

Foreign Direct Investment and the Emergence of a Dual Economy

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Précis: Studies of foreign direct investment in Ireland have concentrated on the absence of linkages and the high proportion of output exported. This paper analyses a sample of manufacturing firms in the Mid-West Region to highlight other relatively neglected aspects, such as managerial skills and technology and argues that the managerial differences between foreign and native firms are such as to lead to a dual economy in the manufacturing sector.

While the essential characteristics of a dual economy are persistent differences over time in the level of economic development of certain sectors, different writers have stressed different aspects: for instance, regional differences in income levels (Myrdal, 1963), differences in social attitudes (Boeke, 1953) the large firm/small firm dichotomy (Broadbridge, 1966, and Galbraith, 1974), while the Lewis and Ranis-Fei models of economic development analysed the problems resulting from the presence of an advanced manufacturing sector in a labour surplus, developing economy (for details, see Meier, 1970, Higgins, 1968, Kelley *et al.*, 1972.)

This paper examines dualism based on differences in the nationality of ownership of manufacturing firms. Other studies relating to Ireland, which have used the same distinction, have drawn attention to dualistic features resulting from a tariff protected native industry, and an export oriented sector, referred to as 'grant aided industry', consisting largely of foreign owned firms (McAleese, 1971, Cooper and Whelan, 1973, Buckley, 1974).

In addition foreign firms were found to have generally low linkages (Cooper and Whelan, 1973, Stewart, 1973, Buckley, 1974), though Stewart found this did not apply to British firms.

While it has been suggested that the ownership dichotomy may not be a sufficient criterion to explain differences in exporting and input purchasing behaviour, it may account for other differences. It is also used in this paper because of the observed coincidence of a sectoral classification with nationality, and the difficulties of devising adequate alternative criteria, considering the sample size, which may successfully explain divergences in behaviour.

The empirical evidence in this paper relates to a random sample of native and foreign manufacturing firms in the Limerick Mid-West Region. This Region was selected on the grounds that firms operating in a largely agricultural, rural environment (the periphery) are likely to behave differently from those operating in an essentially industrial, urban environment (the centre), and hence the behaviour and impact of foreign direct investment on the local economy may also be different. This possibility has been largely ignored by other studies focusing on Ireland.

The next section discusses the origin of a dual economy with particular reference to change and innovation. The empirical evidence is then discussed under four different headings: decision making, functions performed, employment policy, and technology. Finally, some conclusions are drawn.

Origins of a Dual Economy

Attempts to accelerate economic development of developing economies have often noted the existence of a sector, advanced not only in techniques of production and distribution, but also in attitudes, side-by-side with a traditional sector. An attempt to solve the problems caused must identify the nature of this dualism, be it regional, technological, social or behavioural. It may arise from external influences such as an inflow of foreign direct investment, or internal influences, where one sector becomes technologically much more advanced than another.¹ These influences may be related. For instance, an influx of new industry may be promoted by internal agents, or external technology may be imported.

This paper argues that dualism arises from a process of choice and seeks to examine (a) the reasons why decisions to innovate are made for one sector and not another, and (b) how the retarded sectors can change their behavioural and other characteristics in order to become more like the advanced sector. Innovation implies change, and requires both the existence and diffusion of new ideas, as well as the decision to implement them. Rogers

1. There are other explanations. For instance Broadbridge (1966) has argued that maintenance of traditional patterns of consumption has been a powerful cause of industrial dualism in Japan.

(1962) has argued that in examining the process of diffusion social systems may be categorised according to the speed with which they adopt new ideas. Important factors explaining diffusion are, the concept of perception, the influence of opinion leaders, and whether a society has a traditional or modern orientation. Schon (1971) supports Rogers in emphasising personal communication while Parker (1974) stresses the movement of personnel "already versed in the new knowledge".

Hence in examining the features of a dual economy it is important to know:

- 1 Why decision makers fall into one category rather than another.
- 2 Which type of sectors, firms, etc. fall into each category.
- 3 What specific differences in the mode of operation and functions performed result in a dual economy.
- 4 What problems arise from this dualism, and their implications for economic development.

The Sample

The study relates to a random sample of 45 manufacturing firms chosen from a total population of 89 such firms located in the Limerick Mid-West Region (for details, see Stewart, 1973, ch. 1). Classification by country of origin resulted in five groups of firms:

- 9 American
- 10 British
- 19 Irish (of which 14 were established before 1960)
- 7 'All Other' (5 German, a Dutch, and a South African firm)

By subdividing the Irish firms it was hoped to discover:-

- 1 If native firms displayed any characteristics of a learning process through time i.e., whether Irish firms established after 1960 resemble foreign firms more closely.
- 2 Whether recently established native firms had significantly different behavioural characteristics from older firms, independently of the arrival of foreign direct investment in the Region. This would correspond to the earlier discussion of dualism arising from internal sources.

Some Problems of Measuring Managerial Dualism

In the Region under study the particular form of dualism thought to exist is 'managerial dualism', i.e., the use by foreign firms of a superior managerial and production technology. Typically this might mean – more intensive marketing, greater expenditure on R. & D., more emphasis on labour relations, the use of productivity measures in wage negotiations.

These foreign firms might be expected to have a higher productivity than native firms through the use of superior methods of production, and hence to pay higher wages. In sum it is being suggested that managerial dualism exists when foreign firms constitute a more advanced manufacturing sector than native firms. The superiority of foreign firms may depend on a close relationship with the parent company. Therefore the paper attempts to assess the degree of autonomy of foreign direct investment, the sources of information concerning R. & D. and the origin of production processes.

An essential aspect of a dual economy is that differences between one sector and another persist over time. Where possible the empirical evidence makes comparisons between 1964 and 1970. However, in some instances the data relates only to 1970.

The evidence does not appear to indicate any marked form of social dualism as described by Boeke, although it could be the case that 'managerial dualism' has its origin in social dualism. Foreign direct investment in most cases cannot be considered to be in direct competition with native industry as foreign investment has brought in new industries whose output is largely exported. For this reason dualism existing in cost structures will not be emphasised, i.e., new industries which eliminate competition from a traditional sector by producing similar products with superior efficiency and productivity.

The extent of dualism in organisational techniques is first related to the degree of autonomy and the performance of various functions, such as marketing/selling. Interfirm comparisons, however, were made difficult by variations in firm size. For instance, if expenditure on R. & D. is some function of size, larger firms will have larger expenditures. In this paper, size is assumed to be of less importance (though not unimportant) in explaining differences relative to other variables, e.g., sector specialisation of the firm, managerial technology, etc. Hence the absolute magnitude of expenditure is emphasised, rather than relating this to size of firm. Expenditures on training, R. & D., marketing/selling, are also shown per employee, per £1,000 sales, etc. for the various categories of firm in order to indicate different expenditure patterns independently of size.

Another problem relates to the fact that nearly all the foreign firms are subsidiaries, and only a small number of native firms. Differences may simply arise from comparing a subsidiary with an independent firm, rather than foreign with native firms. The small sample size made it impossible to establish statistical differences which arise for reasons other than nationality.

Decision Making.

The hypothesis that foreign firms tend to have less autonomy than native firms is first examined by using the number of reports submitted to the parent company as a measure of the amount of control over a subsidiary.

On this basis Table 1 shows British firms followed by post-1960 Irish firms to be more tightly controlled than subsidiaries of other nationalities.

Table 1: *Average number of reports submitted to the parent company for 1970, and average discretionary capital expenditure*

	Total	American	British	Irish pre 1960*	Irish post 1960†	All other
Number of subsidiaries	34	9	10	5	5	5
Reports submitted for 1970	38.3	30.8	59.4	30.6	36.0	20.0
Discretionary capital expenditure (£)	3,470	11,660	3,450	1,600	2,000	400
Discretionary expenditure per £1,000 invested in fixed assets **	11.14	20.4	11.6	6.6	7.03	0.43

* 4 subsidiaries and 1 independent company with close ties to another company.

† Consisting of 1 subsidiary, 3 branch plants and 1 independent company with close ties to another company.

** Defined as net fixed assets + working capital.

Another criterion might be the ability of subsidiaries to make autonomous investment decisions. The table gives the maximum limits above which investment expenditures must be submitted to the parent company for further approval. These limits demonstrate that for the most part the various nationalities of firm are similar. While there are large absolute differences, the amounts involved seem so small as to indicate little or no power to make investment decisions. The apparent greater autonomy of American firms is largely due to one firm claiming to have complete autonomy. The low figures for Irish subsidiaries might be expected considering their greater proximity to the parent company.

Table 1 also shows discretionary investment in relation to the value of fixed assets, and largely supports these conclusions, American firms having the highest discretionary investment followed by British firms. The value for firms of 'all other' nationality was the lowest. This low degree of autonomy differs from the findings of other studies. Both Brash (1966), who studied US firms operating in Australia, and Safarian (1966), who studied foreign investment in Canada, found considerable variations within the sample, but Safarian considers that the differences were not related to the nationality of the parent, and reports that "a significant degree of decentralisation is involved in many cases (p. 101)." The Steuer Report (1973 p. 139) on the impact of foreign direct investment on the United Kingdom says that "subsidiary size is associated with discretion, and parent size is associated with tighter control". An earlier study of US firms operating in the UK (Dunning, 1958) found that 49 firms (32.9 per cent of the sample) were

strongly controlled by their US associates. All these writers comment extensively on the difficulties of measuring control but suggest some relationship between degree of control and percentage of the equity owned. Most of them rely on essentially subjective evidence. Safarian and Brash consider data on nationality of the executives. Brash also discusses the number of reports submitted to the parent company while the Steuer report concentrates on the ability of subsidiaries to make capital expenditures.

Other writers have considered other aspects of autonomy. In a survey of grant – aided firms operating in Ireland, Ó h-Uiginn (1972 p. 18) found that in 39.6 per cent of cases the parent organisation looks after accounts and financing, and “exercises regular management control and supervision in 42.5 per cent of cases”. Forsyth (1971, ch. 9) says that financial matters in American firms operating in Scotland, tended to be wholly determined from outside and all other matters were subject to local control. Reuber (1973 p. 227) who made a sample survey of foreign investment projects in various lesser developed countries concluded that parent companies granted considerable autonomy over decisions concerning output and local market development and much less autonomy in export market development and additional capital financing. Export oriented projects, particularly, were subject to the greatest degree of control. Similar findings were reported by Brash (1966, p. 116). However, the Steuer Report (1973 p. 14) reported “big differences between firms” in matters of financial control, particularly in relation to large multinational investors versus small foreign investors.

To recapitulate the current evidence, British firms have the least autonomy, on the basis of the number of reports submitted, and ‘All other’ firms the greatest. However, the measure used may be more influenced by factors other than a desire to control the subsidiary as such. If ability to incur additional capital investment is used as a criterion, American firms have the greatest autonomy and firms of ‘all other’ nationalities the least. In this case the amounts involved seem so small, both per firm and in relation to investment in fixed assets, that an analysis of variance test did not find the differences to be significant. It can be concluded then, that foreign firms in the survey sample seem to operate more or less as production units, that is without any real decision making ability. This conclusion appears to be in contrast to Penrose (1956) and Brash (1966) who argue that after a subsidiary has been established it tends to acquire a life of its own, and to behave in a similar manner to other firms.

Functions Performed

Under this heading the study examines marketing/selling, training, research and development, purchasing, and any changes in functions performed since the firm commenced operations. The main propositions to be examined are that:

- (i) Foreign firms (with the exception of British firms) engage more intensively in those functions considered.

- (ii) As a corollary to (i) that Irish and British firms tend to be quite similar in functions performed.

Table 2 indicates that Irish firms (particularly those established in the Region pre 1960) engage the most intensively in marketing/selling activities. Fewer British firms seem to engage in these activities than firms of other nationality.

Table 2: *Number of firms engaged in marketing/selling, training, R. and D., average expenditures per engaged firm, and average number of employees*

	Total	American	British	Irish pre 1960	Irish post 1960	All other
Number of firms	45	9	10	14	5	7
Number engaged in selling	21	3	3	9	2	4
Number engaged in marketing	16	4	1	6	2	3
Expenditure on selling (£)	4,690	5,000	4,100	11,640	2,000	8,140
per £1,000 of sales	3.57	5.91	11.59	12.58	2.92	1.8
Expenditure on marketing (£)	3,860	2,220	0	7,430	0	7,150
per £1,000 of sales	2.94	2.63	0	0.80	0	1.58
Number employed in selling	1.06	1.55	0.7	4.5	1.4	3.43
Number employed in marketing	0.24	0.55	0.3	0.21	0	0
<i>Training</i>						
Number of firms engaged in training	38	6	8	13	4	7
Number providing skilled training	29	5	5	10	3	6
Number providing semi-skilled training	34	6	6	11	4	7
Expenditure on training	3,680	10,880	1,800	1,570	600	3,520
per employee	26.45	73.3	16.9	10.04	5.52	22.17
<i>R. & D.</i>						
Number of firms performing R. & D.	16	4	2	4	2	4
Expenditure on R. & D. (£)	3,730	1,011	800	860	1,600	7,000
per employee	26.8	68.15	7.5	5.5	14.73	43.47
Number employed in R. & D.	1.53	2.88	0.6	0.71	2.4	2.14

The proposition to be examined in relation to marketing/selling is that first, there are significant differences between foreign firms and native firms in expenditure, and, secondly, in the number of employees engaged in these activities. Table 2 shows that expenditure on these activities tends to be low, well under 0.01 per cent of sales for all categories of firm. In relation to selling activities, Irish firms (pre 1960) spent the most, followed by firms of 'all other' nationalities. Irish firms (post 1960) spent the least amount. The

expenditure of British firms was higher, but per £1,000 of sales is nearly as high as pre 1960 Irish firms.

Expenditure on marketing follows the same pattern as expenditure on selling. The low expenditure for the category 'all other' firms is largely explained by one large firm producing a very high value, low bulk product. British firms in the sample reported no expenditure on marketing for 1970.

The pattern of employment in these activities, broadly speaking, follows that of expenditure. Irish firms employ the most, with an emphasis on selling rather than marketing activities. While most Irish firms regard themselves as being engaged in these activities, the findings support the statement of Dillon-Malone (1970) in that their related expenditures and number of employees are low. British firms reported the largest number of employees engaged in selling. Irish firms reported the second highest number engaged in marketing. However, not much significance can be put on this figure, as it is still extremely low, and persons reported engaged in marketing activities probably had other organisational functions as well. This is indicated by the low figure for marketing expenditure. For recent Irish firms and British firms, no expenditure was attributed solely to marketing.

This evidence in relation to marketing and selling may reflect the export oriented nature of foreign investment in the Region. In a study of grant-aided firms in Ireland, Ó h-Uiginn (1972, p. 18) reports that almost two-thirds of the sample had goods marketed by the parent organisation. Reuber (1973, p. 199) claims that export-oriented projects did not undertake marketing activities in the host country. Forsyth (1971) found that over half the US owned firms operating in Scotland had marketing and selling activities located elsewhere, although according to Dunning (1958) US firms operating in Scotland are different from those operating in the rest of the UK in that they (a) are concentrated in the electrical and engineering industries, and (b) practice a policy of product specialisation between the US and UK factories.

In relation to other functions, just under half the foreign firms have personnel departments, versus under 5 per cent of Irish firms. This may be explained by the larger foreign operating units, and a greater appreciation of personnel problems.

Most of the firms also claimed to provide some sort of training facilities, as indicated by Table 2. Here the proposition to be examined is that foreign firms engage more intensively in these activities than native firms, both in terms of training facilities provided, and expenditure. The survey evidence indicated that Irish firms are notable for a lack of managerial and supervisory training. In this connection Gorman *et al* (1974 p. 114) noted that a manager working in a foreign-owned firm was more likely to have had a more recent and a longer period of training than a manager working in an Irish-owned firm. All firms of 'all other' nationalities claimed to provide training for

semi-skilled employees, and practically all claimed to train skilled employees. A majority of Irish firms also claimed to provide training facilities for both skilled and semi-skilled employees.

Table 2 also shows that there are significant differences in the amount spent on training. American firms appear to spend the most, and Irish firms the least. The fact that in British firms expenditure was found to be only a little higher than in Irish firms contrasts with Reuber's (1973, pp. 202-3) report that, irrespective of nationality, foreign investors in lesser developed countries "engaged heavily in training activities both within the firm and without". In the current study these differences may be partly explained by sectoral concentration, for instance, American firms tend to be concentrated in the engineering and textile sectors.

Table 2 shows that for American and firms of 'all other' nationalities almost half regarded themselves as engaging in R. & D. Fewer British firms seem to engage in this activity than firms of other nationalities. Table 2 also shows that American firms employed the most and spent the most² on R. & D. and British firms the least, followed by recent Irish firms. Recent Irish firms appear to employ as many as American firms because one Irish firm manufacturing pottery classified a large proportion of its employees as being engaged in R. & D. The older Irish firms had a slightly higher expenditure per firm, but lower per employee. For recent Irish firms mean expenditure was approximately double this amount.

Finally, the survey examined the ability of firms to make decisions concerning purchasing policy. Most firms appear to perform their purchasing at the place of production. Irish subsidiaries do this to a lesser extent than subsidiaries of other nationalities. This is particularly true of those recent Irish firms which are subsidiaries or branch plants. In their case decision-taking may be centralised due to the relative proximity to the parent company/head office.

As regards changes in functions performed since establishment, Irish firms, particularly, claimed to have expanded their managerial functions, reflecting perhaps the development of a learning process between foreign and native firms. British firms appear to have introduced new functions to a lesser extent than other categories of firm. It also appears that few firms contracted their managerial functions performed since establishment.

To summarise, the evidence in relation to expenditure and numbers engaged in marketing/selling does not seem to indicate the existence of managerial dualism, as Irish firms tended to report the highest figures, and foreign firms the lowest. Significant variations exist within the group of foreign firms. American firms seem to engage more intensively in R. & D.

2. The figures compare with £79 per employee for US subsidiaries operating in Scotland in 1969 (Forsyth, 1971).

than firms of other nationality. This may be a result of a higher general level of expenditure on R. & D. by American industry generally, or else, the Irish Governments grants to encourage R. & D. may have led to a relocation of these activities to a certain extent and this may be more feasible for American firms than for others. American firms also appear to engage more intensively in training, both as regards expenditure and the extent of training facilities provided. This may be explained by a product cycle model (Vernon, 1966) which hypothesises that the type of firm likely to locate abroad, requires unskilled or semi-skilled labour, any training required being performed at the location of production facilities.

British firms appear to have the lowest level of expenditure on R. & D. per firm. Both categories of Irish firm had slightly higher expenditures per firm. British firms also reported the lowest level of expenditure on training of the foreign firms, and reported zero expenditure on marketing, but quite high expenditure on selling in relation to sales volume. British and Irish firms seem to behave quite similarly in relation to functions performed, except perhaps for those functions related to marketing/selling, which is probably explained by the higher proportion of independent companies in the sample which are Irish.

There would seem to be few differences between recent and older Irish firms and between Irish and British firms. In addition Irish firms seem to be becoming more like the advanced sector.³

In conclusion, it should be noted that functions performed and autonomy are closely related. Some foreign firms seem to lack autonomy, and perhaps because of this the evidence for 'managerial dualism' as regards functions performed is not very strong. Another reason for the relative absence of dualism may be because many of these functions – training, personnel, purchasing – must be performed at the location of production facilities. Even so, foreign firms engage more intensively in them than native firms. This is not, of course, *per se*, an indication of more efficient management or better managerial techniques.

Employment Policy

In this section the discussion largely centres around three aspects of employment policy, the extent to which foreign nationals are employed, labour turnover, and wages policy. The section concludes by examining wage levels, and their possible effect on the existence of dualism.

3. This statement assumes that on the criteria discussed above and other criteria discussed later in this paper, foreign industry operating in the Region does constitute an advanced sector. It has been argued (Skinner, 1968) that American industry operating abroad is less efficient than similar industry operating within America, due to certain organisational problems arising from operating in a foreign country. If true this would mean that there was an even greater divergence between native industry operating in Ireland and American industry operating in America.

Table 3: *Average number of non-nationals employed at time of establishment, and for 1970*

	<i>At establishment</i>	<i>In 1970</i>
American	8.4	4.7
British	0.7	0.8
Irish pre 1960	0.8*	0.5
Irish post 1960	0.0	0.0
All others	3.1	17.6
Total	2.6	4.0

* *Employment in 1960*

It might be expected that foreign firms would employ non-nationals to a greater extent than native firms, and most, but not all foreign firms seem to require a nucleus of expatriates at the time of establishing the operation, as indicated by Table 3. In many cases this is supplemented by sending Irish nationals abroad for training. Brash (1966) in his study of American firms operating in Australia, also noted that expatriates tend to be employed in the early years of operation of the subsidiary. Table 3 indicates that, from the time of establishment until 1970, there appeared to be a reduction in the number of non-nationals employed by American firms. This confirms the statements of Reuber (1973, p. 169) that in 1966 under one per cent of all employees of American firms abroad were US citizens. He also found that, for the projects surveyed, the proportion of non-nationals employed as management and engineering personnel showed the greatest decline falling from 44 per cent when the project was undertaken to 27 per cent at the time of the survey. Reuber found no statistical associations between employing non-nationals and nationality of firms, or host country area. In the current study the number remained approximately the same for British firms, while the apparent increase for firms of 'all other' nationalities is largely explained by the further expansion of one large firm. It appears that most non-nationals are employed in a managerial/technical capacity, and it is unlikely that their numbers will change much in the future. It has been suggested (Gorman *et al*, 1974 p. 65) that non-nationals were largely employed to introduce technical skills for production processes novel to Irish industry.

Undoubtedly, this influx of non-nationals could have beneficial effects by exposing other manufacturing firms to a flow of new ideas and techniques. However, it is difficult to judge the extent to which this has led to a greater general awareness of better managerial techniques. Certainly for the UK it appears that mobility of managers between foreign and domestic firms is not sufficient to be a good transmitter of management technology, (Steuer Report, 1973, p. 43).

The labour turnover hypothesis is that more recently established firms have higher rates of labour turnover than older established firms though other

influences may be more important, e.g., wage differentials, personnel policies, etc. Here the empirical evidence reveals no readily discernible pattern. Again, labour turnover may be related to the proportion of female labour in the labour force. Some managements also suggested that distance from work may be an important factor. A majority of firms have labour turnover rates of under 10 per cent. A statistical test indicated that comparing groups by nationality there were significant differences in labour turnover⁴; American and British firms having the highest labour turnover rates followed by the older Irish firms. Semi-skilled females accounted for 46.5 per cent of the labour force for British firms, compared with 25.7 per cent for Irish firms (both groups), but only 22.6 per cent for American firms, and 28.4 per cent for the sample as a whole. It also appears that the rate of labour turnover has been falling for the years 1968-1970. Reuber (1973 p. 174) also reported "a significant turnover for all categories of investment", and that labour turnover was highest for market development projects and appeared to be inversely related to skill levels.

The wages policy hypothesis is that a greater proportion of foreign firms use productivity measures in wage negotiation. There appear to be few differences within the sample however, except for recent Irish firms, three of the five firms claiming to use some means other than time rates, piece rates, etc. Few firms use time study (nine out of 45), or measured day-work (11 out of 45), piece-rates and some combination of time and bonus systems appear to be the most common, used by 14 and 18 firms respectively.

As noted previously, most firms claimed to provide some sort of training for their employees. In addition to being the highest spenders on training American and firms of 'all other' nationalities seemed to rely, to a greater extent than British or Irish firms, on a government training programme. This probably reflects a greater preoccupation by American firms with personnel problems generally.

Approximately half the firms in the sample irrespective of nationality were also members of a local management institute (the Irish Management Institute), which may indicate a desire to participate in local affairs, rather than in Boeke's (1953) form of social dualism, forming an entirely separate social class.

In conclusion it appears that foreign firms tend to have foreign nationals as managers. The number of non-nationals employed is unlikely to change in the future, unless further foreign direct investment takes place, as the absolute number of non-national employees seems to be approximately proportional to the amount of foreign direct investment. There appear to be

4. A repeated measures factorial test, with unequal groups, using a least squares analysis, was used on labour turnover for different categories of nationality, and for each year from 1964-1970. The test gave a value of 2.79.

significant differences between firms of different nationalities in relation to labour turnover, American and British firms having the highest labour turnover followed by the older Irish firms. Labour turnover appears to have declined (calculated as a percentage of the workforce) in more recent years. There would seem to be few significant differences in wages policy within the sample.

Table 4: *Average wage per employee for 1964 and 1970*

	<i>Number of respondents</i>		<i>Average wage (£)</i>	
	<i>1964</i>	<i>1970</i>	<i>1964</i>	<i>1970</i>
American	4	9	529	1281
British	4	10	395	756
Irish*	15	18	523	990
All others	5	7	462	1165
Total	27	44	504	1045

* There was very little difference between the groups of Irish firms, hence they are shown together.

Table 4 indicates that American firms and firms of 'all other' nationalities pay higher wages than other groups of firms. British firms appear to pay the lowest wage per employee. Again this is probably related to the percentage of female employees in the labour force. However, Forsyth (1971) found that American firms operating in Scotland paid higher wages and tended to employ more unskilled labour than indigenous firms. There is some evidence presented later in this paper that productivity tends to be higher in foreign firms, which would also help account for the wage differential. Table 4 also shows that with the exception of the British there appear to be few significant differences in average wage per employee for 1964. However, the table makes no allowance for hours worked. It was previously indicated that American firms place greater emphasis on training and personnel problems, while Irish firms place the least emphasis on these functions.

The wage differential between foreign firms and native firms may have had the effect of creating a shortage of certain types of skilled employees for native firms. Indeed, during the course of the survey, management of Irish firms often remarked on the tendency of newly trained skilled employees to leave and take up employment with firms recently established in the Region. This effect has probably been compounded by the poor training facilities of native firms. This shortage has probably helped increase the average wage level in the Region. Forsyth (1971) describes a similar

phenomenon in relation to the impact of American firms on the Scottish economy. Reuber (1973) also found that a large number of projects surveyed paid employees above market rates.

This increase in the wage level may in turn have had the effect of inducing greater capital intensity in native industry, as capital being relatively more available and cheaper than labour (due to capital grants and various fiscal incentives) is substituted for a relatively more expensive and scarcer labour supply. This assumes that native industry is not characterised by a production function with fixed technical coefficients. A process of substituting capital for labour may also involve technical progress to the extent that this is embodied in new capital, but may not necessarily result in an expansion of output.

This process may also have the effect of reducing any possible technological dualism in the Region. Conversely, if native industry is characterised by a production function with fixed technical coefficients, technological dualism will only be reduced to the extent that native capital and labour are free to flow to those industries, whether capital or labour intensive, which are competitive as regards wage levels and skill content of the labour force with the more advanced sector. But as is discussed later, such an investment strategy, involving the substitution of capital for labour may not be optimal as regards the long term growth of the National and Regional economy.

Technological Dualism

The extent to which the manufacturing sector is characterised by technological dualism is examined in relation to three main areas – sources of R. & D. production methods, and productivity. The discussion of production methods also involves an examination of capital intensity. The overall hypothesis to be examined is that foreign firms use more advanced technology and production methods than native firms.

It was shown previously that apart from British firms, more foreign firms engage in R. & D. than Irish firms. Table 5 below shows that most firms obtained information concerning R. & D. from their parent company but also relied on information from other companies.

Table 5: Sources of Research and Development

	Total	US	British (pre 1960)	Irish (post 1960)	All other	
			<i>Subsidiaries</i>			
No. of respondents	34	9	10	5	5	
R & D from parent	27	7	9	5	3	
			<i>All Companies</i>			
No. of respondents	45	9	10	14	5	
R & D from other companies	21	2	5	8	2	
R & D from IIRS	10	1	-	5	2	
from other sources	6	-	1	5	-	

Another study (Ó h-Uiginn, 1972, p. 18) found that 78.3 per cent (162 establishments) of the survey of grant aided industry relied on the parent organisation for R. & D. For this study it was found that only American subsidiaries tended to rely solely on the parent company for information concerning R. & D. Irish firms tended to rely on Government research bodies (i.e., the Institute for Industrial Research and Standards) to a greater extent than firms of other nationalities. There was very little expenditure on licences and royalties by firms in any category. Total reported intramural expenditure (that is capital plus current expenditure) on R. & D. by industry operating in Ireland, rose from £1,086 million in 1963 to £3,409 million in 1969. Four companies accounted for 41.3 per cent of total expenditure for 1969. In 1963 £0.084 million was spent abroad. This figure rose to £0.539 million in 1967, 70 per cent of which was spent in the UK and increased further to £0.934 million in 1969, 24 per cent of which was spent in the UK and 43 per cent in the US. This change is probably explained by the growth of US manufacturing industry in Ireland rather than the desire of native industry to assimilate a more advanced foreign technology. Most of the expenditures were in the electrical and electronic, chemical and drugs industries. Both sectors are dominated by US firms operating in Ireland (see D. Murphy, 1969, and D. Murphy and D. Ó Broclchain, 1971).

A majority of firms (29 out of 45) claimed to have introduced a greater diversity of products since establishment, while 36 out of 45 firms claimed to have expanded output capacity in the same period. Brash (1966 p. 28) also noted a general tendency to introduce a wider range of products amongst US subsidiaries operating in Australia. This often took the form of backward vertical integration. Few firms claimed to have either reduced the number of products produced (4 out of 45) or contracted capacity (1 out of 45). All in all there appears to be few significant differences amongst the groups in relation to either changes in the volume of output, or range of products produced.

Table 6 indicates that approximately half the foreign firms use unit/small batch technology, and that almost the same proportion of native firms use a process. Most of these firms are largely engaged in food processing and were established prior to 1960.

Table 6: *Production methods used by firms*

	Total	American	British	Irish		All other
				(pre 1960)	(post 1960)	
Number of firms	45	9	10	14	5	7
Unit/small batch	18	4	4	4	1	5
Large batch/mass production	16	6	7	8	4	1
Process	13	2	1	8	1	1

In so far as unit/small batch techniques tend to be associated with handcraft and backward industries it is surprising that foreign firms tend to use such technology. It might be speculated that industry of this type is typical of the American, British, and German economies and simply reflects this fact, or that the 'labour surplus' has attracted labour intensive industries, rather than capital intensive process industries, or it may simply indicate the type of firm to locate abroad.

It also appears that there is a distinct tendency for firms of each nationality to purchase machinery from their respective country of origin, suggesting that a superior technology is being used. Irish firms tend to purchase machinery from Britain suggesting that the technology of British and Irish firms have more in common than those of other nationalities⁵ Other studies indicate that investing firms tend to use technology imported from the source country. Mason (1973) reports that for a sample of 28 firms located in the Philipines and Mexico, consisting of 14 US subsidiaries which were matched with 14 native firms, some 70 per cent of the US subsidiaries equipment was imported from the US versus 35 per cent for native firms. Reuber (1973) found that in 57 projects out of 78 located in various lesser developed countries the investing firm introduced its production technology intact to the host country area.

5. Various hypotheses relating origin of productive machinery for the survey sample to the nationality of the parent company, were tested, using a chi-square test, with Yates correction for continuity. Only the relationship between American firms purchasing machinery from the US was found to be significant at the 1% level.

Table 7 shows that foreign firms are more capital intensive defined as K/L where K is net fixed assets plus value of buildings if leased and L is the number of employees.⁶ This is particularly true of American firms. The trend has been for the capital intensity of foreign firms to increase at a greater rate, than that of Irish firms.

Table 7: *Capital intensity, K/L , being defined as net fixed assets + buildings (if leased) for 1964 and 1970*

	Number of respondents		Capital intensity K/L	
	1964	1970	1964	1970
American	4	9	2.72	5.65
British	3	9	2.22	3.42
Irish	15	18	0.95	1.39*
Other	5	7	3.53	4.52
Total	27	43	1.83	3.22

* For the five firms established post 1960, $K/L = 2.19$ for 1970, and 1.3 for 1964.

The capital intensity of British firms appears to be more similar to native firms than to other foreign firms. This statement becomes more obvious if certain other measures of K are considered, e.g., excluding leased buildings K becomes 2.92 for British firms, 1.47 for Irish firms, and 2.67 for the total sample. The Steuer Report (1973 p. 80) also noted that foreign industry was more capital intensive than British industry (the figures being 2.32 versus 1.34 for British industry). However, the data relates only to a sample drawn from the electrical engineering industry.

Despite a reliance on unit/small batch techniques these higher K/L figures for foreign firms may be explained by the presence of an increasing number of large capital intensive firms, particularly in the group of firms classified as 'all other' nationalities.

A rising wage level coupled with a lessening availability of general labour and scarcity of skilled labour may ensure that this trend continues. Other factors which may be ensuring a capital intensive foreign sector, may be that only vertically integrated firms with a high value added content, and hence high capital intensity, would be viable in a region of this sort, namely, an under-developed backward Region.

6. This measure suffers from a number of disadvantages, e.g., comparing assets of different vintage. Using number of employees may also not be a very accurate measure of labour input.

Table 8: *Value added* (net output) per person for 1964 and 1970*

	<i>Number of Respondents</i>		<i>Value added per person (£)</i>	
	<i>1964</i>	<i>1970</i>	<i>1964</i>	<i>1970</i>
American	4	9	890	2660
British	3	10	1040	1090
Irish before 1960	15	18	1010	1370
Irish after 1960	5	7	1020	3550
Total Other	27	1	14620	10870

* Defined as Sales less purchases of raw materials and all other inputs = Cash flow (Profits + Depreciation) and wages.

Table 8 indicates that foreign firms tend to have a higher value added per employee than either British or Irish firms. Stewart (1973, ch. 5) shows that British firms in the survey sample tend to have higher linkages than the rest of foreign industry, and hence for this reason may not need a higher value added content to remain viable. There is a notable divergence between value added for Irish firms established before and after 1960 in that the latter group has a much higher value added per employee. This might suggest that recent Irish firms are more similar to foreign firms, perhaps as a result of the diffusion of more advanced production techniques and management technology. Alternatively it may indicate, as described previously, that Irish firms are reacting to a relatively more expensive labour supply, by substituting capital for labour. This may be easier to do when establishing a new plant, as it is unlikely that technical coefficients are completely variable, resulting in the substitution of capital for labour in discrete rather than continuous amounts. The divergence between value added per person in the category 'all other' firms and the other groups is explained by one large firm. Value added per employee omitting this firm was £544 for 1964 and £1,195 for 1970. Both figures appear to be low, especially for 1964, and are largely accounted for by the labour intensive nature of these firms, as most of them are in the pottery/handcraft sector and are German owned/managed. The figures for US firms may not be representative due to a slight recession amongst US firms for 1970 (value added per person for 1969 being £3,140).

The low figures of value added per person for British firms, and for the older Irish firms accounts for the low wage level in these firms but it is difficult to decide whether value added per person is low because of sector

specialisation, or because in some sense production techniques are inefficient. The figures for value added per employee may however be distorted due to:

- (a) Profit switching by foreign firms. This would have the effect of artificially increasing the figures for profits and hence value added.
- (b) Sales figures were used without making any adjustment for changes in inventory.
- (c) No account was taken of overtime working or of underemployment.

The latter criticism could be overcome by calculating output per man hour, if this data were obtainable. There is some empirical evidence (Kennedy, 1971, ch. 3) in relation to growth rates of output per man hour for national data which shows that five sectors had higher than average growth rates of productivity per manhour – textiles, chemicals, minerals, metals and miscellaneous. It is likely that these sectors also have a growing proportion of output accounted for by foreign direct investment. The sectors food, drink and tobacco, wood and clothing had lower than average increases in productivity per manhour, and in these sectors native industry appears to account for the bulk of output.

McAleese (1971) shows that in 1966 grant-aided industry accounted for between 0-10 per cent of output for this group of sectors (with the exception of wood and furniture 19.3 per cent of whose output was accounted for by grant-aided industry) while 10-16 per cent of output in the textiles, chemicals, minerals, metals and miscellaneous sectors was accounted for by grant-aided industry. It is likely that in the latter industries in more recent years this proportion increased. However, the data must be interpreted with caution as some foreign industry has not received any capital grants, and native industry, which has received capital grants, is also included. Because of the data limitations the evidence for a concentration of foreign direct investment in those sectors with a higher than average growth in productivity per manhour and a concentration of Irish industry in those sectors with lower than average growth rate in productivity per manhour is not conclusive. In this connection Watanbe (1972) has warned against overemphasising the importance of productivity measures such as output-labour ratios in examining economic development as the ability of firms to market their output, particularly in export markets, may be a much more crucial variable.

Table 9 shows that foreign firms in the Regional sample produced 59 per cent of manufacturing output for 1964, and 72 per cent for 1970. Practically all output in the food processing sector is accounted for by native firms (22 per cent of total output), while 98 per cent of output in the metals and engineering sector is produced by foreign firms, mostly South African and American investment. Foreign (mostly American) firms produced 92 per cent of textile output (8 per cent of total output). UK firms dominated the clothing and footwear sector while Dutch firms were prominent in wood and

furniture. These sectors, however, account for a small proportion of total output.

Table 9: *Number of Foreign Firms and Gross Output by sector in the years 1964 and 1970 for the sample of manufacturing industry*

	FIRMS (NUMBER)				GROSS OUTPUT			
	Total		Foreign (incl. partly owned)		Total (£000)		% from foreign firms	
	1964	1970	1964	1970	1964	1970	1964	1970
Food	6	8	-	2	8,223	13,300	-	2%
Drink & Tobacco	1	1	-	-	144	186	-	-
Textiles	2	5	1	2	1,070	5,160	77%	92%
Clothing & Footwear	3	7	2	6	467	1,998	87%	92%
Wood & Furniture	2	2	1	1	305	1,199	70%	89%
Paper & Printing	1	1	-	-	50	380	-	-
Structural Clay & Cement	3	5	1	3	448	1,157	78%	72%
Metals & Engineering	7	11	5	9	14,791	34,271	96%	98%
Other (i.e. Handicraft)	-	1	-	-	-	13	-	-
Mining & Turf	2	2	1	1	470	1,365	36%	46%
Total	27	43	11	24	25,968	59,029	59%	72%

It might be concluded then, that for the Region foreign firms tend to occupy those sectors having a higher rate of growth of productivity per manhour, and Irish firms those sectors having a lower rate of growth of productivity per manhour. This conclusion supports the proposition that in the Region manufacturing industry is characterised by technological dualism. It is not known whether foreign direct investment has a higher or lower productivity per manhour than similar industry operating in the source country. The reaction of native firms to these differences in capital intensity (and perhaps differences in productivity per manhour) has been discussed earlier when considering differences in wage levels between foreign and native firms. Production methods and employment policies are obviously closely related and have important implications for Regional economic policy.

Forsyth (1971, p.4) reported that US industry operating in Scotland tended to have a higher productivity than indigenous industry and to be structurally biased towards fast growing industries. Value added per employee was £2.164 for 1969 against £1.331 for Scottish firms. Brash (1966, p. 127) also found that American firms operating in Australia appeared to be more efficient than British firms, and also to pay higher wages. Safarian (1966, p. 259) however, says that for Canada economic performance does not seem to be related to nationality or ownership. Mason (1973) found that US

firms use more capital per worker, although this is largely explained by heavier investment in buildings and inventories. US firms were also found to have a higher value added per worker, and to pay a higher wage rate. Reuber (1973, p. 179) reports that, despite the availability of technological expertise from the parent company, the only category to have a significantly greater productive efficiency than similar projects operating in the source country, were those projects exporting all their output. Market oriented projects were found to be highly inefficient in comparison. Technological adaptations to lower labour costs were thought not to be very significant. Strassman (1968, p. 191) found that in Mexico and Puerto Rico technological adaptation to the local environment varied. "A small US subsidiary making durables was most, and a large privately owned Mexican firm least likely to adjust" their production techniques in response to different factor prices.

To summarise, practically all foreign firms obtained information concerning R. & D. from a parent company. The variety and range of products produced does not appear to have changed between 1964 and 1970 except for a few firms. Foreign firms tend to use unit/mass production technology, while Irish firms, particularly the older ones, use a process. Foreign firms are tending to become more capital intensive and to use mass production/process techniques. Companies purchase machinery from their respective country of origin while Irish firms tend to purchase machinery from the UK. There are greater similarities between Irish firms and British firms than other foreign firms. There also seems to be significant and increasing differences in value added *per capita*, and there may be significant differences in output per manhour, although the evidence for this is not conclusive. Foreign firms seem to import more advanced production techniques from their parent company. This seems to be particularly true of American firms but also applies to certain British and other firms. In other countries Forsyth (1971), Mason (1973) and Reuber (1973) all reported the use of superior production techniques imported from the parent company.

Summary and Conclusions

1. The Region's economy does exhibit certain features of a dualistic nature. This dualism might be best described as 'managerial dualism' and appears to be on the basis of foreign industry versus native industry, rather than within the group of Irish firms in the sample. The only significant differences within the Irish group was the higher figures for value added *per capita* for the newer firms probably as a result of using superior production techniques and a greater capital intensity.

2. There also appeared to be some evidence of dualism in relation to employment policies. American firms and 'other' firms differed from British and Irish firms in paying higher wages, being more personnel and labour relations oriented, and engaging more intensively in training activities. This latter difference has probably one of the more important consequences for regional economic policy and would suggest that assuming the various development agencies have some choice in the matter firms willing to train labour should be given greater encouragement to locate in the Region, granted the relative abundance of unskilled labour. The benefits of trained labour may be reduced if the skills acquired are wholly firm specific; it was difficult to gain evidence for this, but it is unlikely that skills acquired by labour would be wholly of this sort.

3. The dualistic features of industry seem to be largely a result of differences in technology, both managerial and production. There is some evidence that Irish firms are adapting and becoming more like the advanced sector in relation to organisational skills and to a certain extent in relation to techniques of production, but there are significant and apparently increasing differences in capital intensity. There are also significant differences in value added *per capita*, and probably also in productivity per manhour. However, certain difficulties arise in assessing the implications of these facts for regional economic development due to:

- (a) Problems in making inter-firm comparisons due to non-comparability of Balance Sheet data for various reasons, e.g., valuation of assets due to inflation and because capital is of differing vintage.
- (b) Problems arising from inter-sectoral comparisons, that is the different sector specialisation of foreign and native firms.
- (c) Other problems arise from inadequate measure of labour inputs due to the use of numbers employed solely.

4. The existence of 'managerial dualism' does not appear to raise serious problems for the economic development of the Region in the short term. The long term effect is more problematic. If the present dualistic trends continue, this may result in:

- (a) Foreign direct investment having a virtual monopoly of skilled labour.
- (b) A forcing up of general wage levels in the Region, largely following from the greater capital intensity of foreign industry other than British and hence higher productivity per manhour.
- (c) These effects are likely to result in unskilled, labour intensive firms ceasing to be viable in the Regional economy. The only way such

firms may survive is through what Lamfalussy (1961) in a study of Belgium called a policy of defensive investment or what is more generally called 'capital deepening'. This process which may occur solely as a result of changes in the factor price ratio depends on the following conditions: (a) a production function without fixed technical coefficients, and (b) availability of finance. Fiscal incentives plus various other Government incentives ensure the second condition is fulfilled. But it is difficult to make any statement about the first condition. If such an investment strategy were followed by Irish industry it would have the effect of preventing capital flowing from declining or stationary industries to expanding or more economically viable industries, and thereby inhibit overall growth.

5. British firms in the Region seem to provide an exception to the existence of dualism as they appear to be broadly similar to Irish firms in areas such as functions performed and production technology. This may be explained by: (a) the type of British firm likely to locate in this Region, or (b) the type of British firm likely to locate abroad. It is likely that the factors influencing British investment in Ireland are different from those of other nationalities due to proximity and the existence of a unified currency area, with virtually free movement of capital and labour within this area. Thus the decision to invest in Ireland by British firms may be viewed as a 'regional' investment decision, rather than an 'international' one. This may indicate that the apparent similarity between Irish and British firms simply reflects broad national similarities, rather than the operation of special factors influencing British firms locational decisions in other parts of the UK firm to locate in this Region. This suggests two further points that (a) the location decision of British firms in Ireland may be better explained by those factors influencing British firms locational decisions in other parts of the UK and (b) that Irish regional problems may be similar to some of those faced in the UK.

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