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Manufacturing Performance

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OWNERSHIP AND EXPORT CHARACTERISTICS OF IRISH MANUFACTURING INDUSTRY*

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Abstract

Recent research has sought to explore whether exporting enterprises have superior performance characteristics relative to non-exporters, and whether such superiority is associated with performance pre- and/or post- exporting. This paper extends existing research to take account of enterprise ownership and export market destination. It explores these issues using micro data on Irish manufacturing between 1991 and 1998, a time period during which Ireland experienced rapid export-driven growth. The study provides further evidence of the superior characteristics of exporters relative to non-exporters and supports the self-selection hypothesis that superior enterprises are more likely to export. However, no evidence is found for learning-by-exporting effects in enterprises. We find export destination matters: the performance characteristics of enterprises that export globally differ from those that export locally.

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1.   Introduction

The macroeconomic significance of exporting for the promotion of economic growth at the country-level has been well documented.[1] However, until recently, micro-level investigations of the links between exporting and enterprise performance have been relatively rare. The decision to participate actively in foreign markets is thought to expose enterprises both to greater competition and to options for increased output and efficiency. Consequently, the share of total sales accounted for by exports is seen to reflect the ability of an enterprise to cope with increased competition and to benefit from greater capacity utilisation, economies of scale, diversification of risk, and access to technology.[2] Thus determining the characteristics responsible for export success at the enterprise level can be a means of establishing indicators for successful enterprise performance generally.

The increasing availability of detailed microeconomic data sets during the 1990s has led to empirical research focusing on the relationship between exporting and enterprise performance. Existing studies have documented the superior performance of exporters relative to non-exporters in the manufacturing sectors of both developed and developing countries.[3] However, the nature of this superior performance is not certain; the better than average performance of exporters may be simply due to producers *self-selecting* as exporters precisely because they are more efficient. Conversely, it is possible that the better performance of exporting enterprises arises from a learning process associated with

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[1] For example, see Ahmad and Kwan (1991) and Greenaway and Sapsford (1994).

[2] For a survey of empirical studies focusing on productivity and exporting, see Bartelsman and Doms (2000). Richardson and Rindal (1995) discuss the potential benefits of exporting.

[3] These include studies of Taiwan (Aw and Hwang, 1995), Germany (Bernard and Wagner, 1997), the US (Bernard and Jensen, 1999), Colombia, Mexico, and Morocco (Clerides, Lach and Tybout, 1998), and the UK (Girma, Greenaway, and Kneller, 2002).

trade, such as production and managerial advice, which further enhances the competitiveness and efficiency of exporters relative to non-exporters.

In examining the relationship between exporting and enterprise performance, two issues have not been addressed substantially in the existing literature. First, do ownership characteristics of an enterprise matter in looking at the relationship between its performance and its export behaviour? Existing studies do not explicitly consider whether enterprises are foreign-owned or domestic-owned, and yet enterprise ownership may strongly impact on the relationship between exporting and performance. At one extreme, foreign-owned enterprises may produce in a host-country primarily to serve the local market so the issue of exporting is unconnected with their performance. At the other extreme, foreign-owned enterprises may locate in a host-country but produce entirely for export and consequently the scale of exporting would be unrelated to enterprise performance. In either case, the relationship between exporting and enterprise performance would be different from that of a domestic-owned enterprise.

A second element not discussed in the literature relates to export destination. It is plausible that the relationship between enterprise performance and exporting depends on the destination of exports. Exporting to a country with, for example, similar cultural and economic institutions may be akin to an enterprise supplying the domestic market if social and economic conditions are simply an extension of 'local' conditions. Conversely, exporting 'globally' to unfamiliar markets where social, economic, and legal structures are different from those normally faced may really be what exposes the enterprise to

competitive pressures and greater learning opportunities. In effect, not all types of exporting are the same and the nature of the enterprise and export performance relationship may depend on the various conditions that different 'local' and 'global' export destinations present.

This paper uses enterprise-level panel data of Irish manufacturing enterprises during the period 1991 to 1998 to investigate the performance of exporting enterprises relative to non-exporters.[4] We extend the focus of previous empirical studies by taking into account enterprise *ownership* patterns and the possible influence of the geographic *destination* of exports on the relationship between enterprise performance and exporting. In particular, we distinguish between foreign-owned enterprises (FOEs) and domestic-owned enterprises (DOEs) and between local exporting (to the United Kingdom market) and non-local exporting (to the rest of the world). We focus our analysis on three questions: firstly, do exporting enterprises exhibit evidence of superior performance relative to non-exporters? Secondly, are exporters more efficient before they enter export markets; that is, do enterprises *self-select* into selling onto international markets? Thirdly, do exporters learn to be relatively more efficient than non-exporters as a consequence of selling into export markets?

The remainder of this paper develops as follows. Section 2 reviews the existing literature relating exporting activities to enterprise performance using the concept of the "export premium", which measures the performance superiority of exporters relative to non-

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[4] The data are collected as part of the Census of Industrial Enterprises, conducted annually by the CSO, of enterprises that are engaged in industrial production in Ireland. An enterprise is defined as the smallest legal unit that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision making (for example, a company, a partnership, or a proprietorship).

exporters, in terms of specific enterprise characteristics. Section 3 examines whether it is valid to aggregate FOEs and DOEs in this analysis, by establishing whether there is a significant *ownership premium*, which is estimated on the basis of the methodology developed by Bernard and Jensen (1995). Section 4 addresses the three questions listed above using Irish manufacturing data to estimate the *export premium*. Section 5 examines whether there is a *destination premium* for those enterprises that export globally rather than locally. Section 6 concludes the paper.

2. Export Performance and the Export Premium

Although previous studies use data from various countries, different methodologies, and emphasise particular aspects of the exporting nature of enterprises, they generally focus on whether exporters exhibit superior performance characteristics compared to non-exporting enterprises and whether such propensity is associated with performance pre- and/or post-exporting. Most empirical studies of the relationship between firm performance and exporting adopt the methodology introduced by Bernard and Jensen (1995) and Bernard and Wagner (1997). The general model searches for an export premium, as a measure of the superiority of exporters relative to non-exporters, in terms of enterprise characteristics and performance. Using enterprise-level data, the export premia are estimated using a regression of the general form

$$\ln X_{it} = \alpha + \beta_1 Export_{it} + \beta_2 Size_{it} + \beta_3 Industry_{it} + \beta_4 Year_t + \varepsilon_{it} \qquad (1)$$

where X_{it} is the enterprise characteristic being examined to determine if there is a premium between exporting and non-exporting enterprises (i), usually on an annual basis (t). The premium is captured by using a dummy variable, $Export_{it}$, to reflect the current

export status of the enterprise (0 for non-exporter, 1 for exporter). The export premium coefficient (β_1) thus captures the average percentage difference between exporters and non-exporters in the same sector (industry). The enterprise characteristics examined include input measures such as employment, wages, and capital intensity, and output measures such as turnover and labour productivity. The model controls for industry differences by including a vector of industry dummies ($Industry_{it}$), and for differences in relative enterprise size ($Size_{it}$), usually by incorporating some measure of enterprise employment. A vector of year dummies is included to control for general business cycle effects ($Year_t$).

In a series of papers, Bernard and his co-authors document the superior performance characteristics of exporters relative to non-exporters in German and US manufacturing plants. Exporters in Germany are found to be relatively larger in terms of employment and output, more capital-intensive, and more productive than non-exporters. Similarly, US manufacturing exporters are found to be considerably larger, more productive, and to pay higher wages than non-exporters. More recently, Girma, Greenaway, and Kneller (2002), using a UK manufacturing micro-data set, obtain results similar to the findings for the US and Germany.

Several studies have examined the issue of exporter performance in less developed countries, specifically focusing on the productivity performance of exporters relative to non-exporters. Without exception, exporters are found to be more productive than non-exporters. Aw and Hwang (1995), using cross-sectional data for the Taiwanese

electronics industry, find that exporters have higher levels of productivity relative to enterprises that sell similar products in the domestic market. Clerides, Lach, and Tybout (1998), using panel data for manufacturing industries in Colombia, Mexico, and Morocco, also find that relatively more efficient enterprises are exporters. Thus regardless of the data examined and methodology used, empirical studies of enterprises in Colombia, Germany, Taiwan, the USA and the UK find that, on average, exporters are typically larger, pay higher wages, and are more capital intensive than their non-exporting counterparts.

The second focus of previous empirical studies is whether exporters are more productive *before* they enter the export market relative to enterprises that remain non-exporters. That is, is 'good' performance a prerequisite for enterprises to become exporters? Additional costs associated with exporting such as transportation, marketing, and distribution expenses would suggest that greater productivity is required of enterprises that become exporters. Similarly, enterprises that are looking to enter a more competitive export market may be forced to reduce costs prior to becoming an exporter (Bernard and Wagner, 1997). Thus it could be expected that enterprises *self-select* into export markets if the returns to doing so are relatively high for them.[5] If enterprises are successful before they begin exporting, then future exporters should exhibit relatively higher levels of productivity and superior characteristics relative to non-exporters in the years leading up to entering the foreign marketplace. This question is addressed empirically by looking at

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[5] See Richardson and Rindal (1995) and Bernard and Jensen (1999) for theoretical and practical explanations of why enterprises would *self-select*.

performance characteristics in the period prior to exporting using the export premium measure.

The results of all previous empirical studies show unanimously that relatively more productive enterprises enter export markets. In the years before exporting both US (Bernard and Jensen, 1999) and German (Bernard and Wagner, 1997) manufacturing exporters show significantly faster employment, shipment, and productivity growth relative to continuing non-exporters. Girma *et al* (2002) also find that UK exporters are more productive than UK non-exporters before they become exporters. Such results lend support to the hypothesis that producers self-select, with the most productive enterprises becoming exporters.

The third major area of empirical analysis examines the question of whether exporting itself enhances the performance characteristics of enterprises. That is, is there a *learning-by-doing* effect achieved by exporters, so that enterprises become 'good' through exporting? Several reasons are postulated as to why exporting can improve enterprise performance, including improved productivity through economies of scale in production as a result of serving a larger marketplace, and the possibility of more intense competition from servicing the foreign marketplace.[6] Again, a similar approach is used here, namely, the calculation of the growth of export premia after enterprises start to export.

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[6] Clerides *et al* (1998) provide a theoretical model of learning-by-doing. Bernard and Wagner (1997) provide a range of practical reasons for improvements in enterprise performance following exporting.

Studies that examine the learning-by-exporting hypothesis exhibit varying results. Aw and Hwang (1995), Bernard and Wagner (1997), Bernard and Jensen (1995; 1999), and Clerides *et al* (1998) fail to find any evidence to support the learning-by-exporting hypothesis. On the other hand, Girma *et al* (2002) find that exporting may actually boost the productivity of the UK exporters examined but, as the authors themselves note, this result could be the consequence of the matching analysis methodology used in their study.

In summary, previous empirical studies find that exporters have superior input and output performance characteristics relative to non-exporters. Consistent evidence that exporters are more productive before they enter foreign markets compared to continuing non-exporters also suggests that there is a *self-selection* process at play. However, the evidence is generally negative on whether the relative productivity of exporters increases once enterprises enter the export market, providing little support for the *learning-by-doing* hypothesis.

All of the above studies ignore nationality of enterprise ownership in their empirical analysis and combine foreign and domestic-owned enterprises in their data sets, regardless of their relative importance. If within-industry variation is most significant, then it seems appropriate to ensure that any of this variation represented by differences in the nature of FOEs and DOEs is specifically addressed in the model of enterprise performance.

3. Measuring the Ownership Premium

The relationship between enterprise performance and export behaviour could be influenced by whether the enterprise is foreign-owned or domestic-owned. As noted above, exporting is likely to play a different role in the business strategy of FOEs compared to DOEs, driven by either the host country's domestic sales potential or by its export platform potential. In either case, the relationships between exporting and enterprise performance for FOEs would not be expected to be similar to those of DOEs.

If the manufacturing sector and corresponding data set contains a mixture of FOEs and DOEs, we must determine whether or not it is appropriate to amalgamate FOEs and DOEs when searching for the existence of export premia. This requires us to search for evidence of an *ownership premium* to FOEs relative to DOEs, which is independent of their export performance. Such analysis is feasible for Ireland because the classification of enterprise ownership by nationality in the Irish manufacturing data permits all enterprises to be defined as either FOEs or DOEs.[7] Furthermore, such analysis is necessary for Ireland, which has an exceptionally high level of foreign ownership in its manufacturing sector, arising from the success of its promotion as an export platform for over forty years.

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[7] The *Census of Industrial Enterprises* (CSO, 1991a-98a) defines DOEs and FOEs using a classification that is determined by the nationality of the owners of 50% or more of share capital, so that an enterprise is classified by majority ownership. Irish foreign direct investment (FDI) policy does not require minimum local equity participation. The *Census* does not detail the extent of foreign ownership of each enterprise and because there are no recorded details on the extent of foreign ownership within an enterprise, it is not possible to determine the impact of different degrees of foreign ownership. However, this is not a major limitation as FDI in Ireland is traditionally in the form of green-field investment with 100 per cent foreign ownership share.

Indeed, much of the spectacular growth in employment (25 per cent) and turnover (130 per cent) in Irish manufacturing between 1991 and 1998 was due to the FOEs. During this period FOE employment rose by more than 30 per cent, while turnover more than trebled during the period, so that their respective shares of employment and turnover rose from 48 to 50 per cent and from 59 to 77 per cent respectively. The export platform nature of FOEs in Ireland is reflected in their exporting more than 90 percent of their manufactured turnover, in contrast to DOEs, which exported approximately 36 per cent of their turnover, a proportion that remained constant over the 1990s (although the volume and value of exports by DOEs did grow).

Differences between FOEs and DOEs in Irish manufacturing are highlighted in Table 1, which shows summary statistics for each of seven enterprise characteristics that are typically used to define enterprise performance. The enterprise characteristics include both input and output measures. We capture the influence of the size of the enterprise by the value of the turnover of the enterprise (*Turnover*). Two measures of labour characteristics are included: the skill intensity of labour (*Skilled labour*) and average wages (*Wages*). The value of turnover produced by each employee (*Labour turnover*) is incorporated as a measure of labour productivity, and the gross value added (GVA) produced by each employee (*Labour GVA*) reflects the profitability of the enterprise. Finally, a measure of capital used by each employee (*Capital intensity*) is included to capture the capital intensity of the enterprise. All monetary values are measured in Irish

pounds and converted to 1985 constant prices using appropriate deflators.[8] The enterprise

characteristics used here and throughout the paper are detailed in Appendix 1.

Table 2 shows that, for every characteristic, the averages for FOEs are greater than for

DOEs. However, since it is possible that some of these differences are due to industry

composition, we need to account for differences in sectoral structure (FOEs in different

sectors to DOEs) and focus on differences within sectors. To do this we identify the

ownership premium at plant level, by applying the Bernard and Jensen (1995)

methodology (encapsulated in (1) above) to ownership in an analogous manner to their

identification of the *export premium.* To measure the ownership premium, if any,

associated with being an FOE relative to a DOE for each of the seven enterprise

characteristics, we estimate (2) as

$$V_{it} = \alpha + \beta_1 FOE_{it} + \beta_2 Size_{it} + \beta_3 Industry_{it} + \beta_4 Year_t + f_i + \varepsilon_{it} \qquad (2)$$

where V_{it} is the enterprise characteristic measured in logarithms. FOE_{it} is a dummy

variable for ownership status, being equal to one if the enterprise is foreign-owned (FOE)

and zero otherwise (DOE). $Size_{it}$ is a dummy variable distinguishing between enterprises

with employee levels above and below the median number of employees across all

manufacturing enterprises in the given year. The dummy variable takes the value of one

if the number of employees in the enterprise is above the median employment number

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[8] All variables with the exception of capital intensity are deflated using the Industrial Producer Price Index
(CSO, 1991b-98b), at the two and three-digit level. The capital intensity variable is deflated using the
Wholesale Price Indices for Energy Products (CSO, 1991c-98c). The statistical summaries of enterprise
data reported in this paper do not correspond to published enterprise figures (CSO, 1991-98a, which are not
deflated.

across all enterprises in the given year.[9] *Industry*$_{it}$ is a vector of four-digit sectoral

dummy variables[10] and *Year*$_t$ is a vector of year dummies. The ownership premium

coefficient, β_1, shows the average percentage difference between FOEs and DOEs within

the same sub-sector for the period 1991 to 1998. Thus we assume that the error term in

equation (2) is composed of two components, namely $\varepsilon_{it} = \mu_i + v_{it}$, with μ_i capturing an

enterprise-specific permanent and unobservable effect, and v_{it} the remaining period-

specific error term, assumed to be independent across enterprises and over time.

Although the data are based on a full census they do not form a balanced panel as some

enterprises commenced production after 1991 whilst others ceased production during the

period considered.[11] Consequently, we use random effects panel data regression

techniques to estimate (2) separately for each of the seven enterprise characteristics and

confirm our choice with a Hausman test for each estimation.

Regression results for (2) presented in Table 2 show positive and significant coefficients

for the FOE ownership premium variable for each enterprise characteristic. Such results

give support to our hypothesis that FOEs exhibit superior performance characteristics

compared to DOEs and confirm that the differences in characteristics between FOEs and

DOEs highlighted in Table 1 derive from differences in plant characteristics and not

merely sectoral composition. The regression analysis also controls for relative enterprise

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[9] The median number of all employees rose from 35 in 1991 to 38 in 1998.

[10] The data are categorised at a sectoral level using the standard 4-digit NACE Rev. 1 classification (CSO, 1991a-98a).

[11] The ownership premium is measured using a data set of 18,733 observations, of which 14,065 are DOEs and 4,668 are FOEs.

size (in terms of employees); large DOEs are less capital intensive and produce slightly less turnover per employee than smaller enterprises. There is no distinction between large and small DOEs in terms of average wages.

These results confirm that FOEs and DOEs in Irish manufacturing are distinctive in terms of enterprise performance characteristics and hence it is not appropriate to aggregate them when studying the relationship between exporting and enterprise performance. Moreover, their export propensities are completely different; FOEs use Ireland as an export platform to the EU and other destinations, with more than 90 per cent of FOE turnover exported, while only one-third of DOE turnover is exported. If DOEs are to improve their export performance it is necessary to understand the individual enterprise characteristics that allow them to do so and thus we focus on the exporting characteristics of DOEs only throughout the remainder of this paper, using export premia to explain the performance characteristics.

4.   **Measuring the Export Premium**

Studies of manufacturing in the US, Germany, and the UK have shown exporters to be larger and more productive than their non-exporting counterparts. We begin this section by using data on DOEs only to investigate whether or not exporters exhibit similar superior performance characteristics relative to non-exporters in Irish manufacturing. Table 3 presents summary statistics for each of the characteristics for exporting and non-exporting DOEs.[12] Overall, we see that exporting enterprises are larger in terms of average employment, turnover, and gross value added, and have higher productivity and

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[12] These are based on 14,065 observations comprising 2,854 Irish-owned enterprises.

profitability as measured by turnover and gross value added per employee. Our objective is to determine whether such apparent differences are significant when we take account of relative size, industry and time.

We use (1) to estimate the possible premium of DOE exporters over non-exporters for each of the seven enterprise characteristics listed in Section 3, using random effects panel data techniques.

$$\ln X_{it} = \alpha + \beta_1 Export_{it} + \beta_2 Size_{it} + \beta_3 Industry_{it} + \beta_4 Year_t + \varepsilon_{it} \qquad (1)$$

The performance gap between DOE exporters and non-exporters is proxied by the dummy variable $Export_{it}$, which is equal to one if the DOE exports, and zero if the DOE does not export. Thus the export premium (β_1) measures the average difference between exporters and non-exporters within the same sector for the period 1991 to 1998. The dummy variable $Size_{it}$ takes the value of one when the number of employees is above the median employment level across all DOEs in each given year, zero otherwise.[13] All other variables are as defined in Section 3 and the regression results are reported in Table 4.

Despite obvious differences in country size, our results for Irish manufacturing reflect those of existing studies for manufacturing sectors in the much larger US, German, and UK manufacturing sectors. We find that exporting is positively and significantly related to all our measures of enterprise performance, after controlling for size, sector, and time and enterprise specific effects. On average, Irish-owned exporting enterprises are larger

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[13] Median employment fluctuated between 30 and 32 over the period.

in terms of turnover, pay higher average wages, and employ a higher share of skilled employees relative to non-exporters. They are also more productive, in terms of both turnover and GVA per employee, and productive structures used by exporters are more capital intensive than those of non-exporters.

In large developed economies with significant domestic markets it is possible to achieve economies of scale and scope without exporting. However, in economies like Ireland, with small domestic markets, enterprises that wish to achieve scale efficiency may need to export at a relatively early stage of the production life cycle if they are to reach critical mass. This raises the issue of whether enterprises *self-select* to become exporters. The costs associated with selling products in foreign markets can act as a barrier to entry to exporting for less successful and marginal enterprises. As a result, more productive and efficient enterprises are expected to be able to absorb the additional expenses incurred when entering a foreign market. Thus the intention to become an exporter stimulates improved performance by the enterprise and we would expect to find significant differences between exporters and non-exporters in our performance indicators in the years leading up to the enterprise becoming an exporter.

To examine the *self-selection* hypothesis we select continuously operating enterprises who did not export in years 1992 to 1996, but who may or may not be an exporter in 1997.[14] Of the 289 non-exporting enterprises operating between 1992 and 1996, 17 became exporters in 1997. Following Bernard and Jensen (1999) we regress the levels of

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[14] By selecting continuously operating enterprises that did not export in 1992 through 1996, we ensure that enterprises did not switch export status between years 1991-1992 and 1997-1998.

our performance measures in the initial sample year (1992) on the export status of the
enterprise in the final sample year (1997). Hence the model estimated is

$$V_{i92} = \alpha + \beta_1 Export_{i97} + \beta_2 Size_{i92} + \beta_3 Industry_{i92} + \varepsilon_{92} \qquad (3)$$

where V_{i92} is the enterprise characteristic in 1992, measured in logarithms. $Export_{i97}$ is
the dummy variable for export status in 1997. The export premium coefficient, β_1,shows
the average difference between enterprises that became exporters in 1997 relative to those
enterprises that remained non-exporters in 1997, within the same sector. The dummy
variable for size ($Size_{i92}$) is as before, adjusted to the relevant median employment.[15]

Table 5 reports the results of differences in initial performance levels between future
exporters and non-exporters. Future exporters are found to be larger than continuing non-
exporters in terms of turnover. Most notable is the productivity premium that future
exporters appear to have over continued non-exporters, with both turnover and GVA per
employee being significantly greater for future exporters. Average wage levels for
employees of future exporters also appear to be relatively higher than those at
continuously non-exporting enterprises.[16]

Thus our results suggest that even five years prior to entering the export market, future
exporting enterprises are larger and more productive than those that remain non-

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[15] The relevant median is circa 26 employees.

[16] To investigate further the proposition that only good enterprises become exporters, we evaluated the
growth performance of future exporters relative to future non-exporters by searching for the annual growth
rate premium that may accrue to future exporters by measuring changes in performance characteristics
using the following regression $\quad \Delta V_{i97} = \dfrac{\ln V_{i97} - \ln V_{i92}}{5} = \alpha + \beta_1 Export_{i97} + \beta_2 Size_{i92} + \beta_3 Industry_{i92} + \varepsilon_i$

The coefficient β_1 measures how much faster future exporters are growing per year in the 5 years
preceding 1997. All regressions estimated for each of the enterprise characteristics proved insignificant.

exporters. These results are consistent with those obtained for both US and UK manufacturers, where exporters have a significant productivity premium to non-exporters at each point in time prior to entering the international marketplace.

The third issue surrounding the premium associated with exporting examines the question of whether or not exporting itself enhances the performance characteristics of enterprises. Such a premium would be expected if exporters experience a *learning-by-doing* effect, achieved through improved productivity via economies of scale in production as a result of serving a larger marketplace; greater competition in international markets relative to the domestic market could force enterprises to become more efficient in their methods of production in order to remain exporters. If this occurs we would expect the post-entry performance of exporters to be superior to continuing non-exporters and they should exhibit relatively stronger growth after they begin exporting.

To examine the relationship between the exporting and subsequent enterprise performance we use a sample comprising 1,002 *continuously operating* DOEs between 1992 and 1997.[17] Of the 1,002 continuously operating enterprises, 45 per cent were continuous exporters over the period, 21 per cent were continuous non-exporters, and the

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[17] In a similar manner to the previous analysis, we test a sample of continuously operating enterprises between 1991 and 1998 and remove those enterprises that switched export status in 1991 and/or 1998 in order to ensure that the sample of 1992 to 1997 enterprises are continuous exporters or non-exporters between 1991 and 1998.

remaining enterprises changed or *switched* export status at some stage between 1992 and 1997.[18]

To understand the transformations that may occur in DOEs when they enter export markets and to identify more precisely any potential benefits from exporting we follow Bernard and Jensen (1999) and estimate the following growth rate equation for each of our seven performance characteristics,

$$\Delta V_{i92} = \frac{\ln V_{i97} - \ln V_{i92}}{5}$$
$$= \alpha + \beta_1 ContExp_i + \beta_2 Switch_i + \beta_3 Z_{i92} + \beta_4 Industry_{i92} + \varepsilon_i \qquad (4)$$

where $ContExp_i$ is a dummy variable equal to one if the enterprise exported continuously during the 1992 to 1997 period, zero otherwise. $Switch_i$ is a dummy variable equal to one if the enterprise switched export status at some point during the period, whether the enterprise entered the export market or exited from it.[19] The coefficients β_1 and β_2 thus capture the increase in growth rates for exporting and switching DOEs respectively, relative to DOEs that remained non-exporters throughout the 1992 to 1997 period. Z'_{i92} is a vector of enterprise characteristics in 1992 that includes a dummy variable for the enterprise size[20], the average wage, and capital intensity. Equation (4) is estimated separately for each of the seven enterprise characteristics using cross-sectional regression estimation. Table 6 reports the results on the differences in growth rates between exporters, switchers, and non-exporters.

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[18] That is, if the enterprise was an exporter in year (t) and became a non-exporter in year ($t+1$), or was a non-exporter in year (t) and became an exporter in year ($t+1$), then it is defined as an enterprise that switched export status.
[19] The dummy variable takes the value of one if the enterprise either entered or exited the export market. It does not distinguish between the two, but simply defines those enterprises that 'switched' export status.
[20] The dummy variable for size is equal to one if enterprise employment was greater than 34 in 1992.

Relative to continuous non-exporters, continuous exporters showed no difference in the growth rates of the six characteristics considered. The same result extends to enterprises that switched export status between 1992 and 1997: switching enterprises showed no significant differences in their performance characteristic growth rates relative to continuous non-exporters.[21] The lack of evidence found in Irish manufacturing to support the *learning-by-doing* hypothesis is consistent with the results obtained for manufacturers in Germany and the US.[22] The method of analysis used in our Irish study may account for our results, but the strength of our evidence, or rather, lack of evidence, for export-enhancing growth, would suggest that Irish exporters do not necessarily perform better once they become exporters relative to those DOEs who serve the domestic market exclusively.

5. Measuring the Destination Premium

A feature of this paper is the introduction of *export destination* into the export premium literature, reflecting the possibility that the destination of exports may be correlated with the features of enterprises and their propensity to export. As UNCTAD (2002) notes, successful exporting involves more than just increasing international market shares, because greater export diversification, reflected by changing export destinations, could be an indication of the improved export propensity of enterprises. Thus by incorporating

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[21] As a measure of robustness, equation (4) was also regressed with the inclusion of the continuous exporter dummy variable relative to continued non-exporters, and the switching dummy variable relative to continuous non-exporters. In both cases the same insignificant results as presented in Table 6 were obtained.

[22] However, it contrasts to that for the UK, where exporters were found to have enhanced productivity growth relative to non-exporters subsequent to their becoming exporters. See Greenaway *et al* (2002).

export destination patterns in the analysis of export premia, account is taken of an important component of the export behaviour of enterprises.

The number and type of export destination markets to which enterprises ship their output can be viewed as proxies for the strength of export activity; enterprises that export to countries with similar economic, political, and cultural conditions may not have to be as competitive as those that export to less traditional markets, where distribution networks are less well established and institutional barriers to exporting must be overcome. Thus a reduced dependence on 'local' export markets and a greater propensity to export to more 'global' marketplaces could be interpreted as an improvement in the export performance of enterprises.

This issue is of considerable interest to Ireland as its export promotion strategy has been attempting to reduce its dependency on the UK market by expanding exports beyond this traditional and primary destination. Table 7 details the shares of output exported by Irish manufacturing to UK and Non-UK destinations between 1991 and 1998; there was relatively little change in the destination pattern of exports with approximately 43 per cent and 57 per cent of Irish manufactured exports shipped to the UK and Non-UK respectively, proportions that were unchanged over the period.

The relatively lower transaction and transportation costs associated with exporting to the UK, combined with the historical economic, institutional, social ties, and trade agreements that have evolved over previous decades have given DOEs relatively greater

trade access to the UK. Thus the UK could be considered as a 'regional' market for DOEs, with Non-UK destinations being part of the 'global' market. As a consequence, enterprises that export to the UK may have inferior performance characteristics relative to DOEs that export to Non-UK destinations because the UK is more like a local market for Irish producers than an export market. Consequently, UK-exporters may be more similar to non-exporters than the exporters who sell to Non-UK markets. Because Non-UK exporters are forced to be more competitive and efficient in order to break into these non-traditional markets, this competitiveness should be reflected in enhanced performance attributes of Non-UK relative to UK exporters. Thus it makes sense to search for differences in the performance of DOEs that export to the UK relative to other Non-UK destinations.

Along with export diversification, another feature of "export success" is greater export intensity, that is, exporting a larger proportion of enterprise turnover. In order to ensure that the average effects determined in Section 4 are representative of DOEs we investigate whether or not there is significant variation in the premium of exporting that is related to export intensity. Despite government policies encouraging DOEs to export, Table 7 notes that both the proportion of DOEs exporting (60 percent) and their corresponding export intensity (36 per cent) remained constant between 1991 and 1998.[23] The stability of DOE export intensity may reflect a lack of productivity improvement and the associated performance characteristics required for enterprises to overcome the extra costs required to export and enter new export markets. Enterprises that export more

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[23] Although the volume of exports by DOEs did rise between 1991 and 1998.

intensively could thus be expected to exhibit superior performance characteristics relative to less intensive exporters.

We incorporate *export intensity* and *export destination* into our export premia calculations using (5) and data comprising Irish exporting enterprises only.[24] We postulate that DOEs that export more intensively and to Non-UK destinations will exhibit superior performance characteristics relative to enterprises that export less intensively and primarily to the UK.

$$V_{it} = \alpha + \beta_1 ExpInt_{it} + \beta_2 NonUKInt_{it} + \beta_3 Size_{it} + \beta_4 Industry_{it} + \beta_5 Year_t + \varepsilon_{it} \quad (5)$$

$ExpInt_{it}$, the share of exports in enterprise turnover, captures the expected premium accruing to enterprises that export more intensively than others. $NonUKInt_{it}$, the proportion of exports shipped to Non-UK destinations, distinguishes enterprises on the basis of their dependence on the UK market. If Non-UK exporters have superior performance characteristics relative to UK exporters, then the expected sign of β_2 is positive. We control for enterprise size, sector and time effects as before. Table 8 presents the regression results.

Enterprises that export more intensively are, on average, larger in terms of turnover and also tend to pay slightly higher wages than less intensive exporters. However, there is little if any significant difference in productivity or capital intensity amongst exporters of differing intensities and the coefficient of skill is actually significant and negative, implying that enterprises exporting more intensively use a smaller share of skilled labour.

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[24] The data set comprises a maximum of 8,363 observations containing 1,980 enterprises.

The coefficient of the export destination variable confirms our hypothesis about enterprise performance and export destination. Enterprises that export proportionately more to Non-UK destinations are larger than UK-exporters in terms and pay increasingly higher wages. Non-UK exporters also tend to employ a higher proportion of skilled labour than UK-exporters and are more productive as measured by turnover per employee. These results thus provide evidence of differences in the performance characteristics of enterprises based upon *export destination*. The relative superiority of Non-UK exporters confirms our hypothesis that UK-exporters face lesser barriers to trade and productivity requirements than Non-UK exporters.

In summary, enterprises that export both more intensively and predominantly to Non-UK destinations exhibit superior characteristics to those that export less intensively and mainly to the UK.

6. Summary and Conclusion

This paper has attempted to measure empirically the relationship between various aspects of enterprise performance and exporting, and extended the literature in this area by incorporating enterprise ownership and export destination patterns as factors that may influence this relationship.

The importance of distinguishing between FOEs and DOEs is particularly striking in Irish manufacturing; FOEs exhibit superior performance characteristics relative to DOEs. The

regression results presented clearly indicate that it would be misleading to aggregate FOE and DOE exports in an analysis of Irish manufacturing.

Following the methodological approach established by Bernard and Wagner (1997) and Bernard and Jensen (1999), we find that exporting DOEs exhibit superior performance characteristics relative to non-exporters. Moreover, DOEs that export more intensively have superior characteristics compared to those that export proportionately relatively less of their output. The performance of DOEs before and after exporting is also explored; we find that 'good' DOEs become exporters, but there is no evidence that they improve their performance once they are in the export market. Furthermore, the significance of enterprise size throughout our analysis indicates that relatively larger enterprises are more likely to be exporters. Thus our empirical results are consistent with previous studies for other developed countries such as Germany and the US.

A feature of our analysis has been the introduction of the role of *export destination* in the relationship between enterprise performance and exporting. Given the unique trade relationship between Ireland and the UK, we hypothesise that the UK is effectively a 'local' market for Irish manufacturers, so that exporters to the UK display dissimilar enterprise characteristics to Non-UK exporters. Our results confirm this, showing that Non-UK exporters are larger and more productive than UK-exporters, giving support to our hypothesis that exporters to Non-UK destinations have superior performance characteristics compared to enterprises that export primarily to the UK.

The empirical questions addressed in this paper are important for understanding the role of trade at the enterprise level, as well as for formulating policies that seek to promote growth through exporting. The analysis presented highlights the need for enterprises to be relatively more productive in order to enter the export market compared to continuing non-exporters and thus policies aimed at enhancing their ability to enter the export market may prove more effective than policies that are designed to assist enterprises once they are in the export market. Additionally, because our results suggest that those enterprises that seek to export globally are superior to those that export locally, the destination pattern and not merely the scale of exporting may need attention in policy design.

Table 1: *Characteristics of Irish Manufacturing Enterprises*

1991 – 1998 Average	Mean	Standard deviation
1. All enterprises		
18,733 Observations		
3,561 Enterprises		
Employment	86	166
Skilled labour share	25.0%	17.2%
Average wages	£11,235	£5,691
Turnover	£12,900,000	£67,600,000
Turnover per employee	£95,573	£222,369
GVA per employee	£33,576	£139,346
Capital intensity proxy	£1,426	£2,614
2. Domestic enterprises		
14,065 Observations		
2,854 Enterprises		
Employment	59	114
Skilled labour share	23.9%	16.2%
Average wages	£10,073	£4,635
Turnover	£5,317,577	£16,400,000
Turnover per employee	£69,719	£97,115
GVA per employee	£19,176	£21,409
Capital intensity proxy	£1,326	£2,343
3. Foreign enterprises		
4,668 Observations		
847 Enterprises		
Employment	168	249
Skilled labour share	28.7%	19.4%
Average wages	£14,734	£6,998
Turnover	£35,700,000	£130,000,000
Turnover per employee	£173,471	£402,448
GVA per employee	£76,965	£272,115
Capital intensity proxy	£1,728	£3,282

Source: Own estimates derived from the *Census of Industrial Enterprises.*
All monetary values in 1985 constant £IR.

Table 2: *Ownership Premium of Foreign Enterprises*

Measure of Ownership Premium	Skilled Labour Share	Average Wages	Turnover	Labour Turnover	Labour GVA	Capital Intensity Proxy
FOE	-.008	.116***	.356***	.184***	.284***	.226***
Premium	(.017)	(.011)	(.023)	(.018)	(.024)	(.024)
Size	-.173***	.004	.577***	-.048***	.038***	-.135***
	(.010)	(.006)	(.012)	(.010)	(.015)	(.013)
Observations	18,565	18,731	18,733	18,733	18,324	18,657
Enterprises	3,535	3,561	3,561	3,561	3,543	3,555
R^2 overall	0.328	0.461	0.579	0.508	0.409	0.450
χ^2	2,464.89	5,283.73	9,802.64	5,099.76	2,942.17	3,545.18
Prob.>χ^2	0.000	0.000	0.000	0.000	0.000	0.000

Note: Summary regression results derived from (2).
        Standard errors in parentheses.
        Statistically significant at *** 1 per cent.

Table 3: *Characteristics of Exporting and Non-Exporting Enterprises*

1991-98 Average	Mean	Standard deviation
1. Non-exporting enterprises		
5,593 Observations		
Employees	38	53
Average wage	£9,545	£4,575
Skilled labour share	22.78%	15.03%
Turnover	£3,051,053	£8,234,967
Turnover per employee	£61,982	£91,687
GVA per employee	£18,303	£19,306
Capital intensity proxy	£1,235	£1,932
2. Exporting enterprises		
8,472 Observations		
Employees	73	139
Average wage	£10,422	£4,641
Skilled labour share	24.56%	16.92%
Turnover	£6,813,879	£20,000,000
Turnover per employee	£74,827	£100,216
GVA per employee	£19,751	£22,673
Capital intensity proxy	£1,386	£2,577

Source: Own estimates derived from the *Census of Industrial Enterprises.*
         All monetary values in 1985 constant £IR.

Table 4: *Superior Performance Characteristics of Exporters v. Non-exporters*

Export premium	Skilled labour share	Average wages	Turnover	Labour turnover	Labour GVA	Capital intensity
Export premium	.062***	.057***	.163***	.105***	.077***	.121***
	(.009)	(.006)	(.009)	(.008)	(.014)	(.014)
Size	-.181***	-.014**	.447***	-.082***	.004	-.136***
	(.010)	(.007)	(.011)	(.009)	(.015)	(.014)
Observations	13,902	14,063	14,065	14,065	13,785	14,017
Enterprises	2,828	2,854	2,854	2,854	2,837	2,849
R^2 overall	0.323	0.367	0.565	0.538	0.293	0.480
χ^2	1,974.56	3,372.67	8,103.94	4,405.53	1,707.54	3,222.99
Prob.$>\chi^2$	0.0000	0.000	0.000	0.000	0.000	0.000

Note: Summary regression results derived from (1).
 Standard errors in parentheses.
 Statistically significant at *** 1 per cent, ** 5 per cent.

Table 5: *Performance Premium of Future Exporters*

Export premium for future exporters	Skilled labour share	Average wages	Turnover	Labour turnover	Labour GVA	Capital intensity
1992-1997 ***289 Enterprises***						
Export	.230	.233***	.725***	.461***	.449***	-.323
	(.141)	(.077)	(.224)	(.161)	(.136)	(.293)
Size	-.011	.235***	1.111***	.248***	.224**	.183
	(.082)	(.054)	(.128)	(.084)	(.097)	(.129)
Observations	286	289	289	289	286	288
R^2	0.435	0.563	0.750	0.739	0.468	0.602

Note: Summary regression results derived from (3).
 Standard errors in parentheses.
 Statistically significant at ***1 per cent, *10 per cent.

Table 6: *Enterprise Characteristics Post-Exporting*

Growth premium post-exporting	Skilled labour share	Average wages	Turnover	Labour turnover	Labour GVA	Capital intensity
1992-1997 *1,002 Enterprises*						
ContExp	-.006	.008	.007	.003	.013	.006
	(.009)	(.005)	(.007)	(.006)	(.012)	(.012)
Switch	.010	.002	.010	.006	.001	.011
	(.008)	(.004)	(.006)	(.005)	(.009)	(.011)
Size	.017***	.007*	-.004	.014***	.006	.010
	(.006)	(.004)	(.006)	(.004)	(.008)	(.009)
Observations	993	1,002	1,001	1,001	973	998
R^2	0.156	0.289	0.266	0.257	0.206	0.183

Note: Summary regression results derived from (4).
        Standard errors in parentheses.
        Statistically significant at ***1 per cent, **5 per cent, and *10 per cent.

Table 7: *Export Features of Domestic-Owned Enterprises in Ireland, 1991- 1998*

Enterprise feature	1991	1998	
Number of enterprises	1,620	1,945	
Proportion of exporting enterprises (%)	61.2	60.1	
Export intensity of enterprises[*] (%)	35.0	35.7	

Export destination of enterprises	Percent of total exports by destination		1991-1998 Volume Change (%)
UK	43.1	42.2	23.8
Non-UK	56.9	57.8	28.5

Source: Own estimates derived from the *Census of Industrial Enterprises*.
        [*] Export intensity is defined as turnover exported as a proportion of total turnover.

Table 8: *Export and Destination Intensity Premia*

Exporters	Skilled labour share	Average wages	Turnover	Labour turnover	Labour GVA	Capital intensity proxy
Export intensity	-.105***	.043***	.185***	.036	.052	.010
	(.024)	(.016)	(.027)	(.023)	(.035)	(.034)
Destination intensity	.033*	.033***	.084***	.046***	-.009	-.029
	(.018)	(.013)	(.020)	(.017)	(.028)	(.026)
Size	-.173***	-.008	.505***	-.068***	.015	-.125***
	(.013)	(.009)	(.015)	(.012)	(.019)	(.019)
Observations	8,301	8,363	8,363	8,363	8,172	8,344
Enterprises	1,968	1,980	1,980	1,980	1,964	1,977
R^2 overall	0.380	0.386	0.592	0.545	0.296	0.502
χ^2	1,535.87	2,271.90	5,393.93	2,926.12	1,146.14	2,253.46
Prob.>χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.000

Note: Summary regression results derived from (5).
Standard errors in parentheses.
Statistically significant at *** 1 per cent, **5 per cent, *10 per cent.

Appendix 1: *Definitions of Enterprise Characteristics*

VARIABLE	DEFINITION
1.Employment (Size)	The total number of persons employed includes managerial, technical, clerical, and industrial employees, as well as apprentices.*
2. Skilled labour	Following the nomenclature of the *CIE*, skilled labour is defined as the sum of managerial, technical, and clerical employees. Skilled labour intensity is thus defined as managerial, technical, and clerical employees as a proportion of total employment.
3. Wages	Average wages are measured as the gross earnings of employees divided by the total number of employees.
4. Turnover	Turnover comprises the net selling value of goods manufactured by the enterprise, of industrial services provided by the enterprise for others, of goods sold without further processing and the value of miscellaneous items of turnover (such as rents, licence fees, royalties, etc) (CSO, *CIP*, 1998a).
5. Labour turnover	Labour turnover is defined as the average value of turnover produced by each employee.
6. Labour GVA	Gross value added is defined as production value less intermediate consumption. Labour GVA is the average value of GVA produced by each employee.
7. Capital intensity	The absence of a capital stock variable in the *CIE* necessitates the use of 'Purchases of fuel and power' per employee as a proxy.**

*The employment data of the *Census* does not represent full-time equivalents. Rather, individuals who are employed in the activities of the enterprise are included without accounting for the unit of employment (the number of hours worked) for which they are employed.
** We recognise that this measure is subject to several imperfections; we are unable to distinguish the purchase of fuel from the purchase of power. Such a proxy measure does not take into account the efficiency of machinery used in the enterprise, or the level of capacity utilisation.

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