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How Many Family Businesses Are There Really and Does ICT and Innovation Improve Their Performance?

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Depending on the source, a reader may be left with the impression that Family Businesses (FBs) typically account for between 75% and 95% of all enterprises operating in an economy. This study, using official structural business statistics from Ireland, suggests that in fact family businesses may account for a considerably smaller share of the business economy, something closer to 46%. This paper attempts to explain how such a discrepancy can arise. Using the Annual Services Inquiry compiled by the Central Statistics Office (CSO) as the anchor dataset, micro data are linked to the e-Commerce and ICT survey, Community Innovation Survey and VAT registrations datasets in order to determine whether labour productivity in Family Businesses (FBs) is significantly different to that of Non-Family Businesses (NFBs) and if Information and Communication Technologies (ICT) or innovation has an impact. The paper also highlights the significant impact that Foreign Direct Investment (FDI) makes to the Irish economy. This analysis is particularly relevant for a small open economy like Ireland where 31% of traded services GVA and 15% of employment is generated by multinational enterprises.

Keywords: productivity, Foreign Direct Investment (FDI), sole trader

Introduction

Depending on the source, a reader may be left with the impression that Family Businesses (FBs) typically account for between 75% and 95% of all enterprises operating in an economy. This study, using official structural business statistics from Ireland, suggests that in fact family businesses may account for a considerably smaller share of the business economy; something closer to 46%. This paper attempts to explain how such a discrepancy can arise.

Using the Annual Services Inquiry (CSO, 2007a) compiled by the Central Statistics Office (CSO) as the anchor dataset, micro data are linked to the e-commerce and ICT survey (CSO, 2006b), Community Innovation

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Survey (CSO, 2008b) and VAT registrations datasets in order to determine whether labor productivity in Family Businesses is significantly different to that of Non-family Businesses (NFBs) and if technology or innovation has an impact.

Data Sources

A number of different official and administrative data sources are utilised in this study. These data sources are summarised below.

The Annual Services Inquiry

The Annual Services Inquiry (ASI) is a sample survey of approximately 18,000 enterprises, compiling structural business data such as turnover, employment, purchases, international trade etc.. The statistical unit used for the ASI is the enterprise, where an enterprise is defined as the smallest legally independent unit. One return is sought in respect of each enterprise covering all constituent branches or local units. The enterprise activity is determined by the predominant activity of that enterprise and any turnover and employment etc. generated by secondary or ancillary activity is classified to the primary activity. The surveys covers the NACE Rev.1.1 sections G, H, I, K, and O. Non-traded dominated sectors such as health, education, and defence are excluded.

VAT registrations file. Value Added Tax (VAT) was first introduced to Ireland on November 1st, 1972. The VAT file provided by the Revenue Commissioners[1] to CSO contains enterprise registration data, such as registration number, customer type (individual, company, partnership etc.), registration date, date ceased, entity name etc..

E-commerce & ICT. The enterprise survey of e-commerce and ICT is a sample survey of approximately 8,000 enterprises and compiles general information on ICT systems and other data such as, use of Internet, e-commerce via the internet, e-commerce via EDI, barriers to e-commerce and electronic sharing of information using Supply Chain Management (SCM). It covers NACE Rev.1.1 sections D, F, G, H, I, J, K, and O. The scope includes all enterprises with 10 or more persons engaged, with the exception of the construction sector where the scope is limited to enterprises with 20 or more persons engaged. This is a challenging survey to conduct; ICT is a quickly evolving and complex area, and consequently compiling comparable year-on-year data is not always possible. The use of broadband is difficult to measure accurately, as the term “broadband” in itself is meaningless. Many respondents believe they have “broadband” but cannot provide the technical specifications, which are necessary to compile robust and meaningful statistics.

The Community Innovation Survey. The Community Innovation Survey (CIS) is a sample survey of approximately 4,000 enterprises and compiles general information on the enterprise and data on product, process or organisational innovation, ongoing or abandoned innovation activities, innovation expenditure, barriers to innovation and intellectual property rights. The survey covers enterprises with 10 or more persons engaged in the NACE Rev.1.1 sections C, D, E, I, J, and NACE divisions 51 and 72 and NACE groups 74.2 and 74.3.

Definition of Family Business

There is no universal agreement on the characteristics that define a family business (Handler, 1989). Some

[1] The Revenue Commissioners are the taxation and customs authorities in the Republic of Ireland.

have used the level of equity held by a single family as the criterion (Lansberg, Perrow, & Rogolsky, 1988) whereas other criteria have ranged from family involvement in the management structure (Kepner, 1983) to multi-criteria definitions (Smyrnios, Romano, & Tanewski, 1997). Litz (1995) proposed a categorization of family business which defined a "pure" family business as being family managed and family owned. Others such as Astrachan and Shanker (1996) have proposed a broader definition of family business based on a three scale classification: broad, middle, and narrow. The broad definition includes little direct family involvement, an intention to keep it in the family and the effective control of strategic development. On the other end of the spectrum the narrow definition requires that the business be multi-generational, the family directly own and run the business and at least one member of the family has significant management responsibility. This scaling approach was further extended by Astrachen, Klein, and Smyrnios (2002) who developed what is known as the "F:PEC" scale as a method for measuring the influence of the family in a business. This approach defines the potential channels of influence a family can establish in a company (e.g., power, experience, or culture).

The Annual Services Inquiry which is the main data source for this analysis, defines family businesses as:

An enterprise where one family holds more than 50% of the voting shares

and/or

A family supplies a significant proportion of the enterprises senior management and is effectively controlling the business

and/or

An enterprise where there is evidence of more than one generation working in the business

and/or

An enterprise that is influenced by a family or a family relationship and that perceives itself to be a family business.

It should be noted that unlike most business statistics definitions, for example, legal form of enterprise, the definition of a family business is a somewhat subjective one. The impact of this subjectivity is nowhere more apparent than when examining sole traders.

Other Definitions

For the purposes of this paper, the size of enterprises will refer to the number of persons engaged, unless stated otherwise. Although not conforming to the European Union standard (Eurostat, 2008), given the relatively large number of smaller enterprises in Ireland, greater granularity is required for enterprises that engage less than 50 persons. Consequently enterprise size classes are defined in Table 1.

Table 1

Enterprise Size Classes

Size class	Persons engaged
Micro	1-9
Small	10-19
Medium	20-49
Large	50+

Analysis in this paper is conducted at NACE Rev.1.1[2] (Eurostat, 2002) section level. Aggregating at this level provides robust data and overcomes most (but not all) difficulties surrounding inadvertent disclosure of confidential data. It of course, has the disadvantage of aggregating, highly heterogeneous business activities into single cohorts. NACE Rev. 1.1 section aggregates are described in Table 2.

Table 2

NACE Rev. 1.1 Sections

NACE Section	Description
G	Wholesale & retail trade
H	Hotels & restaurants
I	Transport, storage & communications
K	Real estate, renting & business activities
O	Other community, social & personal services

Family Businesses—Summary Profile

In 2005, there were 38,927 FBs trading in the services sectors in Ireland, accounting for 46% of all enterprises in those sectors. FBs employed over a quarter of a million persons and generated a total turnover of €49.3 billion.

That only 46% of all enterprises are FBs seems low compared to statistics regularly quoted in Ireland or in other international studies. For example, studies in Germany of the manufacturing sector in Baden-Wurttenberg estimate that 78% of businesses were family run (Hauser, 2005). In the United States, FBs account for an even larger proportion—86% (Keyt, 2007). Bornheim (2000) estimates that FBs account for 80% of enterprises in Mexico and in Austria. Neubauer and Lank (1998) found that family businesses accounted for 75% of all businesses in the United Kingdom, 70% in Portugal, 80% in Spain, 85% in Switzerland, 90% in Sweden, and 95% in Italy and the Middle-East. As already noted, there is no standardised definition for what constitutes a FB. This lack of agreement is likely to be a contributing factor to the apparent discrepancy emerging from different studies.

The distribution of FBs and NFBs across the enterprise size classes are more or less the same (see Figure 1). Almost 88% of all services enterprises have less than 10 persons engaged; this holds for both FBs and NFBs. Less than 2% of FBs had more than 50 persons engaged. Although FBs with less than 10 persons engaged accounted for almost 41% of all services enterprises, these businesses only generated less than 9% of total Gross Value Added (GVA). By contrast the 2% of FBs engaging 50 persons or more accounted for almost 8% of total traded non-financial services GVA.

Overall, average FBs are smaller than NFBs but for most size classes the difference in size is negligible. However, for enterprises with 50 or more persons engaged, there is a significant difference in scale, with large FBs engaging an average of 150 persons compared with 215 persons for NFBs (see Figure 2).

The Sole Trader

The sole trader or individual proprietorships makes an interesting case study, perhaps providing some

[2] NACE Rev.1.1—Statistical classification system of the European Union for economic activity.

insights into enterprise or entrepreneurial behaviour and motivation. Of the sole traders who filed returns for the ASI, only 44% classified themselves as a FB. This is a curious result, as a sole trader might naturally be considered a FB, in that there is only one person managing the business and consequently a sole trader and a FB might reasonably have been considered synonymous. Certainly if all sole traders were automatically classified as FBs, then this would add a further 22,000 FBs to the total. This re-classification alone would result in FBs accounting for 72% of all business and might explain partly the very high proportion of FBs quoted in various reports.

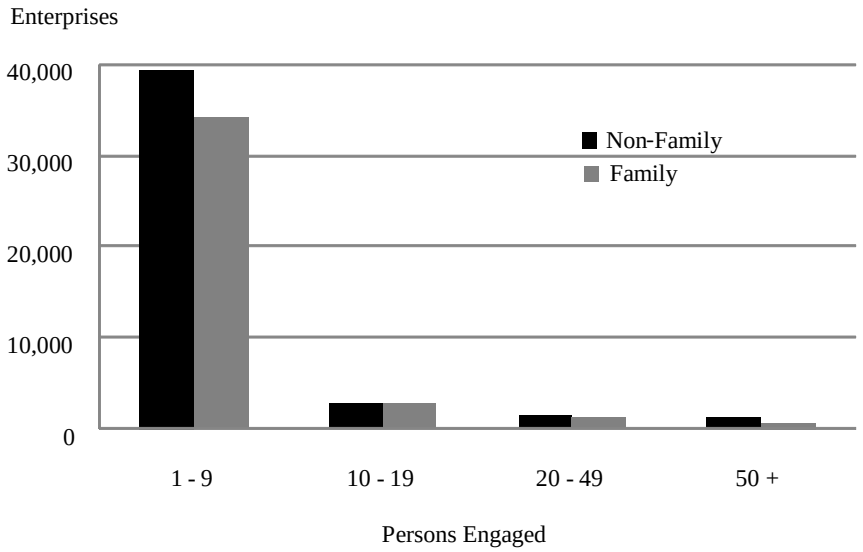


Figure 1. Number of family and non-family businesses by size class, 2005.

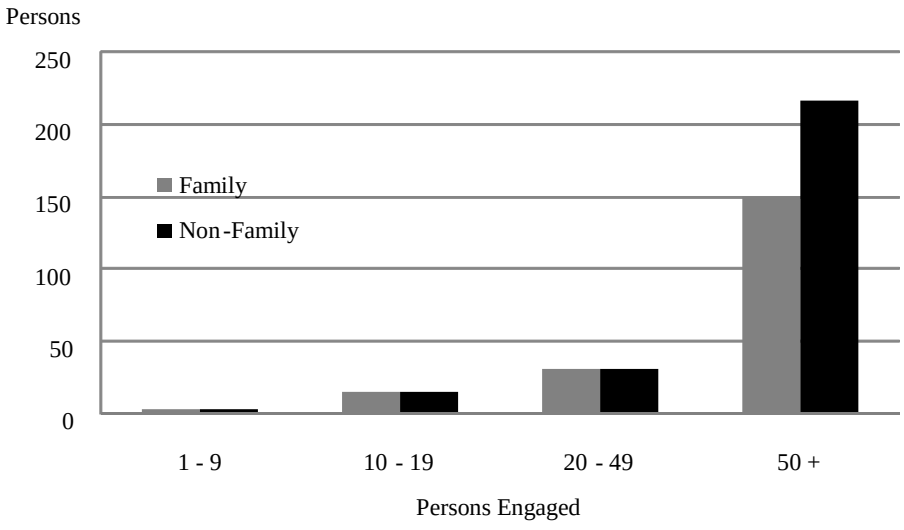


Figure 2. Average number of persons engaged in family and non-family businesses by size class, 2005.

But, what if, as the results suggest, sole traders are not automatically synonymous with FBs? What are the differences between family and non-family sole traders? Perhaps, the motivations of each are quite different,

perhaps for example, a family sole trader is more concerned with succession (especially those approaching transition or in subsequent generations) than maximising profit. These are questions probably better left to behavioural economics rather than statistics. What we can say however is that labour productivity hints at different behaviour, as GVA per person engaged for a non-family sole trader is typically 29% higher than for the family equivalent.

When examining the split between family and non-family sole traders, it appears that the age of the enterprise may play an important role in determining the way enterprises or entrepreneurs classify themselves. Certainly when the age profile of individual proprietorships is examined an interesting pattern emerges.

Business demography statistics in Ireland are relatively new and thus no extended time-series are available yet. However, using the VAT registrations data to estimate the age of sampled enterprises, sole traders were clustered into four time periods. The data in Table 3 are presented as percentages for each time period.

Table 3

Percentage of Sampled Family and Non-family Sole Traders in each Time Period

	Family (%)	Non-family (%)	All (%)
Pre-1977	65	35	100
1977-1986	59	41	100
1987-1996	53	47	100
1997-2006	39	61	100

These data are also presented visually in Figure 3. What clearly emerges is that recently established sole traders (i.e., those registered for VAT during the 10 year period 1997-2006) are less likely to classify themselves as a FB. In stark contrast, those sole traders established before 1977 are more likely to classify themselves as a FB. It should of course be noted that this is how enterprises classified themselves for the 2005 ASI, and not necessarily how they might have classified themselves on establishment.

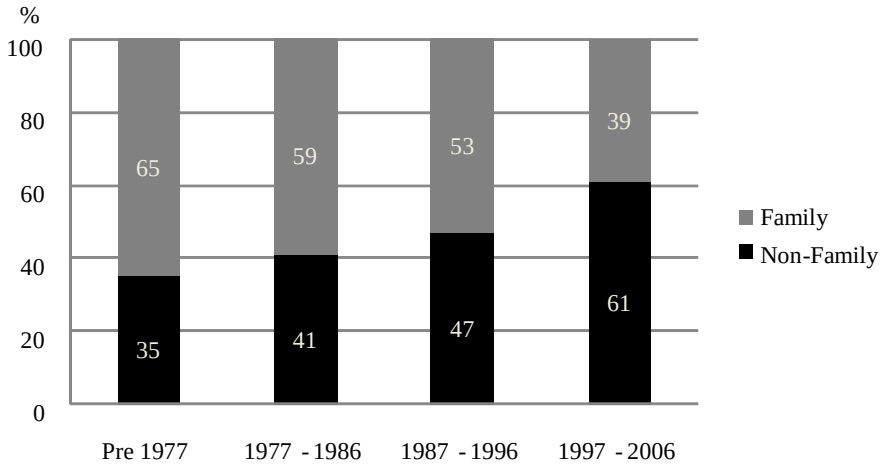


Figure 3. Percentage of sampled family and non-family sole traders by year of registration.

Is it possible that the motivation of a sole trader changes over time? Perhaps the marital status of the sole trader or whether or not they have a family influences their view of themselves and the nature of their business.

Perhaps as a trader and the business get older, concerns over pensions and succession become more immediate than establishing the business, market share or profit maximisation. Equally a FB that has successfully made the transition to second or subsequent generations may become increasingly concerned with lineage. On the other hand, many sole traders may grow and ultimately incorporate and perhaps those that do are more likely to be NFBs, leaving more FB sole traders behind. With the data currently available it is not possible to trace the reasons for these results. But perhaps it is not unreasonable to assume that some sole traders who established their businesses over 20 or 30 years ago may have switched from being a NFB to a FB.

Productivity

Determining the appropriate measure of productivity for services sector activity is not always easy. In Ireland, a measure of capital or multi-factor productivity are beyond the data currently available. Consequently an analysis of "indicative labour productivity" is presented.

An exact measure of labour productivity cannot be calculated from the ASI. Firstly, GVA is estimated for the full accounting year of each enterprise[3] whereas the measure of labour refers to a specific time point (for the 2005 ASI the reference week was the week ending 9 September). Consequently, the ASI does not adequately measure seasonal peaks and falls in employment and thus may underestimate (or less likely overestimate) employment and the number of persons engaged. The scale of this problem will likely differ by economic sector and most probably affect sectors with greater seasonal employment variation more, such as the hospitality sector. Secondly, the unit of labour is not clearly defined.

Employment in the ASI is simply a head-count of both full-time and part-time labour, rather than an exact full-time equivalent (FTE) unit, which standardises labour units by the number of hours worked (or more precisely the number of paid or remunerated hours worked). As working arrangements differ considerably by sector, the impact of standardising the unit of labour utilisation will vary sector by sector. For example, one might expect a greater range of part-time working conditions in the retailing or hospitality sectors. Equally, one might reasonably expect the "normal" working week, in terms of hours to vary across sectors.

There are other challenges in linking hours worked to remuneration or output, as the only likely source of all of these data is the employer or enterprise. Enterprises in sectors where there is a greater bias towards salaried employment, rather than wages, may not record how many hours were actually worked but the hours contractually remunerated (not necessarily the same thing). With regard to family businesses there may also be measurement issues with regard to employment, as casual labour provided by family members may or may not be included in the returns to CSO.

However, the ASI does provide sufficiently good data that some Indicative Labour Productivity (ILP) measures (i.e., GVA per person engaged) can be calculated. Even using such a crude measure, the comparative ILP between FBs and NFBs are striking.

Overall, labour utilisation in FBs appears to be less than half as productive as labour employed by NFBs (see Table 4). This ratio holds with minor variations in scale across most NACE sections of services activity. There are two exceptions. The productivity differential between FBs and NFBs in the Hotel and Restaurant sectors is

[3] This accounting year does not necessarily correspond with the fiscal or calendar year.

less severe at about 21%. For Section I, Transport, Storage and Communications the differential was significantly higher—64%.

Table 4

Indicative Labour Productivity Measures Classified by Business Type, 2005

NACE Rev.1.1 Section	Business type	Average GVA per person engaged-All enterprises (€ 000)	Average GVA per person engaged-Irish Owned Enterprises (€ 000)
G	Family business	37	36
	Non-family business	66	43
H	Family business	22	21
	Non-family business	28	27
I	Family business	48	46
	Non-family business	134	88
K	Family business	45	45
	Non-family business	98	69
O	Family business	23	23
	Non-family business	42	43
All	Family business	35	34
	Non-family business	80	56

At first glance, differentials of such magnitude scarcely seem credible. But there are some rather unique structural conditions in the Irish economy that might contribute to these very high differentials. Ireland is a small, open, and highly globalised economy with a relatively small enterprise population but with a high degree of Foreign Direct Investment (FDI). For example, foreign owned enterprises account for 82% of GVA and 49% of total employment in the manufacturing sectors (CSO, 2007d). In the non-financial, traded, services sectors, foreign owned enterprises account for 46% of GVA and 24% of total employment (CSO, 2007a).

There are relatively few foreign owned FBs whereas quite a number of large NFBs are foreign owned. ILP for both the manufacturing and services sectors tends to be higher for larger firms and for foreign owned enterprises (CSO, 2007c, p. 62). Accounting practices may partly explain this trend as the financial accounts for foreign owned enterprises can be distorted by the impact of outsourcing, transfer pricing, merchanting, licensing or royalty arrangements.

When foreign owned enterprises are excluded from the comparison, it makes little or no difference to FB productivity but there are significant changes to some of the NFB indicative productivity figures. The overall differential productivity between FBs and NFBs reduces from 56% to about 39%. At NACE section level, the differentials for sections G, I, and K reduce considerably. For Sections H and O, the removal of foreign owned enterprises makes little difference to the results. However, even when the distortionary effect of foreign owned enterprises are removed, the overall conclusion is the same. NFBs appear to have considerably higher ILP than FBs. A study of the Australian Business Longitudinal Survey 1995 -1998 provided similar findings (albeit less extreme), concluding that “Family businesses, on average, are 21 per cent less productive than non-family businesses” (Harris et al., 2002, p. 14).

A possible contributory factor is the ratio of part-time to full-time employees used by FBs and NFBs, 35% of FBs employees are part-time in comparison with only 25% of NFBs (CSO, 2008a). An additional measurement issue may also arise if FBs “employ” family members as casual labour. It is not clear whether these family members are included in the employment count collected by the ASI. Thus, the comparability of ILP may

be affected, depending on how much casual labour is utilised by a FB, or whether they are recorded in official statistics or not.

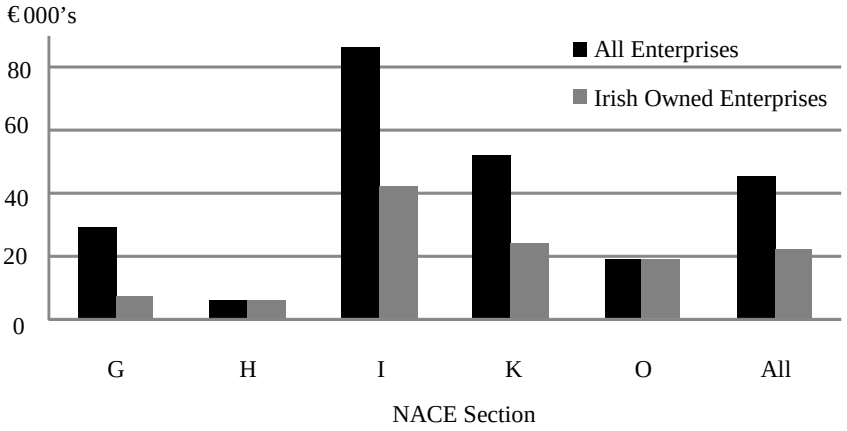


Figure 4. Difference in Average GVA per Person Engaged between Family and Non-Family businesses when foreign owned enterprises are excluded.

Influence of Information and Communication Technologies (ICT) on Productivity

The world is continually being remade by technology and innovation. Together, they have given rise to pervasive computerisation, global communications, and the information or knowledge-based economy that coexists with the industrial economy. Forfas (2007, p. 20) noted that "ICT is generally accepted as being one of the drivers of productivity growth in modern economies".

Consumers rely on the Internet for 24-hour banking, booking flights, reserving cinema tickets, and increasingly for day-to-day grocery shopping. Capitalising on this usage of Information and Communication Technologies (ICT) is a necessity for any enterprise wishing to thrive or survive in the modern business world.

In 2005, more than 15,200 (39%) of FBs reported they had e-mail but only 6,378 (16%) FBs had a website. For both e-mail and website, usage by NFBs was higher but the difference was more pronounced for website take up. It also appears that NFBs make better use of their ICT to generate sales. In 2005, NFBs generated over €17bn (14.5% of their total turnover) from orders submitted via electronic format (i.e., either via e-mail, EDI or internet). In comparison, FBs generated just over €4bn (8.5% of their total turnover). ICT take-up and usage varied across the different economic sections; for Sections G and H where FBs are most active, the relative turnover generated from via electronic sales did not differ significantly from NFBs. For other NACE sections, in particular, Sections I and K the differences were stark. The most striking differential was in Section K where NFBs generated 21% of their total turnover via ICT compared with only 6% for FBs (see Table 5).

Overall however, ICT take-up does appear to have a positive correlation with ILP. Across every size class, for both FBs and NFBs, enterprises with e-mail and website and e-sales have a higher ILP (see Figure 5).

The 2005 ASI were linked to the 2005 e-Commerce & ICT survey at individual record level; a total of 831 enterprises were common to both datasets. Some basic *t*-tests on ICT systems and internet use/access were conducted to determine whether ILP is greater for enterprises that have e-mail, a website, LAN, intranet and high speed internet access than for enterprises that don't have all of the above.

The hypotheses tested were:

H_0: The average GVA per person engaged for enterprises that have e-mail, a website, LAN, intranet and high speed internet access is the same as the average GVA per person engaged for enterprises that do not.

H_1: The average GVA per person engaged for enterprises that have e-mail, a website, LAN, intranet and high speed internet access is different to the average GVA per person engaged for enterprises that do not.

Table 5

Use of E-mail, Web Site, and E-sales, 2005

Business type	NACE REV.1.1 sectors	Number of enterprises	With E-mail	With website	With orders via e-sales	Total turnover excl. VAT (€)	Turnover from orders submitted via e-sales (€)
Family	G	15,763	5,922	2,382	1,692	36,123,282	3,359,505
Non-Family		13,472	4,897	2,518	1,935	62,312,898	6,436,031
Family	H	6,364	1,243	730	409	3,994,526	136,547
Non-Family		4,083	916	600	264	5,116,473	169,817
Family	I	3,124	841	311	311	3,001,822	361,837
Non-Family		3,402	1,054	514	368	19,197,375	4,416,752
Family	K	11,097	6,653	2,676	1,652	5,470,072	318,668
Non-Family		20,186	12,358	5,213	3,547	29,465,644	6,060,525
Family	O	2,578	563	278	136	694,907	15,041
Non-Family		3,918	1,094	690	218	2,185,419	82,731
Family	All	38,927	15,221	6,378	4,200	49,284,610	4,191,597
Non-Family		45,061	20,319	9,535	6,332	118,277,810	17,165,855

Note. e-sales: e-mail, EDI, or Internet.

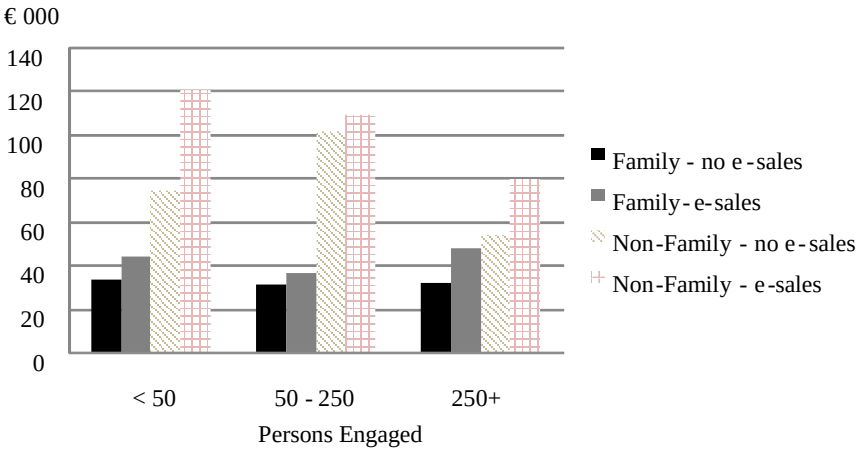


Figure 5. GVA per person engaged for family & non-family businesses by size class with and without email & website & e-sales.

Separate tests were done for family and non-family businesses. The results proved to be significant for FBs where the test showed a *p*-value of 0.0002. In other words, there is sufficient evidence to reject the null hypothesis. The mean GVA per person engaged for FBs that have e-mail, a website, LAN, intranet and high speed internet access is almost €50,500 compared to just under €35,600 for FBs that did not have all of the above. The results of the test for NFBs were less significant. The *t*-test gave a *p*-value of 0.0727 and this means that there is sufficient evidence to reject the null-hypothesis at the 10% significance level. The mean GVA per person engaged for NFBs that have e-mail, a website, LAN, intranet and high speed internet access is just under €241,300 compared to just over €56,100 for NFBs that did not have all of the above. Thus, we conclude that both FBs and NFBs that have

e-mail, a website, LAN, intranet and high speed internet access have higher average GVA per person engaged than firms that do not.

The second set of tests focussed on enterprise's use of the internet for marketing purposes. *T*-tests were done to determine whether or not ILP is greater for enterprises that use the internet for marketing their products and providing product and price information than for those that do not.

The hypotheses tested were:

H_0: The average GVA per person engaged for enterprises that use the internet for marketing the enterprise's products and facilitating access to product and price information is the same as the average GVA per person engaged for enterprises that do not.

H_1: The average GVA per person engaged for enterprises that use the internet for marketing the enterprise's products and facilitating access to product and price information is different to the average GVA per person engaged for enterprises that do not.

Once again separate tests were done for family and non-family businesses. The results proved to be significant for FBs where the test produced a *p*-value of 0.0067 and this gives us sufficient evidence to reject the null hypothesis. The mean GVA per person engaged for FBs that use internet for marketing the enterprise's products and facilitating access to product and price information is just over €46,800 compared with just under €36,300 for FBs that do not. We can therefore conclude that FBs that use internet for marketing enterprise products and facilitating access to product and price information have higher ILP on average than those that do not. The results were not significant for NFBs, where the *t*-test gave a *p*-value of 0.1713. Consequently, we have insufficient evidence to conclude that there is any difference in labour productivity between NFBs that are using internet for marketing enterprise products and facilitating access to product and price information and those that are not doing so.

These results reinforce the findings from the ASI which indicated a link between ICT take-up and indicative labour productivity. Some cautions should be exercised however regarding the magnitude and significance of these relationships as no controls were made for other variables that are likely to influence productivity. Nevertheless, the results are important as NFBs made proportionately a much greater investment in computers, particularly hardware, than FBs did (CSO, 2007a).

Influence of Innovation on Productivity

As already noted, economies and societies are being continually reshaped by technology and innovation. To test the impact of product and process innovation on ILP, the Community Innovation Survey (CIS) were linked to the ASI at a unit record level. Respondents to the CIS were asked if they had engaged in any product or process innovation during the three years 2004 to 2006. Product innovation was defined as the introduction of a new good or service to market or a significantly improved good or service with respect to its capabilities. Process innovation was defined as the implementation of a new or significantly improved production process, distribution method or support activity for the enterprises goods or services. Enterprises were classed as "innovation active" if they had engaged in either product or process innovation or both.

The benefits arising from the introduction of new processes or products usually take some years to realise, and consequently linking to 2004-2006 CIS to the 2005 ASI is rather optimistic. Most likely, the benefits of

innovation developed during the 2004-2006 period will not manifest themselves in terms of ILP until 2007 at the earliest. Nevertheless the datasets were linked, as innovation active enterprises in 2004-2006 may well have an earlier history of innovation.

The microdata for the two datasets were linked yielding 408 enterprises common to both surveys. GVA per person engaged was derived for these enterprises and some tests were done to establish whether or not there was any difference in ILP between the enterprises that were innovation active and those that were not. Separate *t*-tests were conducted for product and process innovation and for FBs and NFBs.

In each case the null hypothesis was:

H_0: There is no difference between the average GVA per person engaged for enterprises that were innovation active and those that were not.

And the alternative hypothesis was:

H_1: The average GVA per person engaged for enterprises that were innovation active is different from the average GVA per person engaged for enterprises that were not.

The results showed that there was insufficient evidence to reject the null-hypothesis in any case, in other words, we could not conclude that there is a difference in ILP between enterprises that are innovation active and those that are not. The results of the *t*-tests for product and process innovation are presented in Table 6.

Table 6

P-Values for Product and Process Innovation

	Family (*p*-value)	Non-family (*p*-value)
Product	0.9681	0.5239
Process	0.4174	0.2944

Conclusions

FBs account for over 46% of all enterprises and almost 40% of total persons engaged in the non-financial traded services. Although this seems low by international standards, it may be explained by the fact that sole traders and FBs are not synonymous. The results also suggest that the age of an enterprise, or the CEO, may have an influence on whether an enterprise is reported as a FB or not.

The results show that FBs make an important contribution to the Irish economy. They are predominantly Irish owned enterprises which may play an important stabilising role in an increasingly globalised economy. FBs may be an important, and until now, largely unrecognised determinant for assessing labour productivity. This may have implications for assessing firm activity and performance.

The impact of technology would appear to make an important contribution to firm performance. There is a clear correlation between e-sales and Indicative Labour Productivity (ILP). However the direction of causality cannot be determined and further analyses are required to control for a range of possible variables that might influence productivity before we can be confident about the significance of these relationships.

The impact of innovation is inconclusive at this stage but this is not surprising. It takes several years to develop a product and establish it in the marketplace. The effects of a process change are also likely to take some years before they are clear. Consequently this remains as work for the future. There are also new data sets coming

on stream, such as the International Sourcing. Linking the micro data from this dataset to the ASI will provide a new and rich avenue for researchers to mine.

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