0.2028	0.2213
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	1.3073	0.6441	0.6707
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	0.3741	0.1290	0.1292
Manufacture of Rubber and Plastic Products (ndh)	–0.1168	–0.0810	–0.0516
Manufacture of Other Non-Metallic Mineral Products (ndi)	0.0214	**0.0051**	**0.0092**
Manufacture of Basic Metals (n27)	0.2327	0.1318	0.1209
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	–0.0764	–0.0720	–0.0430
Machinery of Machinery and Equipment n.e.c. (ndk)	**–0.0334**	–0.0387	–0.0309
Manufacture of Office Machinery and Computers (n30)	0.0773	0.0299	–0.0227
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	–0.0874	–0.0144	**–0.0235**
Manufacture of radio, television and communication equipment and apparatus (n32)	**–0.0129**	0.0418	0.0245

Table 3: *Inter-Industry Wage Differentials in Ireland, in Percentage Terms, 1996 (contd.)*

	Only Sector Dummies in Wage Equation	*Sector Dummies, Employee and Job Attributes*	*Sector Dummies, Employee and Firm Attributes*
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	0.0153	**0.0067**	**-0.0074**
Manufacture of motor vehicles, trailers and semi-trailers (n34)	–0.1127	–0.1089	–0.1132
Manufacture of Other Transport Equipment (n35)	0.1552	**0.0101**	**–0.0281**
Manufacture of furniture (n36)	–0.1357	–0.1230	–0.1105
Recycling (n37)	**0.0435**	0.1163	**0.1785**
Electricity, Gas, Steam and hot water supply	0.8828	0.2216	0.1968
Collection, purification and distribution of water	0.0576	–0.0762	**–0.0212**
Sale, maintenance and repair of motor vehicles (n50)	–0.1297	–0.1009	–0.0710
Wholesale Trade & commission trade (n51)	0.0979	0.0496	0.0724
Hotels and Restaurants (nh)	–0.3904	–0.1719	–0.1762
Financial Intermediation (n65)	0.5415	0.3906	0.2433
Insurance and Pension Funding (n66)	0.6525	0.4325	0.3582

Note: Figures in bold are not statistically significant. All other differentials are significant at the 5 per cent level.

We see that some of the gross differentials across industries, without taking employee, job or firm characteristics into account, are indeed substantial. Some industrial sectors have pay levels 30-40 per cent below the average, namely retailing, textiles, clothing and hotels and restaurants. Others have levels about that much above the average, such as chemicals, while finance and power generation are even higher. (Note that several very high-wage sectors, including mining and manufacturing of petroleum etc. products, have very small numbers in the sample.)

These gross differentials are of interest and importance in themselves, and are similar in magnitude to those found in studies for other countries (see for example Krueger and Summers, 1987; Rycx, 2002). However, a priority is to see the extent to which they are due to differences between sectors in measured worker characteristics and job conditions. Focusing on column 2, we see that although controlling for observed heterogeneity in employee and job characteristics does reduce these differentials substantially, there are still considerable wage differentials between industries. The most noticeable decrease is in the electricity, gas, etc. sector where employees receive only 22

per cent more than the average worker having accounted for employee characteristics, compared to a differential of 89 per cent before any such controls were introduced. The major sectors which we noted as substantially below average before any controls for worker and job characteristics – retailing, hotels and restaurants, textiles and clothing – are now 10-20 per cent below rather than 30-40 per cent below average. So the raw or gross industry effects are substantially reduced but by no means eliminated by taking these characteristics into account. The simple correlation co-efficient between the differentials presented in columns 1 and 2 is 0.68, indicating that the pattern and rank order of differentials does change somewhat once we add in these controls.

As we saw in Section II, this is consistent with the pattern found in a range of cross-sectional studies for other countries, where controlling for measured employee and job characteristics reduced but failed to eliminate inter-industry differentials. Of course, like those studies there remain unobserved individual and job characteristics which were not measured in the data and thus not included in our model, but which could nevertheless be playing a key role in producing the remaining industry effects. With cross-sectional data we cannot of course pursue the strategy adopted by Krueger and Summers and by Goux and Maurin (albeit with very different results), of using longitudinal data to control for individual fixed effects by focusing on those switching sectors.

What we can do however is go beyond some of those other cross-sectional studies to also incorporate some firm and sectoral characteristics into the analysis. Investigating the extent to which these might contribute to the industry effect remaining to be explained should help in evaluating alternative explanations to unobserved individual and job attributes, of the sort outlined in Section II. First of all, we include firm-related characteristics, namely firm size, type of financial control and bargaining regime. In Table 3 column 3 we see that including these employer characteristics further reduces some of the measured differentials. In the financial intermediation and insurance sectors, for example, the positive differentials are brought down from 39 per cent to 24 per cent and 43 per cent to 36 per cent respectively. Interestingly, among the additional variables it is firm size that makes most difference, with larger firms paying more, which as we saw earlier Goux and Maurin for example, have interpreted in an efficiency wage/monitoring framework. Overall, though, the pattern of net differentials is not markedly different when these firm characteristics are added. The rank order of the wage differentials does not change much when we include these firm characteristics, the correlation co-efficient between the final differentials and those of column 2 in Table 3 is 0.98.

(c) Inter-Industry Wage Dispersion

Having looked at the scale of the effects of the individual industrial sectors, we now summarise the overall dispersion in these inter-industry wage differentials as measured by the standard deviation. Table 4 presents in the first column the (employment-weighted) standard deviation of gross or raw wage differentials. When we simply look at sector only, the standard deviation is over 30 per cent – there is very substantial variation in hourly wages across sectors, as found consistently in similar cross-sectional studies for other countries.

Overall dispersion is however reduced very substantially when we control for employee and job characteristics, with the standard deviation falling to 12.7 per cent. So measured individual and job characteristics in that sense account for about 60 per cent of the raw wage differentials without any controls. The addition of employer characteristics (firm size and type of pay agreement) then leads to only a marginal further reduction in the standard deviation, to 11.7 per cent.

The second column of Table 4 shows that when we correct for variance in the wage differentials in the manner described earlier, the figures for the adjusted standard deviation are very slightly lower but the pattern of results as described is unaffected.

Table 4: *Measures of Dispersion of Inter-industry Wage Differentials, Ireland 1996*

	Standard Deviation %	
	Weighted	*Weighted and Adjusted*
Sector only	31.6	31.2
Sector and Employee Characteristics	12.7	12.3
Sector, Employee and Employer Characteristics	11.7	11.3

So in sum these results for Ireland show first that there are substantial differences in earnings across industrial sectors. Second, these differentials predominantly reflect differences in human capital and experience of workers, together with attributes of the jobs which might affect its attractiveness to employees. Third, there none the less remain significant differences across sectors in earnings having controlled for these measured individual and job characteristics. These differences might be attributable to unobserved individual and job characteristics which could not be included in our model, or to alternative explanations going beyond the standard competitive model and appealing to, for example, efficiency wage or rent-sharing theories. Including

a range of firm characteristics did not markedly alter the remaining inter-industry differentials, failing to offer support – though not ruling out – such alternative models. The possible role of factors such as corporatism, union density and sectoral profitability will be discussed in the next section, having put these results for Ireland in comparative context.

VII IRELAND'S INTER-INDUSTRY WAGE DIFFERENTIALS IN COMPARATIVE CONTEXT

Is the extent of wage dispersion across industries that we have found for Ireland, having controlled for a range of employee, job and firm characteristics, distinctive or is it similar to that found elsewhere? To answer this question we draw on available evidence from international comparisons of inter–industry wage differentials, which also leads on to a discussion of some possible reasons why differences in the scale and pattern of differentials might arise across countries.

Table 5 presents overall measures of inter-industry wage dispersion for a number of OECD countries. The majority of these are taken from Teulings and Hartog (1998), with additional figures for individual countries from Ferro-Luzzi (1994) and Rycx (2002). Like our own results, these are based on estimating wage equations including sectoral dummy variables and a range of employee, job and firm characteristics – so it is net rather than raw or gross inter-industry differentials that are the focus.[9]

This comparison shows that with a standard deviation of 0.11 Ireland ranks among the countries with the highest levels of net inter-industry wage dispersion. It is much higher than for example Sweden, Austria, Denmark and France, and just below the 0.14 reported for the UK and the USA, the highest levels of dispersion of the countries covered.

Teulings and Hartog (1998) argue on the basis of their results that there is a strong empirical relationship between the magnitude of inter-industry wage differentials and the degree of corporatism in the country's wage-bargaining structures. Various indicators of corporatism have been produced in the literature, notably by Calmfors and Driffill (1988) and Bruno and Sachs (1985) – with Teulings and Hartog relying primarily on the last of these. These indicators show Sweden for example ranking high on the corporatism index, with the UK ranked in the lower range and the US very low. Combining these indices with the dispersion measures reported in Table 5, Teulings and Hartog argue that there is indeed a close relationship, with much lower levels of

[9] The control variables used are very similar though not identical across the different studies.

dispersion in inter-industry differentials in the more corporatist countries, and that this is consistent with their theoretical arguments about the effects of wage bargaining structures which we outlined in Section II.

Table 5: *Dispersion of Inter-Industry Wage Differentials*

	Year	*N Sectors*	*N Employees*	*Dispersion of Inter-Industry Wage Differentials*
Sweden[1]	1981	31	3229	0.0436
Austria[1]	1983	24	11829	0.0502
Denmark[1]	1990	18	6527	0.0538
France[1]	1992	36	143097	0.0576
Finland[1]	1987	27	3852	0.0646
Netherlands[1]	1985	42	7514	0.0664
Belgium[2]	1995	43	–	0.074
Norway[1]	1989	29	3560	0.0852
Germany[1]	1988	34	2625	0.1100
Switzerland[3]	1991	40	–	0.113
Ireland[4]	1996	32	36515	0.113
Canada[1]	1986	7	28130	0.1365
UK[1]	1991	59	4219	0.1427
USA[1]	1988	44	19777	0.1411

1. Teulings and Hartog (1998); 2. Rycx (2002); 3.Ferro-Luzzi (1994); 4. Table 4 above.

Many of the studies measuring corporatism do not include Ireland, although where it has been included it has been assessed as having a low degree of corporatism (see for example, Hemerijk, 1992). This is partly a matter of timing, with the advent of social partnership and a return to centralised wage bargaining from 1987 representing a sea-change. Before that point it would certainly have been reasonable to see Ireland as ranking relatively low on a corporatism index, while more recently the issue is a more open one, depending on exactly how corporatism is conceptualised and measured. (The study by Hall and Franzese (1998), for example, still ranks Ireland as low on a corporatism index.)

What is clear from our results is that the size of inter-industry wage differentials place Ireland firmly with the low-corporatism countries. Even if Ireland's social partnership arrangements require a re-ranking in terms of corporatism since the late 1980s, it is of course questionable whether that could be expected to have a major impact on what were in all likelihood long-standing and deep-seated differentials across industries. So Ireland does not offer a ready test of the relationship between corporatism and wage differentials, but it does provide another observation. Tracking how these differentials evolve over time, in particular using the more recent Structure of

Earnings Survey carried out in 2002, would clearly enhance the value of that observation.

Apart from corporatism, sectoral characteristics such as union density and level of profitability in the sector have also been hypothesised to be important influences on the scope for and extent of rent-sharing between employers and employees. To test these we included measures of both sectoral union coverage and profitability derived from external sources in our model,[10] together with the full set of employee and firm characteristics available to us. When measured in levels terms neither proved statistically significant. When measured relative to mean overall union density (in ratio form), union density in the sector was significant but with a negative sign, whereas a positive impact on wages is hypothesised. Profitability per person engaged relative to the overall average was also significant, with higher sectoral profitability being associated with higher wages as hypothesised. Clearly further investigation of such potential channels of influence between the nature of the sector and earnings for similar individuals and jobs would be worthwhile.

VI FIRM OR INDUSTRY EFFECTS?

We saw in Section II that some studies have argued that inter-industry wage differentials of the type we have found for Ireland in fact mostly reflect differences across firms within sectors, rather than across sectors *per se*, in the wages paid to individuals with similar observed characteristics doing similar jobs. Goux and Maurin (1999) in particular found in their analysis of longitudinal data for France that firm characteristics impact on wages to a greater extent than industry, with limited inter-industry wage differentials then reflecting cyclical variations in industry productivity levels and imperfect labour mobility. Using longitudinal data and including firms as fixed effects, they find that the heterogeneity of firms in each industry clearly emerges as a powerful determinant of wage diversity.

Although the Structure of Earnings Survey does not provide panel data, it does allow for some initial investigation of firm effects because it has observations on a sample of employees for each participating firm, rather than just one employee per firm as would be customary in household or employee surveys. This means that we can estimate a simple model of firm effects by including a dummy variable for each firm in our estimated full model

[10] The measure of union density in each sector is derived from the responses of employees in the Living in Ireland Survey for the same year, and matched onto the SES data. Profitability is derived by taking gross value added and subtracting labour costs and excise duties, divided by numbers engaged, in the *Census of Industrial Production* and again matching to the SES.

described earlier, that is including the full range of employee, job and firm characteristics and sectoral dummy variables.

When a dummy variable for each firm are included in the model, almost all the industry dummy variables in fact become insignificant. This suggests on the face of it that much of what has been measured as net inter-industry wage differentials may in fact relate to firm effects. These results should not be over-interpreted, particularly because there are in some cases only a small number of firms in a given sector in the data (and indeed sometimes in the economy as a whole). In addition, it is not clear from a theoretical perspective how such firm effects might be interpreted – Goux and Maurin mention firm size as important, for example, but that was already included separately as a control variable in our model. More broadly, properly disentangling firm fixed effects from sectoral effects would require panel data on a large sample of firms and their employees, as was available to Goux and Maurin. However, these results do suggest that the potential role of firm-specific effects should be taken seriously.

VII CONCLUSIONS

This paper has investigated inter-industry wage differentials in Ireland, taking advantage of access to a cross-sectional dataset that is uniquely suitable for this purpose in an Irish context, the 1996 Structure of Earnings Survey. This allowed us to measure not simply overall differentials in the average wage across sectors, but also to investigate the extent to which these are associated with a range of employee, job, employer and sectoral characteristics.

Our results show first that there are substantial differences in earnings across industrial sectors in Ireland. For example, sectors such as insurance, pensions and financial intermediation had average hourly wages 55-65 per cent above the average for the sectors covered by the survey, whereas retailing and hotels and restaurants had wages 30-40 per cent lower than the average. The nature of the Structure of Earnings Survey means that these "raw" differentials can be measured more reliably than in, for example, household surveys.

It also means that, given access to the micro-data, one can investigate the extent to which these differentials are associated with employee and job characteristics which would be seen in a standard competitive framework as giving rise to such differences across industries. We found that much of the "raw" differentials did indeed reflect differences in human capital and experience of workers, together with attributes of the jobs which might affect

its attractiveness to employees. The standard deviation in earnings across sectors was reduced by 60 per cent when these were taken into account.

There none the less remain significant differences across sectors in earnings having controlled for these measured individual and job characteristics. Insurance, pensions and financial intermediation is still 25-35 per cent above the average, for example, and retailing and hotels and restaurants about 20 per cent below average. These differences might be attributable to unobserved individual and job characteristics which could not be included in our model, or to alternative explanations going beyond the standard competitive model and appealing to for example efficiency wage or rent-sharing theories.

To investigate the role of such alternative explanations, a range of firm and sectoral characteristics were included in our estimated model. The results showed that larger firm size and higher sectoral profits were positively associated with higher wages, having controlled for individual and job attributes – as some variants of efficiency wage and rent-seeking perspectives suggest. However, their inclusion did not markedly alter the scale of inter-industry differentials. Longitudinal data offers the best prospect of progress in further teasing out the factors underlying earnings differentials across industries, and thus assessing competing theoretical frameworks. In particular, this offers the best prospect of disentangling industry from firm-specific effects, which inclusion of firm-level dummy variables in our analysis certainly suggested may be important since most industry effects then became insignificant.

A comparative perspective is also likely to be helpful. We have found that the dispersion of wages across industries, controlling for individual, job and firm attributes, is quite high in Ireland compared to countries such as France and Sweden. Of the countries for which comparable figures were available, Ireland had one of the highest levels of dispersion, just below the UK and the USA. Some have pointed to a strong empirical relationship between the magnitude of inter-industry wage differentials and the degree of corporatism in the country's wage-bargaining structures: the fact that bargaining has been through national wage agreements since 1987 does not necessarily mean that Ireland represents a counter-example.

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Table A1: Summary Statistics of Variables in ESES –final sample used, 36515

	%
Education	
Primary or no degree 0-6 ed1	6.2
Lower secondary 9 yrs ed2	22.6
General upper secondary 12 yrs ed4	50.4
Higher non-university short type 14 yrs ed7	13.6
University and non-university higher ed8	6.1
post grad ed9	1.1
Prior experience	
Simple	8.6 years (mean)
Seniority in the company	
Simple	9.2 years (mean)
Sex	
Male	59.7
Female	40.3
Occupation	
Office clerks 0cc41	14.3
Corporate managers occ12	1.8
Managers of small enterprises occ13	4.2
Physical, mathematic and engineer science professionals occ21`	2.8
Life science and health professionals occ22	0.1
Other professionals occ24	2.7
Physical and engineer science associate professionals 0cc31	3.4
Life science and health associate professionals occ32	0.2
Other associate professionals (occ34)	4.0
Customer services clerk (occ42)	3.9
Personal and protective services workers (occ51)	4.9
Models, salesperson and demonstrators (occ52)	10.8
Extraction and building trading workers (occ71)	0.4
Metal, machinery and related trades workers (occ72)	5.1
Precision, handicraft, printing workers (occ73)	1.2
Other craft and related trades workers (occ74)	5.2
Stationary plant and related operators occ81)	4.7
Machine operators and assemblers (occ82)	19.1
Drivers and mobile plant operators (occ83)	2.6
sales and services elementary occupations (occ91)	4.3
labourers in mining, construction, manufacturing and transport (occ93)	4.3
Industry	
Retail Trade;repair of personal and household goods n52	12.2
Mining or Coal and Lignite n10	0.6
Mining of Metal Ores (n13)	0.2
Other Mining and Quarrying (n14)	0.6
Manufacture of Food Products and Beverages (n15)	11.9
Manufacture of Tobacco Products (n16)	0.3
Manufacture of Textiles (n17)	1.9

Manufacture of Wearing Apparel (n18)	2.4
Manufacture of Leather and Leather products (ndc)	0.2
Manufacture of Wood and Wood Products (ndd)	0.7
Manufacture of Pulp, Paper and Paper Products (n21)	1.0
Publishing, printing and reproduction of recorded media (n22)	3.5
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	0.1
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	5.7
Manufacture of Rubber and Plastic Products (ndh)	2.1
Manufacture of Other Non-Metallic Mineral Products (ndi)	2.1
Manufacture of Basic Metals (n27)	0.5
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	2.4
Machinery of Machinery and Equipment n.e.c. (ndk)	3.3
Manufacture of Office Machinery and Computers (n30)	4.1
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	3.0
Manufacture of radio, television and communication equipment and apparatus (n32)	1.9
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	3.3
Manufacture of motor vehicles, trailers and semi-trailers (n34)	1.2
Manufacture of Other Transport Equipment (n35)	1.5
Manufacture of furniture (n36)	2.1
Recycling (n37)	0.01
Electricity, Gas, Steam and hot water supply	3.9
Collection, purification and distribution of water	0.4
Sale, maintenance and repair of motor vehicles (n50)	1.1
Wholesale Trade & commission trade (n51)	5.6
Hotels and Restaurants (nh)	8.4
Financial Intermediation (n65)	8.7
Insurance and Pension Funding (n66)	3.1
Supervises the work of his or her co-workers	
No	90.3
Yes	9.7
Hours	
Ln of the hours paid, including overtime paid	3.6
Overtime paid	
No	66.9
Yes	33.1
Contract	
Unlimited -term employment contract	93.8
Limited-term employment contract	4.2
Other employment contract (includes apprentice)	2.0
Size of the establishment	
Mean number of workers	579
Mean Gross Hourly Wage	**7.26**
Level of wage bargaining	
National	60.1
Other	39.1

Annual Bonus	26.4
Overtime premium	18.0
Privately owned	96.3

Table A2: Estimation Results for Alternative Wage Equations, Structure of Earnings Survey, Ireland 1996

	Sector Only		Sector and Employee	
	Co-efficient	**Standard error**	**Co-efficient**	**Standard error**
Constant	1.5867	0.0090	0.9688	0.0236
Sector				
Retail Trade;repair of personal and household goods n52				
Mining or Coal and Lignite n10	0.6452	0.0154	0.2869	0.0335
Mining of Metal Ores (n13)	1.2918	0.0922	0.8840	0.0598
Other Mining and Quarrying (n14)	0.2772	0.0337	0.0549	0.0225
Manufacture of Food Products and Beverages (n15)	0.3173	0.0119	0.1338	0.0090
Manufacture of Tobacco Products (n16)	0.8775	0.0526	0.4387	0.0342
Manufacture of Textiles (n17)	0.1864	0.0186	0.0435	0.0131
Manufacture of Wearing Apparel (n18)	**-0.0259**	**0.0193**	0.0841	0.0136
Manufacture of Leather and Leather products (ndc)	**-0.0105**	**0.0417**	**0.0231**	**0.0272**
Manufacture of Wood and Wood Products (ndd)	0.1715	0.0250	0.0422	0.0169
Manufacture of Pulp, Paper and Paper Products (n21)	0.3918	0.0238	0.2486	0.0161
Publishing, printing and reproduction of recorded media (n22)	0.5718	0.0157	0.3207	0.0112
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	1.1989	0.0823	0.5984	0.0532
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	0.6806	0.0142	0.2656	0.0106
Manufacture of Rubber and Plastic Products (ndh)	0.2386	0.0175	0.0901	0.0125
Manufacture of Other Non-Metallic Mineral Products (ndi)	0.3840	0.0193	0.1659	0.0135
Manufacture of Basic Metals (n27)	0.5720	0.0381	0.2678	0.0251
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	0.2833	0.1623	0.0983	0.0117
Machinery of Machinery and Equipment n.e.c. (ndk)	0.3287	0.0162	0.1281	0.0117
Manufacture of Office Machinery and Computers (n30)	0.4373	0.0193	0.1867	0.0136
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	0.2714	0.0185	0.1492	0.0129
Manufacture of radio, television and communication equipment and apparatus (n32)	0.3498	0.0221	0.1965	0.0152
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	0.3780	0.0175	0.16672	0.0124
Manufacture of motor vehicles,	0.2432	0.0261	0.0643	0.0176

trailers and semi-trailers (n34)				
Manufacture of Other Transport Equipment (n35)	0.5071	0.0299	0.1700	0.0201
Manufacture of furniture (n36)	0.2170	0.0176	0.0510	0.0124
Recycling (n37)	0.4054	0.1618	0.2559	0.1039
Electricity, Gas, Steam and hot water supply(n40)	0.9956	0.0232	0.3343	0.0165
Collection, purification and distribution of water (n41)	0.4188	0.0322	0.0945	0.0216
Sale, maintenance and repair of motor vehicles (n50)	0.2239	0.0203	0.0718	0.0137
Wholesale Trade & commission trade (n51)	0.4561	0.0131	0.2029	0.0090
Hotels and Restaurants (nh)	-0.1321	0.0122	**0.0034**	**0.0093**
Financial Intermediation (n65)	0.7955	0.0147	0.4485	0.0109
Insurance and Pension Funding (n66)	0.8651	0.0201	0.4749	0.0136
Education				
Primary or no degree 0-6 ed1			0.1208	0.0078
Lower secondary 9 yrs ed2			0.2375	0.0079
General upper secondary 12 yrs ed4			0.3671	0.0098
Higher non-university short type 14 yrs ed7			0.5211	0.0122
University and non-university higher ed8			0.6693	0.0194
post grad ed9			0.0354	0.0011
Prior experience				
Simple			0.0355	0.0011
squared/10^2			-0.1364	0.0070
cubed/10^3			0.1640	0.0010
Seniority in the company				
Simple			0.0347	0.0006
Squared/10^2			-0.0536	0.0019
Dummy=1 if individual has no seniority			-0.0715	0.0066
Sex				
Male				
Female			-0.1599	0.0042
Occupation				
Office clerks 0cc41				
Corporate managers occ12			0.6779	0.0134
Managers of small enterprises occ13			0.3797	0.0108
Physical, mathematic and engineer science professionals occ21`			0.3261	0.0139
Life science and health professionals occ22			0.2514	0.0538
Other professionals occ24			0.3535	0.0131
Physical and engineer science associate professionals 0cc31			0.1086	0.0115

Life science and health associate professionals occ32		0.1704	0.0354
Other associate professionals (occ34)		0.2632	0.0107
Customer services clerk (occ42)		**0.0070**	**0.0099**
Personal and protective services workers (occ51)		-0.1217	0.0106
Models, salesperson and demonstrators (occ52)		-0.0877	0.0088
Extraction and building trading workers (occ71)		-0.1063	0.0236
Metal, machinery and related trades workers (occ72)		-0.0485	0.0102
Precision, handicraft, printing workers (occ73)		**-0.0114**	**0.0149**
Other craft and related trades workers (occ74)		-0.0916	0.0095
Stationary plant and related operators occ81)		-0.0882	0.0103
Machine operators and assemblers (occ82)		-0.0983	0.0075
Drivers and mobile plant operators (occ83)		-0.1482	0.0122
sales and services elementary occupations (occ91)		-0.2508	0.0101
labourers in mining, construction, manufacturing and transport (occ93)		-0.1916	0.0101
Supervises the work of his or her co-workers			
No			
Yes		0.1516	0.0060
Hours			
Ln of the hours paid, including overtime paid		0.0365	0.0056
Overtime paid			
No			
Yes		0.0258	0.0046
Contract			
Unlimited -term employment contract			
Limited-term employment contract		-0.0014	0.0087
Other employment contract		-0.2414	0.0109
Premium shift work? Yes		0.1617	0.0055
Bonus annual paid? Yes		0.3213	0.0042
R2	0.2284	0.6831	
N obs	36515	36515	
N industries	34	34	

Table A3: Inter-industry wage differentials in log point terms, Ireland 1996

	Only sector variables in wage equation	Sector, employee and job variables	All variables in wage equation
Sector			
Retail Trade;repair of personal and household goods n52	-0.3234	-0.1527	-0.1713
Mining or Coal and Lignite n10	0.3228	0.1341	0.0693
Mining of Metal Ores (n13)	0.9684	0.7312	0.6416
Other Mining and Quarrying (n14)	**-0.0462**	**-0.0979**	-0.1010
Manufacture of Food Products and Beverages (n15)	**-0.0060**	-0.0190	-0.0305
Manufacture of Tobacco Products (n16)	0.5542	0.2859	0.2777
Manufacture of Textiles (n17)	-0.1370	-0.1093	-0.1000
Manufacture of Wearing Apparel (n18)	**-0.3493**	-0.0687	-0.0796
Manufacture of Leather and Leather products (ndc)	**-0.3339**	**-0.1297**	-0.1164
Manufacture of Wood and Wood Products (ndd)	-0.1518	-0.1106	-0.0843
Manufacture of Pulp, Paper and Paper Products (n21)	0.0684	0.0958	0.1138
Publishing, printing and reproduction of recorded media (n22)	0.2484	0.1679	0.1780
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	0.8755	0.4457	0.4533
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	0.3572	0.1129	0.1109
Manufacture of Rubber and Plastic Products (ndh)	-0.0848	-0.0627	-0.0357
Manufacture of Other Non-Metallic Mineral Products (ndi)	0.0606	**0.0131**	0.0160
Manufacture of Basic Metals (n27)	0.2486	0.1150	0.1046
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	-0.0401	-0.0545	-0.0282
Machinery of Machinery and Equipment n.e.c. (ndk)	**0.0055**	-0.0247	-0.0178
Manufacture of Office Machinery and Computers (n30)	0.1139	0.0339	-0.0108
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	-0.0520	**-0.0036**	**-0.0115**
Manufacture of radio, television and communication equipment and apparatus (n32)	**0.0264**	0.0437	0.0286
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	0.0546	**0.0144**	**0.0022**

Manufacture of motor vehicles, trailers and semi-trailers (n34)	-0.0802	-0.0885	-0.0910
Manufacture of Other Transport Equipment (n35)	0.1837	**0.0173**	**-0.0154**
Manufacture of furniture (n36)	-0.1064	-0.1018	-0.0885
Recycling (n37)	**0.0820**	**0.1031**	**0.1474**
Electricity, Gas, Steam and hot water supply(n40)	-0.9145	0.1815	0.0848
Collection, purification and distribution of water (n41)	-1.4913	-0.0583	**-0.0095**
Sale, maintenance and repair of motor vehicles (n50)	-0.0995	-0.0810	-0.0528
Wholesale Trade & commission trade (n51)	0.1328	0.0501	0.0671
Hotels and Restaurants (nh)	-0.4555	**-0.1494**	-0.1509
Financial Intermediation (n65)	0.4722	0.2957	0.1934
Insurance and Pension Funding (n66)	0.5417	0.3221	0.2702

Table A1: Summary Statistics of Variables in ESES –final sample used, 36515

	%
Education	
Primary or no degree 0-6 ed1	6.2
Lower secondary 9 yrs ed2	22.6
General upper secondary 12 yrs ed4	50.4
Higher non-university short type 14 yrs ed7	13.6
University and non-university higher ed8	6.1
post grad ed9	1.1
Prior experience	
Simple	8.6 years (mean)
Seniority in the company	
Simple	9.2 years (mean)
Sex	
Male	59.7
Female	40.3
Occupation	
Office clerks 0cc41	14.3
Corporate managers occ12	1.8
Managers of small enterprises occ13	4.2
Physical, mathematic and engineer science professionals occ21`	2.8
Life science and health professionals occ22	0.1
Other professionals occ24	2.7
Physical and engineer science associate professionals 0cc31	3.4
Life science and health associate professionals occ32	0.2
Other associate professionals (occ34)	4.0
Customer services clerk (occ42)	3.9
Personal and protective services workers (occ51)	4.9
Models, salesperson and demonstrators (occ52)	10.8
Extraction and building trading workers (occ71)	0.4
Metal, machinery and related trades workers (occ72)	5.1
Precision, handicraft, printing workers (occ73)	1.2
Other craft and related trades workers (occ74)	5.2
Stationary plant and related operators occ81)	4.7
Machine operators and assemblers (occ82)	19.1
Drivers and mobile plant operators (occ83)	2.6
sales and services elementary occupations (occ91)	4.3
labourers in mining, construction, manufacturing and transport (occ93)	4.3
Industry	
Retail Trade;repair of personal and household goods n52	12.2
Mining or Coal and Lignite n10	0.6
Mining of Metal Ores (n13)	0.2
Other Mining and Quarrying (n14)	0.6
Manufacture of Food Products and Beverages (n15)	11.9
Manufacture of Tobacco Products (n16)	0.3
Manufacture of Textiles (n17)	1.9

Manufacture of Wearing Apparel (n18)	2.4
Manufacture of Leather and Leather products (ndc)	0.2
Manufacture of Wood and Wood Products (ndd)	0.7
Manufacture of Pulp, Paper and Paper Products (n21)	1.0
Publishing, printing and reproduction of recorded media (n22)	3.5
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	0.1
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	5.7
Manufacture of Rubber and Plastic Products (ndh)	2.1
Manufacture of Other Non-Metallic Mineral Products (ndi)	2.1
Manufacture of Basic Metals (n27)	0.5
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	2.4
Machinery of Machinery and Equipment n.e.c. (ndk)	3.3
Manufacture of Office Machinery and Computers (n30)	4.1
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	3.0
Manufacture of radio, television and communication equipment and apparatus (n32)	1.9
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	3.3
Manufacture of motor vehicles, trailers and semi-trailers (n34)	1.2
Manufacture of Other Transport Equipment (n35)	1.5
Manufacture of furniture (n36)	2.1
Recycling (n37)	0.01
Electricity, Gas, Steam and hot water supply	3.9
Collection, purification and distribution of water	0.4
Sale, maintenance and repair of motor vehicles (n50)	1.1
Wholesale Trade & commission trade (n51)	5.6
Hotels and Restaurants (nh)	8.4
Financial Intermediation (n65)	8.7
Insurance and Pension Funding (n66)	3.1
Supervises the work of his or her co-workers	
No	90.3
Yes	9.7
Hours	
Ln of the hours paid, including overtime paid	3.6
Overtime paid	
No	66.9
Yes	33.1
Contract	
Unlimited -term employment contract	93.8
Limited-term employment contract	4.2
Other employment contract (includes apprentice)	2.0
Size of the establishment	
Mean number of workers	579
Mean Gross Hourly Wage	**7.26**
Level of wage bargaining	
National	60.1
Other	39.1

Annual Bonus	26.4
Overtime premium	18.0
Privately owned	96.3

Table A2: Estimation Results for Alternative Wage Equations, Structure of Earnings Survey, Ireland 1996

	Sector Only		Sector and Employee	
	Co-efficient	**Standard error**	**Co-efficient**	**Standard error**
Constant	1.5867	0.0090	0.9688	0.0236
Sector				
Retail Trade;repair of personal and household goods n52				
Mining or Coal and Lignite n10	0.6452	0.0154	0.2869	0.0335
Mining of Metal Ores (n13)	1.2918	0.0922	0.8840	0.0598
Other Mining and Quarrying (n14)	0.2772	0.0337	0.0549	0.0225
Manufacture of Food Products and Beverages (n15)	0.3173	0.0119	0.1338	0.0090
Manufacture of Tobacco Products (n16)	0.8775	0.0526	0.4387	0.0342
Manufacture of Textiles (n17)	0.1864	0.0186	0.0435	0.0131
Manufacture of Wearing Apparel (n18)	**-0.0259**	**0.0193**	0.0841	0.0136
Manufacture of Leather and Leather products (ndc)	**-0.0105**	**0.0417**	**0.0231**	**0.0272**
Manufacture of Wood and Wood Products (ndd)	0.1715	0.0250	0.0422	0.0169
Manufacture of Pulp, Paper and Paper Products (n21)	0.3918	0.0238	0.2486	0.0161
Publishing, printing and reproduction of recorded media (n22)	0.5718	0.0157	0.3207	0.0112
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	1.1989	0.0823	0.5984	0.0532
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	0.6806	0.0142	0.2656	0.0106
Manufacture of Rubber and Plastic Products (ndh)	0.2386	0.0175	0.0901	0.0125
Manufacture of Other Non-Metallic Mineral Products (ndi)	0.3840	0.0193	0.1659	0.0135
Manufacture of Basic Metals (n27)	0.5720	0.0381	0.2678	0.0251
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	0.2833	0.1623	0.0983	0.0117
Machinery of Machinery and Equipment n.e.c. (ndk)	0.3287	0.0162	0.1281	0.0117
Manufacture of Office Machinery and Computers (n30)	0.4373	0.0193	0.1867	0.0136
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	0.2714	0.0185	0.1492	0.0129
Manufacture of radio, television and communication equipment and apparatus (n32)	0.3498	0.0221	0.1965	0.0152
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	0.3780	0.0175	0.16672	0.0124
Manufacture of motor vehicles,	0.2432	0.0261	0.0643	0.0176

trailers and semi-trailers (n34)				
Manufacture of Other Transport Equipment (n35)	0.5071	0.0299	0.1700	0.0201
Manufacture of furniture (n36)	0.2170	0.0176	0.0510	0.0124
Recycling (n37)	0.4054	0.1618	0.2559	0.1039
Electricity, Gas, Steam and hot water supply(n40)	0.9956	0.0232	0.3343	0.0165
Collection, purification and distribution of water (n41)	0.4188	0.0322	0.0945	0.0216
Sale, maintenance and repair of motor vehicles (n50)	0.2239	0.0203	0.0718	0.0137
Wholesale Trade & commission trade (n51)	0.4561	0.0131	0.2029	0.0090
Hotels and Restaurants (nh)	-0.1321	0.0122	**0.0034**	**0.0093**
Financial Intermediation (n65)	0.7955	0.0147	0.4485	0.0109
Insurance and Pension Funding (n66)	0.8651	0.0201	0.4749	0.0136
Education				
Primary or no degree 0-6 ed1			0.1208	0.0078
Lower secondary 9 yrs ed2			0.2375	0.0079
General upper secondary 12 yrs ed4			0.3671	0.0098
Higher non-university short type 14 yrs ed7			0.5211	0.0122
University and non-university higher ed8			0.6693	0.0194
post grad ed9			0.0354	0.0011
Prior experience				
Simple			0.0355	0.0011
squared/10^2			-0.1364	0.0070
cubed/10^3			0.1640	0.0010
Seniority in the company				
Simple			0.0347	0.0006
Squared/10^2			-0.0536	0.0019
Dummy=1 if individual has no seniority			-0.0715	0.0066
Sex				
Male				
Female			-0.1599	0.0042
Occupation				
Office clerks 0cc41				
Corporate managers occ12			0.6779	0.0134
Managers of small enterprises occ13			0.3797	0.0108
Physical, mathematic and engineer science professionals occ21`			0.3261	0.0139
Life science and health professionals occ22			0.2514	0.0538
Other professionals occ24			0.3535	0.0131
Physical and engineer science associate professionals 0cc31			0.1086	0.0115

Life science and health associate professionals occ32		0.1704	0.0354
Other associate professionals (occ34)		0.2632	0.0107
Customer services clerk (occ42)		**0.0070**	**0.0099**
Personal and protective services workers (occ51)		-0.1217	0.0106
Models, salesperson and demonstrators (occ52)		-0.0877	0.0088
Extraction and building trading workers (occ71)		-0.1063	0.0236
Metal, machinery and related trades workers (occ72)		-0.0485	0.0102
Precision, handicraft, printing workers (occ73)		**-0.0114**	**0.0149**
Other craft and related trades workers (occ74)		-0.0916	0.0095
Stationary plant and related operators occ81)		-0.0882	0.0103
Machine operators and assemblers (occ82)		-0.0983	0.0075
Drivers and mobile plant operators (occ83)		-0.1482	0.0122
sales and services elementary occupations (occ91)		-0.2508	0.0101
labourers in mining, construction, manufacturing and transport (occ93)		-0.1916	0.0101
Supervises the work of his or her co-workers			
No			
Yes		0.1516	0.0060
Hours			
Ln of the hours paid, including overtime paid		0.0365	0.0056
Overtime paid			
No			
Yes		0.0258	0.0046
Contract			
Unlimited -term employment contract			
Limited-term employment contract		-0.0014	0.0087
Other employment contract		-0.2414	0.0109
Premium shift work? Yes		0.1617	0.0055
Bonus annual paid? Yes		0.3213	0.0042
R2	0.2284	0.6831	
N obs	36515	36515	
N industries	34	34	

Table A3: Inter-industry wage differentials in log point terms, Ireland 1996

	Only sector variables in wage equation	Sector, employee and job variables	All variables in wage equation
Sector			
Retail Trade;repair of personal and household goods n52	-0.3234	-0.1527	-0.1713
Mining or Coal and Lignite n10	0.3228	0.1341	0.0693
Mining of Metal Ores (n13)	0.9684	0.7312	0.6416
Other Mining and Quarrying (n14)	**-0.0462**	**-0.0979**	-0.1010
Manufacture of Food Products and Beverages (n15)	**-0.0060**	-0.0190	-0.0305
Manufacture of Tobacco Products (n16)	0.5542	0.2859	0.2777
Manufacture of Textiles (n17)	-0.1370	-0.1093	-0.1000
Manufacture of Wearing Apparel (n18)	**-0.3493**	-0.0687	-0.0796
Manufacture of Leather and Leather products (ndc)	**-0.3339**	**-0.1297**	-0.1164
Manufacture of Wood and Wood Products (ndd)	-0.1518	-0.1106	-0.0843
Manufacture of Pulp, Paper and Paper Products (n21)	0.0684	0.0958	0.1138
Publishing, printing and reproduction of recorded media (n22)	0.2484	0.1679	0.1780
Manufacture of Coke, refined petroleum products and nuclear fuel (ndf)	0.8755	0.4457	0.4533
Manufacture of Chemicals, chemical products and man-made fibres (ndg)	0.3572	0.1129	0.1109
Manufacture of Rubber and Plastic Products (ndh)	-0.0848	-0.0627	-0.0357
Manufacture of Other Non-Metallic Mineral Products (ndi)	0.0606	**0.0131**	0.0160
Manufacture of Basic Metals (n27)	0.2486	0.1150	0.1046
Manufacture of Fabricated Metal Products, except Machinery and Equipment (n28)	-0.0401	-0.0545	-0.0282
Machinery of Machinery and Equipment n.e.c. (ndk)	**0.0055**	-0.0247	-0.0178
Manufacture of Office Machinery and Computers (n30)	0.1139	0.0339	-0.0108
Manufacture of Electrical Machinery and Apparatus n.e.c. (n31)	-0.0520	**-0.0036**	**-0.0115**
Manufacture of radio, television and communication equipment and apparatus (n32)	**0.0264**	0.0437	0.0286
Manufacture of Medical, Precision and Optical Instruments, watches and clocks (n33)	0.0546	**0.0144**	**0.0022**

Manufacture of motor vehicles, trailers and semi-trailers (n34)	-0.0802	-0.0885	-0.0910
Manufacture of Other Transport Equipment (n35)	0.1837	**0.0173**	**-0.0154**
Manufacture of furniture (n36)	-0.1064	-0.1018	-0.0885
Recycling (n37)	**0.0820**	**0.1031**	**0.1474**
Electricity, Gas, Steam and hot water supply(n40)	-0.9145	0.1815	0.0848
Collection, purification and distribution of water (n41)	-1.4913	-0.0583	**-0.0095**
Sale, maintenance and repair of motor vehicles (n50)	-0.0995	-0.0810	-0.0528
Wholesale Trade & commission trade (n51)	0.1328	0.0501	0.0671
Hotels and Restaurants (nh)	-0.4555	**-0.1494**	-0.1509
Financial Intermediation (n65)	0.4722	0.2957	0.1934
Insurance and Pension Funding (n66)	0.5417	0.3221	0.2702