FOREIGN DIRECT INVESTMENT AND WAGE SPILLOVERS IN IRISH MANUFACTURING INDUSTRY

Ali Uğur and Frances Ruane*

Department of Economics, Trinity College Dublin

September 2003

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1. Introduction

During the past decade, the Irish economy has been characterised by high rates of economic growth and low unemployment rates relative to other European Union (EU) and OECD countries. The increase in the real Gross Domestic Product (GDP) reached double-digits in the period 1995-2000 compared to overall growth rates of between 2.5 and 4 per cent in the EU and OECD countries. (See Table 1.) Once associated with the high unemployment rates, especially in the 1980s and early 1990s, this growth in the output levels of the Irish economy has brought down unemployment levels from 15 per cent in 1992 to 3.9 per cent in 2001.

One of the main contributors to this overall high rates of growth in the Irish economy has been the Irish manufacturing sector, which experienced exceptionally high growth

* To facilitate the research necessary for this paper the Central Statistics Office gave the authors controlled access to anonymised micro data. This access was at all times within the CSO's premises and under stringent and rigorous conditions. Access such as this is provided for in the Statistics Act, 1993 solely for statistical research purposes. We acknowledge the assistance in handling queries related to the data from Elaine Lucey, Tom McMahon and Patsy King.

rates in terms of both employment and output during the period. Total net output[1] has increased by over 200 per cent during the 1991-1999 period accompanied by a 26 per cent rise in the employment levels. Foreign Direct Investment (FDI) has played a major role in achieving these growth rates in terms of both output and employment. Ruane and Uğur (2003) show that foreign firms in Irish manufacturing industry accounted for 92 per cent of the growth in net output and 68 per cent of the growth in employment in Irish manufacturing industry over the period 1991-1999.

The host country effects of FDI through multinational enterprises (MNEs) are well documented in the literature (see Lipsey (2003) for a recent review). These studies implicitly distinguish between its *direct* and *indirect* effects. *Direct effects* are reflected in capital formation, employment and trade associated with the FDI project. Although the direct effects of foreign investment may be more important for certain countries, it is increasingly accepted that FDI is likely to have important indirect *effects* on host economies. In particular, it has been suggested in the literature that the investments of MNCs generate important externalities that enhance the productivity of indigenous firms in the economy. These externalities, which are typically referred to as "positive productivity spillovers", are seen as helping to improve the comparative advantage of the economy over time. A number of surveys of the spillover effects from FDI already exist. (See Görg and Strobl (2001), Greenaway and Görg (2002), Lipsey (2002) for a review)

During the past decade several studies examined the effects of FDI in Irish manufacturing industry. Early studies focused on the role of FDI in facilitating the

[1] Measured in 1985 prices.

considerable restructuring in Irish manufacturing industry[2]. Table 2 shows the composition of the Irish Manufacturing sector at the two-digit level in 1999, in terms of both net output and employment. Because the Irish corporate tax system can be seen as creating incentives for transfer pricing in certain sectors, employment shares are generally seen a preferred indicator of sectoral composition.[3] The employment shares indicate that the high-tech sectors (Pharmaceuticals, Chemicals, Office Machinery and Computers Radio, Television & Communications and Medical Precision & Optical) now account for over 50 per cent of manufacturing employment, and that foreign firms in these sectors account for over 80 per cent of employment.

Recently there has been a shift in policy internationally towards greater focus on the indirect impact of FDI on the manufacturing sector; see UNCTAD 2000. This shift has been evident also in Ireland, especially as unemployment rates have declined and emphasis has shifted to productivity differences between MNEs and domestic enterprises and how these have altered over the decade of rapid growth.[4] A related question is whether the presence of MNEs might be expected to raise the prodicity levels of domestic enterprises. Given the very high presence of MNE employment in many key sectors in Ireland, it might be expected that such spillover effects would be observed. Kearns (2000) examined productivity spillovers from FDI in Ireland and found that indigenous plants have higher productivity levels in those sectors where there is a higher share of foreign employment, suggesting positive productivity spillovers from MNEs to local enterprises (LEs) where there was evidence of R&D activity. Barry et al. (2001) examines the effects of foreign direct investment on wages and productivity in domestic firms in Ireland using plant level data for 1990 to

[2] For a detailed discussion see Ruane and Görg (1996,1997),, Barry (1999),
[3] Note particularly the differences in shares in net output and employment in the Chemical sector.
[4] See Ruane and Ugur (2003) and O'Muircheartaigh (2000)

1998. Their analysis focuses on the effects of foreign presence on domestic exporter and domestic non-exporter firms and finds that foreign presence has a negative effect on wages and productivity in domestic exporting firms but no effect on wages in domestic non-exporters in the same sector. In another study, Ruane and Ugur (2002) investigated productivity spillovers in Irish manufacturing industry using plant level data for the period 1991-1998 and found some evidence of positive productivity spillovers, but this depended crucially on how the presence of foreign enterprises was measured.[5]

It has been argued in the literature that another area where the indirect effects of MNEs might be evident is in terms of manufacturing wages.[6] As with productivity, there are two strands to the discussion. Firstly, wage levels paid by MNEs are higher than those paid by domestic enterprises operating in the same sector and secondly, that there might also be wage spillovers from MNEs to domestic enterprises, that is to say, that wage levels in domestic enterprises would be higher in sectors where there is a higher presence of MNEs.

The objective of this paper is to examine empirically whether, correcting for enterprise level differences, there is any evidence that MNEs pay higher wages than their domestic counterparts, and secondly whether there are wage spillovers effects in Irish manufacturing industry, i.e., whether wages are higher in sectors with a greater MNE presence. The remainder of the paper is organised as follows. Section 2

[5] The data set in this study covers all firms with more than 3 employees and is more representative than the other studies that used firm level data sets in Irish manufacturing industry. When foreign presence in a sector was measured by the share of employment in foreign firms in total employment in that sector, no evidence was found; when it was measured by the change in scale of foreign employment, evidence of spillover was found at the 2-digit and 4-digit levels.
[6] See Greenaway and Gorg (2002) and Lipsey (2002).

discusses some of the growing literature on wage differences between MNEs and domestic enterprises and regarding the possibility of wage spillovers from MNEs. In Section 3 we investigate the wage differential between foreign and domestic enterprises in Irish manufacturing industry. We describe the data set and the model that we use to estimate wage spillover effects in Section 4. We present our empirical results in Section 5. Section 6 concludes.

2. Wage Differences and Wage Spillovers

The empirical evidence shows that foreign firms pay higher wages than their domestic counterparts both in developing and developed countries.[7] Why would they do this if they are operating in the same labour market pool? The first explanation put forward in the literature as to why foreign firms may pay higher average wages than domestic counterparts is they have a relatively more skilled workforce and this difference in composition is reflected in average wages. A second reason is that because of their productivity advantage, they can afford to do so. (The argument is that they are more technologically advanced as reflected in the presence of greater spending on R&D and greater capital intensity and consequently their labour productivity is higher). A third reason is that, since they are less familiar with local labour market conditions, they offer higher wages in order to attract better quality labour in the first instance. They may continue to do so, because they find that the higher wages reduce worker turnover. A further reason why they may offer higher wages is that they need to do so to attract workers, who may expect it, because they feel that employment in a foreign firm seems less certain. A final reason is that the skills needed by MNEs may differ from those of domestic enterprises and, for supply reasons, they may have to pay

[7] See Lipsey (2002) for a review.

more for these skills – in effect they are not operating in the same labour market pools. Given that wage differentials exist, the issue is whether these differences can be explained by these different factors.

Turning to wage spillovers, there have been a number of conduits for such spillovers identified in the literature. Firstly, if there are positive productivity spillovers to domestic enterprises from the activities of MNEs, then this will lead to higher productivity of domestic enterprises, allowing them to pay higher wages. This will particularly be the case where the productivity effect is realised through skilled labour moving from the MNE to the domestic enterprise. Secondly, if, as argued above, MNEs have firm specific advantages over their domestic counterparts, such as superior technology usage, which allow them to pay higher wages, then domestic enterprises will have to pay higher wages in order to attract/retain workers. This is more likely to be the case where labour is scarce, i.e., there is no unemployment pool which can be drawn on.

The general approach in the empirical literature to examining foreign-domestic wage differentials and wage spillovers from foreign to domestic enterprises has been to examine while controlling for industry, enterprise and worker characteristics (a) whether foreign ownership can explain average wage differentials and (b) whether the differences in average wages of domestic enterprises can be explained by foreign presence.

In one of the early studies in the literature Aitken et al. (1996) measure the impact of FDI on wages in the US, Mexico and Venezuela. They examine the wage differentials between foreign and domestic firms and find that, even after controlling for size, geographic location and capital intensity, wage differentials persist. They then examine the relationship between higher wages and FDI and find that in all three countries wages are higher where foreign presence is greater. However they find no evidence of wage spillovers from foreign to domestic firms for Mexico and Venezuela since they show that FDI is associated with higher wages only for foreign firms in the two countries. In the US they find stronger evidence in favour of wage spillovers and they attribute this result to smaller wage differentials between foreign and domestic firms.

Lipsey and Sjöholm (2001) examine wage spillovers in Indonesian manufacturing industry using a cross section of plants from 1996. First they investigate whether foreign firms pay higher wages than domestic ones and conclude that, even controlling for different characteristics of the workforce, industries and enterprises, foreign-owned enterprises pay higher wages than domestic enterprises. They also find that higher foreign presence in an industry is associated with higher level of wages in domestically-owned enterprises for workers of a given educational level, controlling for industry and firm characteristics.

In their subsequent analysis of the effects of FDI on wages in Indonesian manufacturing industry, Lipsey and Sjöholm (2003) use plant level data for the period 1975-1999. Once again they find that even when industry, plant and worker characteristics are taken into account foreign enterprises in Indonesian manufacturing industry pay higher wages than their domestic counterparts. They also investigate the domestic enterprises which were taken over by foreign enterprises during the same period to see whether this had any impact on wages. They find that after foreign takeovers both white-collar and blue-collar wages increase significantly.

Girma et al. (2001) test for wage spillovers from foreign to domestic enterprises using data on UK manufacturing industry for 1991-1996. They find that on average there is no evidence of wage spillovers in a sector on the wage level in domestic enterprises but there is some weak evidence of a negative effect of foreign presence on domestic enterprises' wage growth.

With regard to wage differentials and wage spillover in the Irish economy, thus far there have only been two studies. The first, by Figini and Görg (1999) looks at sectoral level data (which disaggregates foreign and domestic enterprises) to examine the impact of FDI on wage inequality in Irish manufacturing industry using data for the period 1979-1995 and find that with the increasing presence of foreign firms, wage inequality first increases, reaches a maximum and decreases eventually. Barry et al. (2001) investigates the effect of foreign presence on wages in domestic firms using firm level panel data. Their study focuses on domestic exporter and non-exporter firms and analysis show that foreign presence has a negative effect on wages in domestic exporting firms but no effect on wages in domestic non-exporters in the same sector.[8]

3. Wage Differentials between Domestic and Foreign Plants in Ireland

Many studies in the literature have found that foreign firms pay higher wages than their domestic counterparts both in developing and developed countries. In this

[8] This study uses a dataset covering firms with more than 20 employees and Barry et. al. suggest that their results might be affected by the exclusion of many small Irish firms from the analysis.

section we investigate whether this is valid in Irish manufacturing industry for the period 1991-1999.

Table 3 presents average wages in Irish manufacturing industry for domestic and foreign enterprises in 1991, 1995 and 1999. In 1991 overall average wages were 48 per cent higher in foreign enterprises than their domestic counterparts. This wage differential increased to 50 per cent in 1995 and then decreased to 41 per cent in 1999. It is well known that the demand for skilled and unskilled workers could be quite different between foreign and domestic firms in an industry. In order to investigate the changes in average wages for skilled and unskilled workers in Irish manufacturing industry we also present results separately for skilled and unskilled worker groups. We define skilled workers as clerical and technical and administrative workers and unskilled workers as industrial workers, apprentices and outside piece workers. The wage difference between foreign and domestic firms was greater in the case of skilled compared with unskilled workers – 49 compared with 36 per cent in 1991. We see that in 1995 this wage differential decreased to 39 per cent for skilled workers whereas it increased to 43 per cent for unskilled workers and in 1999 wage differentials between foreign and domestic firms decreased to 29 and 35 per cent for skilled and unskilled workers, respectively.

Overall average wages increased by 48 per cent during this period of rapid growth, from £10k in 1991 to over £14k in 1999.[9] As we can see from Table 4, growth in average wages in Irish manufacturing industry was higher in the second half of the 1990s than it was in the 1991-1995 period due to the higher growth in wages in

[9] Real after tax wages increased even more rapidly in the later period as income tax rates were reduced from 65 to 40 percent and tax allowances were increase significantly.

domestic firms than in their foreign counterparts. An analysis of wage changes in skilled and unskilled workers during the two periods show that in the 1991-1995 period, growth in average wages in skilled workers was higher in domestic firms than in foreign firms, whereas the change in unskilled workers' average wages was higher in foreign firms than their domestic counterparts. Overall average wage increases were greater for skilled workers (60 per cent) compared with unskilled workers (40 per cent), reflecting the structural changes in the economy that increased the demand for skilled compared with unskilled workers.

The overall average wage gap between domestic and foreign enterprises decreased by seven percentage points between 1991 and 1999. This was driven almost entirely by the reduction in the gap between averages wages of skilled labour in foreign-owned and domestic enterprises from 49 percent to 29 percent, while there was a negligible drop in the gap between average wages of unskilled labour. Consequently, over the period the greater wage gap between average wages for skilled compared with unskilled labour in 1991 was replaced by a greater gap between averages wages of unskilled compared with skilled workers in 1999. This dramatic fall in the wages gap for skilled workers is consistent with the emergence of skill shortages during the latter part of the 1990s, which led to a radical change in employment policy in Ireland.[10]

In Table 5 we investigate the wage gap between foreign and domestic firms in more detail at 2-digit industry level. We find that the overall wage gap differed widely by sector, ranging between 6 per cent in Paper and Paper Products industry to 68 per cent in Food, Drink and Tobacco sector in 1991. By 1999, while the overall wage gap had

[10] Policies were introduced to increase the output of skilled labour from training college and universities and to encourage immigration of workers with skills which were in short supply.

declined (48 to 40 percent), the range had actually widened: from -2 percent in Paper and Paper Products to 77 percent in Wood and Wood Products. For skilled workers the wage gaps were less than for all workers across sectors in 1991 (between 21 per cent and 63 per cent) and fell to between –5 percent and 51 per cent in 1999. In the case of unskilled workers, not only did the wage gap not change between 1991 and 1999, neither did the range, which range from 1 – 69 percent in 1991 to –4 to 65 percent in 1999.

4. Empirical Model and Data:

The analysis in the previous section showed that foreign plants in Irish manufacturing industry pay higher wages than their domestic counterparts. This result is in accordance with other studies on foreign ownership and wages. However our analysis in section 3 did not take industry or firm characteristics into account when comparing average wage levels between foreign and domestic firms.

In this section we first start with an investigation of the wage differentials between foreign and domestic firms in an econometrics framework and following Girma et.al. (2001) we use the following model:

$$W_{it} = For_{it} + X_{it} + S_{jt} + D_t + f_i + \varepsilon_{it} \qquad (1)$$

where i, j and t represent plants, sectors and years respectively, W is a plant's average wage, For is a dummy variable to distinguish between foreign and domestic firms, X include firm characteristics that may influence the level of wages, S is industry specific effects, D represents time dummies that account for aggregate shocks, f is a time invariant firm-specific and will be estimated both as random and as a fixed effect and ε denotes a random noise term. It is argued in the literature that foreign firms are more capital intensive and larger than domestic firms which might account for some of the wage differentials between these two groups. In order to take the effect of the current physical capital intensity of the plant into account we use a proxy for capital, namely, fuel and power consumption by the plant, since the capital stocks of plants are not recorded for the Census of Industrial Production (CIP). Thus our capital intensity variable is measured by the ratio of fuel and power consumption to total employment. It is well documented that larger firms pay higher wages and foreign firms tend to be larger than their domestic counterparts so size of the plant could be another important factor in explaining wage differentials between foreign and domestic firms. In order to control for this factor in our model, following Girma et. al. (2001), we use scale as a proxy for size of the firm and measure it as the ratio of net output in each plant to average industry net output. The industry averages that we use refer to the foreign and domestic firms' mean values of net output in the industry. So, we calculate average net output in a sector for foreign and domestic firms separately.[11] We also include sector and time specific dummies to account for sector and time specific wage effects.

The data used in this paper are from the Irish Census of Industrial Production (CIP). This census is carried out annually by the Central Statistics Office in Ireland and covers all industrial local units with 3 or more persons engaged. As such it is the only fully representative survey of manufacturing plants in Ireland.

[11] Net output figures for foreign firms in Irish manufacturing industry are influenced by the transfer pricing activities of these firms. In order to remove this effect we use this method.

The Census comprises two separate annual inquiries, namely the Census of Industrial Enterprises and the Census of Local Units. In this paper we use data from the Census of Local Units and all calculations carried out at the micro level refer to the plant level data. The data available are those standard for such Censuses – output (gross and net), sales, employment, wages, capital additions, sectoral (NACE 4-digit) and regional (county) classification as well as nationality of ownership. In the CIP the classification by nationality of ownership is determined by the nationality of the owners of 50 per cent or more of the share capital. There are no details recorded on the extent of foreign ownership within a given company and thus it is not possible to determine the impact of different shares of foreign ownership.

5 Determinants of Wage Differentials between Foreign and Domestic Firms and Wage Spillovers:

5.1 Wage Differentials between Foreign and Domestic Firms:

Table 6 present results of the determinants of wage levels for all workers in Irish manufacturing industry. In the first 2 columns we present results using the ownership variable employing fixed (FE) and random (RE) effects models and we see that average wages are 20 per cent and 15 per cent higher in foreign firms than in their domestic counterparts for fixed and random effects estimates, respectively. We should note that RE model controls for both sector and time effects whereas FE model can only control for time effect and this could result in the higher wage differential effect in this estimate. In the next two columns we introduce other the capital intensity and scale effects into the estimation and we see that controlling for these firm characteristics the wage differential between foreign and domestic firms decreases to 14 and 11 per cent in FE and RE estimates, respectively. Overall results from Table 6 show that even after controlling for sector and some firm characteristics, average wages are still higher in foreign plants than in domestic ones in Irish manufacturing industry over the period 1991-1999.

Next we carry out the same analysis for skilled and unskilled workers to see whether the results hold for these two categories of workers. Results from Table 7 show that on average foreign firms pay around over 12 per cent for skilled workers than their domestic counterparts but once sector and firm characteristics are taken into account this wage difference reduce to around 8 per cent. In the unskilled category we see that foreign firms on average pay 22 per cent more than their domestic counterpart, but this differential reduces to 14 per cent once sector and time effects are taken into account and further decreases to 10 per cent with introduction of firm characteristics as control variables. Overall we see that foreign firms pay higher than domestic counterparts for both skilled and unskilled workers although the gap is narrower in the skilled workers category. This result is in line with our analysis above where we showed that the growth in average wages of skilled workers in domestic firms has been higher than the growth in foreign firms over the period 1991-1999. However Girma et. al. (2001) argue that one of the reasons behind this wage differential between foreign and domestic firms could be measurement errors. They argue that if capital utilisation and hours worked vary systematically between foreign and domestic firms this may influence the results. Although we try to control for capital utilisation our variable is only a proxy and this could affect the results and we can not control for hours worked from our data set.

5.2 Wage Spillovers from Foreign Firms:

We outlined a number of conduits for wage spillovers identified in the literature in section 2. In order to test whether there are wage spillovers from foreign to domestic firms in Irish manufacturing industry we use equation (1) but rather than using the ownership variable we use foreign presence variable (FP). So our equation becomes as follows:

$$W_{it} = FP_{it} + X_{it} + S_{jt} + D_t + f_i + \varepsilon_{it} \qquad (2)$$

In line with existing studies, the foreign presence variable is measured by the share of employment accounted by all foreign-owned plants in the sector, which the plant operates. Our definition of W and X variables are the same as in equation 1 and we also include sector and time dummies to control for sector and time specific wage effects. We estimate this equation only for domestic firms in Irish manufacturing industry.

Table 8 presents results for the effect of foreign presence on the average wages in domestic firms controlling for sector and firm characteristics as well as common shocks proxied by year dummies. The first column shows that when foreign presence is included on its own to explain the average wages in domestic firms it has a positive and significant effect, however as we can see in the second column when sector specific factors are taken into account the effect of foreign presence reduces and is only statistically significant at 10 per cent significance level. Furthermore as we can see in the last two columns, once firm characteristics such as capital intensity and scale are taken into account the effect of foreign presence on average wages in domestic firms is not statistically significant. These results show that there are no significant wage spillovers from foreign to domestic firms in Irish manufacturing industry during the period 1991-1999.

Table 9 extends the analysis for skilled and unskilled workers in order to examine whether the effect of foreign presence on the average wages of skilled and unskilled workers in domestic firms are different. Results show that for both skilled and unskilled worker groups although foreign presence has a positive effect on average wages, these results are not statistically significant hence there is no evidence of wage spillovers from foreign to domestic firms in both skilled and unskilled worker groups in Irish manufacturing industry over the period 1991-1999.

6. Summary and Conclusions

Uniquely within Europe, Ireland has promoted FDI in its manufacturing sector for over 40 years. As noted in the introduction, this has resulted in MNCs in the sector playing a major role in terms of net output, employment and exports.

The literature on the host country effects of FDI shows that foreign firms on average pay higher wages than their domestic counterparts and suggest that there may be positive wage spillovers from foreign to domestic firms, i.e. higher foreign presence in a sector leading to higher average wages in domestic firms.

Using a panel data for Irish manufacturing industry we first investigated the wage differentials between foreign and domestic firms and found that foreign firms pay higher wages than their domestic counterparts although the wage differential reduces once sector and firm characteristics are taken into account. Our analysis of skilled and unskilled workers showed that the wage gap between foreign and domestic firms have decreased for both categories however the reduction in the skilled workers category has been higher.

In terms of wage spillovers we found that there are positive and significant wage spillovers from foreign to domestic firms in Irish manufacturing industry but once the sector and firm characteristics are taken into account the effect of foreign presence on the average wages of domestic firms is not significant.

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Tables:

Table 1: Annual Growth Rates in Read GDP, 1991-2001								
	1991	1993	1995	1997	1998	1999	2000	2001
Ireland	1.9	2.7	10.0	10.8	8.6	10.8	11.5	6.6
Germany	5.0	-1.1	1.7	1.4	2.0	1.8	3.0	0.6
U.K.	-1.4	2.5	2.9	3.4	3.0	2.1	3.0	2.2
Japan	3.1	0.4	1.6	1.8	-1.1	0.7	2.4	-0.4
Australia	-0.7	3.8	3.9	3.5	5.4	4.5	3.4	2.4
U.S.	-0.5	2.7	2.7	4.4	4.3	4.1	4.1	1.2
EU	1.8	-0.3	2.5	2.6	2.9	2.6	3.4	1.7
OECD Area	1.2	1.4	2.5	3.5	2.7	3.1	3.9	1.0

Source: OECD Economic Outlook 71, June (2002)

Table 2. Significance of Foreign Firms in the Irish Manufacturing Sector, 1999				
	Total Net Output		Total Employment	
	Sectors as % of Total	Foreign as % of Sector	Sectors as % of Total	Foreign as % of Sector
Food, Drink and Tobacco	10.9	66	10.3	26
Textiles and Clothing	0.6	50	3.6	35
Wood and Wood Products	0.2	34	0.9	19
Paper and Paper Products	0.3	32	0.7	19
Publishing and Printing	11.2	86	5.5	34
Pharmaceuticals	7.5	92	5.5	82
Chemicals	39.5	98	9.6	80
Rubber and Plastics	0.5	46	3.5	40
Other non-metallic Minerals	0.3	17	1.3	15
Basic and Fabricated Metals	0.7	37	3.1	24
Machinery and Equipment	1.2	60	5.4	46
Office Machinery and Computers	11.7	98	14.4	88
Electrical Machinery	1.9	80	8.3	70
Radio, Television and Communications	7.9	97	9.7	89
Medical, Precision and Optical	4.3	91	11.6	85
Motor Vehicles and Transport	0.7	71	4.2	54
Other Manufacturing	0.7	40	2.4	27
Total Manufacturing	100	85	100	49

Source: Own calculations from Census of Industrial Production, 1991-1999

Table 3: Average Wages In Irish Manufacturing Industry, 1991-1999									
	1991			1995			1999		
	For	Dom	All	For	Dom	All	For	Dom	All
All	13.6	9.2	10	16.3	10.9	11.7	19.6	13.9	14.7
Skilled Workers	18.2	12.2	13.2	21.4	15.3	16.3	26.2	20.3	21.2
Unskilled Workers	12	8.8	9.4	14.5	10.1	10.8	16.9	12.5	13.1

Source: Own calculations from Census of Industrial Production, 1991-1999

Table 4: Growth in Average Wages in Irish Manufacturing Industry, 1991-1999									
	1991-1999 %Δ			1991-1995 %Δ			1995-1999%Δ		
	For	Dom	All	For	Dom	All	For	Dom	All
All	44	51	48	20	18	17	20	28	25
Skilled Workers	44	66	60	17	26	24	23	33	30
Unskilled Workers	41	41	40	21	15	15	17	24	21

Source: Own calculations from Census of Industrial Production, 1991-1999

Table 5: Ratio of Average Gross Earnings in Foreign Plants to Domestic Plants at 2-digit level of NACE Rev 1. 1991-1999						
	all		skilled		unskilled	
	1991	1999	1991	1999	1991	1999
Food, Drink and Tobacco	1.68	1.62	1.56	1.32	1.55	1.65
Textiles and Clothing	1.30	1.44	1.42	1.29	1.33	1.46
Wood and Wood Products	1.69	1.77	1.52	1.43	1.63	1.71
Paper and Paper Products	1.06	0.98	1.21	0.95	1.01	0.96
Publishing and Printing	1.29	1.30	1.35	1.13	1.06	1.20
Pharmaceuticals	1.28	1.38	1.26	1.19	1.33	1.54
Chemicals	1.59	1.37	1.41	1.17	1.69	1.48
Rubber and Plastics	1.32	1.24	1.42	1.29	1.30	1.34
Other non-metallic Minerals	1.64	1.54	1.63	1.51	1.46	1.44
Basic and Fabricated Metals	1.58	1.31	1.62	1.25	1.45	1.27
Machinery and Equipment	1.39	1.20	1.36	1.24	1.34	1.13
Office Machinery and Computers	1.22	0.98	1.23	1.07	1.30	1.11
Electrical Machinery	1.41	1.25	1.58	1.13	1.18	1.19
Radio, Television and Communications	1.24	1.10	1.22	1.31	1.28	1.05
Medical, Precision and Optical	1.44	1.09	1.58	1.16	1.22	1.17
Motor Vehicles and Transport	1.44	1.52	1.44	1.31	1.31	1.46
Other Manufacturing	1.25	1.38	1.46	1.42	1.19	1.17
Total Manufacturing	1.48	1.40	1.49	1.29	1.36	1.35

Source: Own calculations from Census of Industrial Production, 1991-1999

Table 6: Determinants of Average Plant Wages in Irish Manufacturing Industry, 1991-1999				
	FE	RE	FE	RE
Ownership	0.20*** (2.67)	.15*** (7.74)	.14*** (2.85)	.11*** (6.79)
Capital Intensity Proxy	-	-	.06*** (2.89)	.07*** (3.51)
Scale	-	-	.08*** (3.19)	.04*** (4.94)
Year Dummies	Yes	Yes	Yes	Yes
Sector Dummies	-	Yes	-	Yes
Prob>F	0.000		0.000	
Prob>Chi2		0.000		0.000
No. of observations	39,975	39,975	39,975	39,975
R-squared	0.18	0.20	0.23	0.36

Notes: 1) t-ratios for FE and z-values for RE are in brackets
2) ***=Significant at 1%, **=significant at 5%, *=significant at 10%

Table 7: Determinants of Average Plant Wages for Skilled and Unskilled Workers in Irish Manufacturing Industry, 1991-1999								
	Skilled Workers				Unskilled Workers			
	FE	RE	FE	RE	FE	RE	FE	RE
Ownership	.16*** (2.23)	.12*** (8.13)	0.13*** (2.02)	.08** (1.85)	0.22*** (2.55)	.0.14*** (8.91)	.15*** (2.17)	0.10*** (7.21)
Capital Intensity Proxy	-	-	0.03*** (10.23)	0.05*** (7.03)	-	-	0.05*** (8.12)	0.07*** (5.74)
Scale	-	-	0.05*** (6.06)	0.07*** (5.20)	-	-	0.08*** (5.89)	0.09*** (5.49)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	-	Yes	-	Yes	-	Yes	-	Yes
Prob>F	0.000		0.000		0.000		0.000	
Prob>Chi2		0.000		0.000		0.000		0.000
No. of observations	36518	36518	36518	36518	39263	39263	39263	39263
R-squared	0.07	0.17	0.15	0.25	0.05	0.17	0.21	0.32

Notes: 1) t-ratios for FE and z-values for RE are in brackets
2) ***=Significant at 1%, **=significant at 5%, *=significant at 10%

Table 8: Effect of Foreign Presence on Average Wages in Domestic Firms in Irish Manufacturing Industry, 1991-1999				
	FE	RE	FE	RE
Foreign Presence	0.06*** (2.04)	0.04*** (7.45)	0.04 (1.41)	0.03 (1.01)
Capital Intensity Proxy	-	-	0.05*** (2.30)	0.06*** (4.55)
Scale	-	-	0.03*** (6.54)	0.04*** (6.47)
YEAR DUMMIES	Yes	Yes	Yes	Yes
SECTOR DUMMIES	-	Yes	-	Yes
Prob>F	0.000		0.000	
Prob>Chi2		0.000		0.000
No. of observations	34435	34435	34435	34435
R-squared	0.06	0.13	0.21	0.22

Notes: 1) t-ratios for FE and z-values for RE are in brackets
2) ***=Significant at 1%, **=significant at 5%, *=significant at 10%

Table 9: Table 8: Effect of Foreign Presence on Average Wages for Skilled and Unskilled Workers in Domestic Firms in Irish Manufacturing Industry, 1991-1999				
	Skilled Workers		Unskilled Workers	
	FE	RE	FE	RE
Foreign Presence	0.01 (0.97)	-0.04 (-1.03)	-0.02 (-0.74)	-0.03 (-0.92)
Capital Intensity Proxy	0.06*** (10.24)	0.07*** (4.49)	0.04*** (5.29)	0.03*** (5.91)
Scale	0.04*** (6.07)	0.04*** (4.71)	0.03*** (2.97)	0.02*** (3.03)
YEAR DUMMIES	Yes	Yes	Yes	Yes
SECTOR DUMMIES	-	Yes	-	Yes
Prob>F	0.000		0.000	
Prob>Chi2		0.000		0.000
No. of observations	30639	30639	33525	33525
R-squared	0.09	0.20	0.18	0.27

Notes: 1) t-ratios for FE and z-values for RE are in brackets
2) ***=Significant at 1%, **=significant at 5%, *=significant at 10%