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OUTWARD DIRECT INVESTMENT AND THE IRISH ECONOMY

FINAL REPORT | MAY 2007

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EXECUTIVE SUMMARY

Over the past two decades, inward foreign investment (FDI) by foreign multinational enterprises has played a substantial role in Ireland's economic development. While indigenous enterprises have traditionally engaged overseas markets through exports, they are increasingly expanding their commercial presence and activities into overseas markets in the form of outward FDI or 'Outward Direct Investment' (ODI).

Illustrating this phenomenon, the stock of ODI from indigenous Irish firms rose by almost 350% between 2000 and 2005. Measured as percentage of Ireland's GDP, the stock of ODI rose from 0.5% to 2.5% of GDP during this period.

This increasing trend of ODI activity by Irish firms has consequences for the structure of the domestic economy as investments (e.g. an expansion of production facilities) which were previously made in Ireland are increasingly taking place outside of the country. ODI gives rise to a range of costs and benefits which impact the firm itself, its stakeholders, and the Irish economy as a whole.

The phenomenon of ODI by indigenous enterprises should not be confused with the relocation of FDI operations by foreign multinational corporations in Ireland. ODI by indigenous enterprises is a natural stage in the growth and development of internationally trading enterprises as they seek to achieve international scale.

Forfás and Enterprise Ireland requested Copenhagen Economics to analyse the economic consequences of ODI by indigenous enterprises. Copenhagen Economics applied econometric techniques on a large and representative sample of Irish investments abroad in the period 2004-05, covering all sectors of the economy and both large and small firms. Furthermore, complementary to the econometric analyses, the consultants also carried out a literature study and five in-depth case-studies, in order to provide a qualitative analysis of the economic impacts.

The main results arising from the econometric analysis are as follows:

- **ODI has had a positive direct effect on labour demand and productivity:** ODI by Irish enterprises has had a significantly positive effect on employment and labour productivity within those firms. Firms investing abroad have, all other things being equal, hired more employees (or fired fewer) than firms not involved in ODI, and likewise have these investing firms improved labour productivity more than non-investing firms. (see chapter 2)

- **ODI has had limited positive spillovers to other firms and sectors:** The research indicates mildly positive vertical employment spillovers¹ within the value chain of the investing firms. This suggests that the positive effects experienced by the ODI investing firms have not happened at the expense of a negative effect on distributors or suppliers.

However, looking at spillovers to other sectors outside the industry value chain of the ODI investing firms, there is no sign of either negative or positive impacts, either in the case of employment or productivity. In other words, there is no hard evidence of horizontal spillovers from ODI to other sectors outside the value chain of the investing firms. (see chapter 3)

- **There is a positive correlation between ODI intensity and the change in skill structure:** The research indicates a relationship between ODI by enterprises and changes in the skills profile within those enterprises. Specifically, data analysis indicates a strongly positive correlation between ODI by enterprises in the manufacturing sector and share of high skilled employees in their domestic operations.

In the services sector, the increase in ODI has also been positively correlated with an increase in the share of high-skilled labour. However, the slope of the correlation is less steep than in manufacturing, indicating slower growth in the share of high-skilled employment. It is hypothesised that this is because Irish service sectors in general have a capacity to absorb the low-skilled labour made redundant by the transformation of Ireland's competitive manufacturing industries. (see section 3.4)

Complementing the econometric research, the case study analysis illustrated the following benefits and costs to the firm and economy from ODI:

Benefits:

Irish firms benefit from ODI as profits from the investments are transferred back to Ireland, resources and people within the investing firms are freed up to take on new challenges more apt to their skills, and new knowledge from foreign markets is adapted and incorporated to improve successful Irish business models.

¹ In the case of econometric estimations, we refer to 'spillover effects'. Spillovers are to be understood as effects accruing from the investing firms to the rest of the firms in the economy.

Costs:

Employees whose jobs are made redundant may lose from Irish investment abroad. Unless they are able to re-qualify for the higher-skill positions generated by ODI in Ireland, they will not reap the full benefits of the trend, or may become unemployed for the long term.

As for all empirical analyses in social sciences, these results are subject to some uncertainties. While the econometric methodology sought to strip out as much distortion as possible it is extremely difficult to definitively prove causation. Similarly, the case study analysis serves to provide practical illustration of the effects of ODI, but is not sufficient to prove causation. In terms of statistical significance, the support for the first set of conclusions (regarding employment) is the most robust, while the conclusions regarding the skill structure are those with the least empirical foundations for causality.

The study has for the first time provided an empirical evaluation of the costs and benefits of the ODI on the Irish economy. The overall conclusion is that the net measurable economic impact of ODI is positive, rather than negative.

Nevertheless, it should be recognised that ODI does contribute to employment churn as low value added activities in Ireland are often replaced by less human resource intensive high value added activities. This is likely to have future implications for those in low skilled employment.

The report is organised as follows: in chapter 1 we summarise the objectives of the study as stipulated by the Terms of Reference and briefly introduce our methodology. In chapter 2 we outline the effects of ODI accruing to the investing firm, while chapter 3 explains what happens outside the investing firm. Chapter 4 concludes.

Chapter 1 | INTRODUCTION

Our terms of reference with respect to this project have been set to:

- Identify and, where possible, quantify the economic and non-economic *costs* to the Irish economy from indigenous Irish enterprises engaging in ODI. Where it is not possible to quantify certain effects, we source case study evidence about them.
- Identify and, where possible, quantify the economic and non-economic *benefits* to the Irish economy from Irish indigenous enterprises engaging in ODI. Where it is not possible to quantify certain effects, we source case study evidence about them.

Our report is divided into two parts: (i) the main text containing the analysis and conclusions, and (ii) appendices documenting the econometric methodology, micro-data used for estimations, and results.²

The main text comprising chapters 2-4 is intended to guide readers through the analysis and results of this study. Their purpose is to provide an assessment of the net effect of ODI on Irish firms and the economy.

Readers interested in the details of applied methodology and results generated are encouraged to consult the relevant appendices. The appendices cover aspects of qualitative and quantitative methodologies, data collection, and econometric modelling³, and document the results obtained in the study.

By ODI we consider *all types* of outward investment, including its classifications with respect to the subsidiary's position in the parent value chain (horizontal, vertical), entry mode into the foreign market (brownfield, greenfield, joint-venture), timing of entry (new, established), sectoral breakdown, and similar criteria⁴.

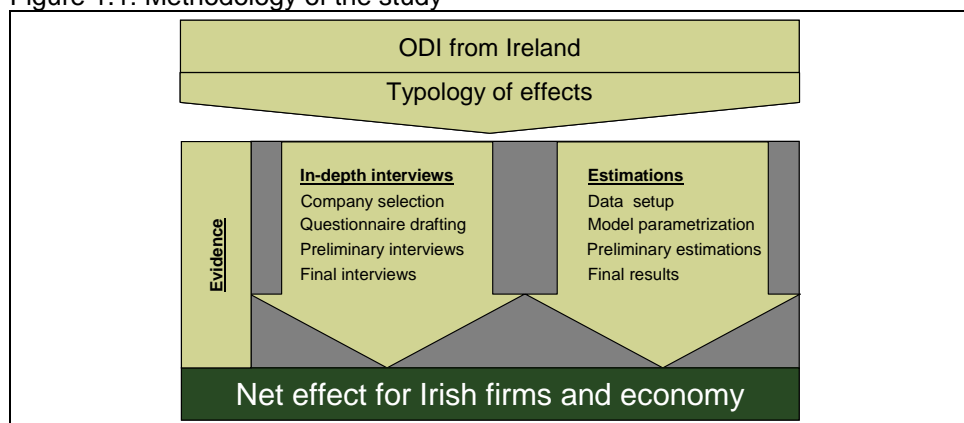
Our methodology to estimate the net effect of ODI for the Irish economy is centred on two pillars: quantitative estimations with firm-level data and in-depth interviewing of firms engaged in ODI cf. Figure 1.1.

² The details of the company case study interviews have not been published due to reasons of confidentiality and the presence of commercially sensitive information.

³ Following an extensive literature survey, we have specified and estimated a number of matching models, where the causal link between the treatment (ODI) and the response, e.g. in terms of employment, is stronger than for OLS models. In this way, we have strengthened the robustness of our econometric findings.

⁴ The reader not familiar with this terminology is advised to consult the Glossary of Terms from an earlier ODI study by Forfás, available at http://www.forfas.ie/publications/outward_direct_invest_01/glossary.html.

Figure 1.1: Methodology of the study



Source: Copenhagen Economics

In general, we distinguish between economic and non-economic effects to assess their direct impact on the investing company, together with spillover effects⁵ on peer companies in the industry, and the rest of the economy, cf.

Table 1.1.

Throughout this report, the phrase ‘direct effects’ is to be understood as effects accruing to the companies in Ireland engaged in ODI. Likewise, the phrase ‘economy-wide’ effects refers to the effects accruing outside the investing companies.

Table 1.1: A general typology of effects from ODI and sources of information.

	Direct effects	Economy-wide effects (spillovers)
Benefits	Cases and estimations	Cases and estimations
Costs	Cases and estimations	Cases and estimations

Source: Copenhagen Economics

⁵ In the case of econometric estimations, we refer to ‘spillover effects’. Spillovers are to be understood as effects accruing from the investing firms to the rest of the firms in the economy.

Chapter 2 | DIRECT EFFECTS FOR INVESTING COMPANIES

In this chapter we summarise the direct economic effects of ODI distinguishing between the positive and negative effects. The evidence in this chapter stems from five in-depth interviews with Irish enterprises engaged in ODI (section 2.1, 2.2) and econometric analyses (section 2.3). Readers interested in the details of the applied interview methodology are advised to consult Appendix 2.

2.1. CASE STUDY EVIDENCE OF DIRECT POSITIVE EFFECTS⁶

Market Opportunities

ODI provides new market opportunities for products and services developed in Ireland, making it possible to expand the scale of operations and revenues. Equally, ODI can serve to sustain operations and revenues where declining domestic demand occurs, e.g. declining product life cycles (cf. *Manufacturing 1* case), business cycle downturns (cf. *Services 2* case), or the relocation of key clients outside of Ireland (cf. *Services 1* case). The majority of companies interviewed stated that without ODI, demand for their products and services would have declined, and in extreme scenarios, threatened the existence of the company in Ireland. Meanwhile, two of the five companies stated that their motivations for ODI were to tap into international market opportunities, providing additional sources of revenue for their Irish operations.

The following paragraphs discuss in more depth the benefits experienced by enterprises engaging in ODI.

Deepening client relationship

ODI makes it possible for an Irish company to follow its international clients abroad, either to continue existing relationships or take advantage of emerging business opportunities. This is an important benefit, especially in a context where a number of foreign investors have relocated from Ireland to lower-cost locations in recent years. As a result, Irish companies involved in the down- or up-stream operations of the foreign investor deciding to leave Ireland face an immediate loss of business. For those Irish companies having made large specific investments to accommodate the needs of their clients, following them abroad becomes critical. The added benefit of investing overseas is that staying close to the customer opens up the possibility for constructing a close relationship and better understanding of clients, ultimately enabling Irish companies to generate more business, e.g. by sparking off innovation (cf. *Services 1*).

⁶ The names of case companies have been changed for reasons of confidentiality. See Appendix II for details.

Cost savings

Ireland has experienced a steady increase in employment costs in recent years, c.f. Table 2.1. For many indigenous companies, especially those in traditional manufacturing, savings on the cost of productive inputs and labour, are an important benefit from ODI (cf. *Manufacturing 1, Services 1*).

Table 2.1 : Minimum wage development, 2000-2005.

	2000*	2001	2002	2004*	2005*
Minimum wage (€/hr]	€5.58	€6.00	€6.35	€7.00	€7.65
Minimum wage index	100	108	114	125	137
CPI **	100	107	115	123	128

Note: Minimum wage for an experienced worker. The minimum wage index is constructed from the data on the level of minimum wages in Ireland (2000=100). CPI is the consumer price index, (2000=100). Rising minimum wages have been explicitly quoted as the reason for the increasing labour costs in Ireland, and have been referred to as reasons for ODI in interviews, cf. Manufacturing 1 case.

Sources: Nolan et al. (2003)

(*) <http://www.finfacts.ie/Private/personel/nationalpayagreement.htm>

(**) Central Statistics Office, Ireland www.cso.ie

Following the investment decision, a number of strategic functions remain centralised in the headquarters, generating cost savings and profits⁷. For example, *Manufacturing 3* reports that savings generated by centralised procurement amount to about 6-7% of its costs. Other companies achieve savings of the same order of magnitude by keeping R&D, planning systems (ERP/SCM)⁸, or marketing functions centralised in Ireland, rather than duplicated across the investment locations.

Management capability development

Following the investment decision, headquarter functions and the management skills contained therein continue to develop and grow as they play an increasingly important role in the company's continuing foreign expansion activities. For example, headquarters acquire country-specific knowledge; develop abilities to manage risk when entering and expanding operations abroad; form relationships and partnerships with foreign companies; access venture capital for international expansion, last but not least develop knowledge to create new markets.⁹

⁷ These functions typically remain centralised in Ireland because subsidiaries rarely have sufficient competencies to be granted full autonomy. Another reason is for protecting sensitive corporate knowledge from foreign competitors.

⁸ Enterprise Risk Management (ERM) and Supply Chain Management (SCM).

⁹ More details on these effects are available throughout Appendix 5.

Another benefit concerns the necessity to implement new managerial knowledge in consequence of undertaking foreign expansion, which requires the strengthening of in-house ‘managerial capabilities’. ODI develops brand new managerial capabilities required for managing international projects. Such skills form a ‘dynamic knowledge base’ embedded in the organisation. This knowledge can be readily utilised e.g. in new ODI projects, or when reallocating resources to more productive uses in Ireland.

Successful companies are quick to build up this knowledge base, allowing them to minimise potential costs and maximise the benefits of ODI. Examples include cases where the investing companies have embedded flexibility into their overseas operations by using local companies for labour intensive activities in a country with burdensome employment regulations, or use of specially designed ‘investment companies’ to probe into promising but risky markets (cf. *Services 1, Manufacturing 3*).

Increased high-skilled employment

All interviewees stated that white-collar employment increases as a result of ODI. The origin of these increases reportedly stems from a greater demand for headquarter functions, such as procurement or finance.

Another reason for the increase in high-skilled employment is that investing companies typically expatriate a number of Irish staff in senior management, operations and marketing functions to their foreign subsidiaries. The positions becoming vacant in Ireland are then filled with newly recruited Irish staff. Although the evidence we gathered suggests that expatriation happens often, the number of vacancies created is not likely to be large.¹⁰

Key R&D or product development activities typically remain conducted out of Ireland. ODI increases the intensity of such operations, cf. *Manufacturing 1* or *Manufacturing 3* cases, facilitating more employment. There would be no need to employ any additional highly qualified staff in Ireland without continuing foreign investment. However, once the new jobs are created, they are usually sustainable.

Profitability

Closely linked to cost savings is ODI’s effect on the corporate bottom line. Individual interviewed companies have reported higher profitability due to ODI, although we are not able to verify this with financial data. Nevertheless, companies pointed to a number of mechanisms through which their profitability increases as a result of ODI:

¹⁰ We have no systematic data on the number of expatriated positions in the companies.

- royalty and licence fee receipts from subsidiaries (cf. *Manufacturing 3*).
- transfer of Irish technology, know-how, training or networks to subsidiaries with low cost of operations (cf. *Manufacturing 2*).
- sourcing from low-cost countries helps sustain manufacturing activities in Ireland, even if factory wages in Ireland remain higher than in many other countries (cf. *Manufacturing 1*).

While ODI may be linked to increases in firm level profitability, these profits may not always be generated in, nor repatriated to, the home country. The case study companies examined each stated that they repatriate profits (in so far as they are profitable) to their Irish operations, although it was not possible to verify this independently.

For the two case study companies which have not reported improved profitability (cf. *Services 1*, *Services 2*) it is most likely because these companies have invested for 'survival' reasons (both have stated so explicitly). A measure of their success is therefore either to continue operations or to prevent profitability from decreasing further. It may yet be too early to witness significant increases in their profitability stemming from profit repatriation.

Sourcing new skills and technology

Companies can often access new skills, IP and technology not available in Ireland through engaging in ODI. For example, *Services 2* invested in a Eastern European country to access graduates of a local University which is internationally renowned for its excellence in the field of mathematics. If such knowledge or technology is successfully repatriated, it can improve employment, productivity and profitability

Table 2.2 summarises the direct firm-level benefits and their drivers.

Table 2.2: Beneficial direct effects of ODI for Irish firms

	Potential impact	Benefit to the investing company	Role of ODI in creating the benefit
Direct economic effects	High	Increased revenues from market expansion	ODI gives access to new consumer markets for existing products. Production can take place both in Ireland (typically knowledge-intensive products), or abroad (typically low level assembly).
		Strengthened relations with key clients	Some Irish firms invest overseas following the footsteps of their clients. Stronger relations to the client may trigger the development of new products and services via innovation. Furthermore, going abroad can be the only option for Irish suppliers when a large international customer leaves Ireland. In such cases, going abroad helps sustain Irish operations, partially at least.
		Cost savings on labour and input costs	ODI gives expanded access to markets for both productive resources and labour. Better access can improve productivity or profitability of indigenous Irish operations, improving international competitiveness. Cost savings from international investments have been crucial for sustaining the Irish operations of a number of indigenous in the medium to long run.
		Source new talent and technologies	ODI can be undertaken solely for the purpose of accessing specific knowledge or technology not available in Ireland. If such knowledge or technology is successfully repatriated, it can improve employment, productivity and profitability.
	Medium	Repatriated profits	Profits generated abroad can be repatriated home and used for investment or distributed as dividends. While most of the interviewed companies have stated profit repatriation is their goal ¹¹ , it takes time for foreign operations to become profitable. Profits earned may be used to finance organic growth of the foreign operations.

Source: Copenhagen Economics

Note The effects have been ranked according to their 'potential impact' on the firm, which represents an assessment of the significance and probability of occurrence of each effect.

2.2. CASE STUDY EVIDENCE OF DIRECT COSTS

In addition to the above benefits, the five interviews provided examples of certain costs associated with investing abroad. The costs identified are discussed below:

Increased risk exposure

ODI introduces new sources of risk for companies investing abroad. Since firms have different levels of experience with ODI, many need first to acquire competencies to manage this risk, which is costly.

¹¹ Three out of the five interviewed companies have referred to profit repatriation being an explicit part of ODI.

'Irish multinationals', such as *Manufacturing 1*, with great international expertise are able to target specific location advantages, actively choosing ODI projects to maximise derived benefits. For such companies, they have the expertise to identify and manage risks – and higher risk often means access to more profitable options, and more benefits.

At the other end of the spectrum are small and medium sized companies, with a more reactive approach to ODI, for whom engaging in specific ODI projects is often a necessity, rather than a strategic option (cf. *Services 1*). With less experience and fewer available strategic options to conduct ODI, smaller companies are more exposed to the risk of potential failure vis-à-vis the larger Irish companies.

Technology Poaching

A specific manifestation of the risk involved in investing abroad is the threat of technology poaching in countries that do not enforce international intellectual property law. For example, *Manufacturing 1* experienced the theft of a product design from an offshore manufacturing facility, and the subsequent release of a competing product based upon that design. In consequence, *Manufacturing 1* faced not only lower revenues but also a credibility threat as the image of an inferior design negatively influenced customer perceptions of the genuine products. In response, *Manufacturing 1* has been repetitively launching lawsuits against the distributors of the products in question in the most important markets. These were costly in terms of legal fees, and also in terms of time and management resources involved.

High Start-Up Costs

For all the interviewed companies, ODI involved an upfront commitment of financial resources to either acquire or develop foreign assets. While this may not be a burden for the more established Irish multinationals, this is a real challenge for smaller companies who operate within tighter budgets.

Acquisitions of production assets appear to be the preferred mode of entry for industries where quick access to distribution networks is key, as shown in the *Manufacturing 1* or *Constructions Materials* cases. The cost of such investments may be high e.g. due to the large amount of real estate behind physical distribution networks, but also due to purchases of specific brand equity.

Greenfield investment appears to be preferred by companies requiring access to highly specific production assets, which do not readily exist in the required size or quality. In such cases, the greatest challenges relate to choosing a location and assessing the optimum scale of operations required. The tighter budgets available to smaller companies give less flexibility in this respect. This may potentially translate to higher costs should,

for example, a given location be insufficient or fail to reach its planned scale of operations.

Higher Headquarter Overheads

Besides greater investment expenses, the cost of ODI shows up as greater operating expenses on the corporate accounts. A proportion of that cost comes from larger corporate overheads and higher transport costs. Higher corporate overheads may be a problem if the company fails to deliver the associated productivity increases, duplicates activities or fails to exploit the benefits of centralisation.

Transportation Costs

Transport costs become a concern even for the larger companies if their ODI is in remote locations and frequent travel is required.

Costs of intermediation

The need to engage local intermediaries can be another cost of ODI, which may consume a part of the project value to the company. Insofar as the cost of these relationships is managed, it is simply a cost of productive input. But if the cost structure exceeds a certain threshold, strong reliance on intermediation may jeopardise the ODI project.

Costs of disrupting existing and creating new networks

Finally, ODI involves changes in domestic corporate networks and the creation of new networks abroad – both of which can be costly. In the first case, the loss of domestic networks implies a certain amount of foregone opportunities at home. In the second case, the establishment of networks abroad requires search time and uncertainty with respect to issues that cannot be easily controlled by contracts, such as reliability or quality of the relationship.

We outline in summary form the direct firm-level benefit and their drivers in Table 2.3.

Table 2.3: Costly direct effects of ODI for Irish firms

	Potential impact	Cost to the investing company	Role of ODI in creating the cost
Direct economic effects	High	Increased risk exposure	Operating abroad subjects the company to new sources of country-specific risk. If not managed, it may increase the volatility of earnings.
	Medium	Technology poaching	Core competencies of Irish companies may be stolen by foreign competitors. Foreign competitors can then challenge the Irish company both in the foreign but also the home market. This cost has been reported as relevant for both manufacturing and IT companies.
	Low	Start-up costs abroad	Start-up costs abroad are large and foreign establishment is risky. The emergence of new business risks can be costly for Irish companies without prior experience with ODI.
		Higher HQ overheads	Foreign establishment in almost all cases increases headquarter overheads. If not controlled, higher costs of doing business at home can jeopardise the viability of foreign operations.
		More demand for intermediation	Going abroad may increase the demand for downstream and/or upstream intermediation services, such as supply or distribution. Furthermore, operating abroad may be linked to a change of the existing supply or distribution networks.
		Transportation costs	Foreign investment increases transportation costs. Where this is an issue (e.g. countries with poor transport connections to Ireland), the parent company stands to lose.
		Loss of local networks and creation of new ones	ODI involves discontinuing relations with existing networks, such as suppliers and distributors. Concurrently, new networks must be created, which is costly and risky, in terms of contracting.

Source: Copenhagen Economics

Note: The effects have been ranked according to their 'potential impact' on the firm, which represents an assessment of the significance and probability of occurrence of each effect.

2.3. ECONOMETRIC EVIDENCE OF DIRECT EFFECTS

We proceed with a presentation of econometric evidence bringing us closer towards assessing the net effect of costs and benefits of ODI among the investing firms. In this section, we summarise the results about the direct effects ODI brings about on employment and productivity of the investing companies. The econometric analysis suggests that there is a strong relationship between ODI and higher levels of indigenous employment and productivity in ODI investing companies. Readers interested in the details of the methodology should refer to Appendix 6.

Considering first the effect of ODI on employment, the findings strongly indicate that on average, Irish companies engaging in ODI employ about 60% more employees in Ireland compared to their industry peers not engaging in ODI, (Appendix 6, Stata output 1.). In other words, companies engaging in ODI generate more indigenous employment (and/or make less people redundant) than very similar companies (controlled for size, performance and industry) which have not invested abroad.¹²

It should be noted that other factors not controlled for in the estimations, such as a favourable export environment, management capability or non-ODI expansion abroad (e.g. via alliances with foreign but without equity investment in them) may also have been a contributory factor in the higher employment levels in companies investing overseas. Nevertheless, taking the empirical and case evidence combined, it is likely that ODI has been the major driver of the relatively higher employment levels in firms engaged in ODI.

Why have ODI firms displayed an increased level of indigenous employment relative to non-ODI firms? Our research provides three explanations:

- Although companies may relocate parts of their activities, ODI creates more demand for the part of production that remains localised in Ireland. This happens when ODI causes greater demand for exports from Ireland.
- In all the five cases studies, we witnessed an increase in headquarter activities. More demand for headquarter functions from abroad results in the creation of more high quality jobs.
- ODI triggers the establishment of new jobs, especially in the area of R&D and product development.

The econometric analysis further suggests that ODI increases the productivity of investing companies. More productive companies can generate more value with the same amount of input as less productive companies. The data suggests that Irish companies investing in ODI are up to 50% more productive than other companies – meaning that they can potentially generate up to 50% more value with a given amount of labour and productive resources compared to the companies without investment (cf. Appendix 6, Stata output 4). While firms engaging in ODI experience a productivity surplus vis-à-vis those who do not invest, we caution the reader to treat the quantitative estimate as an upper range approximation of the possible gain, as other factors may also have contributed to the productivity surplus identified.

¹² Other model specifications, i.e. other variables to match on, give all a positive effect between 40 and 80 percentages (all significant results).

The higher productivity may be traced to the following:

- ODI triggers domestic restructuring, which reallocates productive resources and employment from less to more productive activities in the economy. Less productive activities are offshored and replaced with more productive activities.
- ODI gives access to better technologies increasing the productivity of the *existing* activities.
- ODI contributes to skill upgrading in the labour force. With lower demand for low value added jobs, the supply of higher value added jobs increases. This triggers skill upgrading in the indigenous labour force, boosting domestic productivity. In addition, ODI improves access to repatriating foreign skilled labour force to Ireland. The result of all these effects is that the productivity of the existing activities is higher.

Table 2.2 listed profit repatriation as a company-level benefit of ODI, reported by the interviewed companies. We have not been able to document econometrically if this is the case, because of data limitations, c.f. Box 1.

Box 1: Explaining challenges with estimating profitability effects

To measure the effect of ODI on corporate profitability, our approach was to set up a matching model comparing an accounting measure of profit – such as profit before tax – for two sub-samples composed of investing and non-investing companies in Ireland. *A priori*, we expected companies engaged in ODI to be significantly more profitable vis-à-vis the non-investing peer companies. Our estimation did not show a significant difference in profitability levels between the sub-samples, but as the robustness of this finding is challenged by data, we do not consider the result as conclusive. Trials with alternative profitability measures and ODI proxies did not improve the estimation.

What explains the result of the profitability model estimation?

Data availability is the most severe problem:

- Availability of profit statistics about the accounting measures of profit in Amadeus has been insufficient for the model, while alternative variables are not available. Although we have used one of the most detailed commercially available databases, with 122,500 Irish companies, profitability data is overwhelmingly missing.
- The lack of data is particularly acute among small and medium firms in Ireland (which constitute over 90% of the initial amount of Irish companies in Amadeus). Small and medium sized companies are subject to certain reporting exemptions in Ireland, cf. Companies Registration Office, www.cro.ie.
- The effect of ODI on the bottom line may have been obscured by accounting practices. A number of the case study companies were quite willing to discuss their growth in terms of manufacturing capacity, employment and turnover, but is less open to discussing their financial affairs.
- Investing companies will not display higher profitability instantaneously, and therefore models with a lag structure may be necessary to capture the effect. Unfortunately, the missing profitability figures make it impossible to set up a panel of sufficient size for the estimation with a lag structure.

Estimating our profitability model, we have anticipated ODI to have a positive direct effect on corporate profitability. Our expectation stems from the following reasoning:

- Increases in productivity we attributed to ODI should be accompanied by higher profitability, correcting for the effects of capital investment expenditure.
- If ODI is to increase shareholder value, company cash flows increase due to the positive present value of growth opportunities. Greater cash flows should be at least somewhat correlated with accounting measures of profit we have access to.

In nearly all contexts ODI generates tangible cost savings, either due to cheaper inputs or repatriation of superior technology. Cost savings should contribute to an increased bottom line result.

Source: Copenhagen Economics

Chapter 3 | SPILLOVERS TO OTHER FIRMS AND THE REST OF THE ECONOMY

The consequences of ODI extend beyond the boundaries of the investing firm itself, to its competitors, suppliers and distributors, and the rest of the economy in Ireland. Indigenous companies not engaged in ODI may therefore be affected indirectly by the decisions of other companies to invest abroad. A typical scenario involves reallocation of key clients, suppliers or even competitors (Irish or foreign) to offshore markets, altering the relationships an indigenous Irish firm was involved with these companies. Furthermore, the effects of ODI can accrue to the labour force, the government, the competitiveness of Irish international trade, and the perception of Irish products and services abroad.

In this chapter we follow a structure analogous to that of chapter 2. We start by presenting the evidence collected from the five case studies, and thereafter outline the results from econometric analysis.

3.1. CASE STUDY EVIDENCE OF POSITIVE SPILLOVERS

Creation of high value added employment

The most immediate effect of ODI is experienced by the Irish labour force, which is offered more high-value added jobs and fewer low-value added jobs, particularly in the manufacturing sector. This trend towards the creation of high-value added jobs is desirable and consistent with Ireland's economic policy objectives.

Supporting additional domestic investment

While concerned with investment overseas, ODI can open up new investment opportunities within Ireland (cf. *Manufacturing 1*). The increased revenues (and/or cost savings) accruing to an enterprise from overseas operations can provide a source of funds for new investment projects in Ireland. For example, *Manufacturing 1* has heavily invested its proceeds from offshore activities in unrelated businesses in Ireland, such as property and hotels. Similarly, new workplaces created have tended to offset the jobs lost through ODI.

Contribution to tax revenue

The government also stands to gain from ODI as more indigenous employment translates into more income tax revenue, even if we do not find a significant effect in terms of higher profitability of the investing companies. This holds even if the government loses some of its revenue when certain jobs are lost in Ireland as a result of ODI. This is based on the premise that the lower value jobs were likely to have been lost anyway due to competitive pressures, and in the absence of ODI, alternative high value jobs would not

have been created – to offset initial reductions in tax revenue. Case evidence suggests that the loss of low value added jobs would have been inevitable, primarily due to the increasing cost of labour-intensive activities in Ireland, such in as low-level assembly activities.

Stronger comparative advantages

The greater the number of successful, internationally competitive Irish firms in specific sectors, the stronger Ireland Inc.'s comparative advantage in a global context. Comparative advantages are not static, but evolve subject to specific country conditions and the development of other countries' comparative advantages. For Irish companies to remain internationally competitive in areas such as the ICT sector, in which Ireland has accumulated comparative advantages already, companies must be exposed to international business environments. Competing internationally from an export base in Ireland has its limitations, not only on the cost-side of operations, but also in terms of weaker understanding of world markets, technologies or weaker ties to key foreign clients.

Facilitating knowledge spillovers

Although the empirical analysis finds no significant knowledge spillovers from ODI to other firms in Ireland (see Section 3.3), there is case evidence that illustrates that they have occurred in isolated cases, such as in the software industry (e.g. in the case of *Services 2*). Such spillovers occurred when top experts left a company to establish new start-up firms in Ireland.

Enhanced recognition of Ireland

Irish ODI shapes a favourable 'country-of-origin' effect for Irish goods and services. Irish ODI is typically perceived favourably in offshore locations,¹³ and Irish products and services are considered of high quality. When selling products manufactured with Irish technology, Irish firms are known to have raised the bar in foreign markets, surpassing local standards in terms of product quality, performance or safety. Although the reason is strategic – to increase barriers to entry – the positive image of Irish products and services strengthens as a side effect, increasing brand value of Irish companies. All of this contributes to establishing a favourable 'country-of-origin' effect for Ireland. Non-investing companies acquire both benefits while not having to commit resources towards creating these effects. Furthermore, should they decide to invest, second movers are likely to experience lower entry barriers when entering markets where Irish companies have invested before.

¹³ There is evidence of that the perception Irish ODI is in the destination locations, translating e.g. into support from the local government for specific projects cf. <http://www.taoiseach.gov.ie/index.asp?locID=462&docID=2344>.

Table 3.1: Beneficial ODI spillovers

	Potential impact	Benefit on the economy –level*	Role of ODI in creating the benefit
Spillover effects from ODI	High	More employment in high-value added functions; maintained low-value added employment	By becoming more productive, ODI firms create high-value adding jobs in the economy. Creation of such jobs is desirable as they are sustainable.
		Supporting new investment in Ireland	Case evidence points to ODI being complimentary to new investment in Ireland. Although companies may shut down their productive assets in Ireland, and invest abroad, the successful ones are found to generate sufficient investment in Ireland to offset the negative effects.
	Medium	More income and corporate taxes	Greater profitability of ODI companies will increase government revenue from corporate tax. Greater employment will increase employment from income tax.
		Stronger comparative advantages	Companies successful with their ODI are more competitive internationally. Greater competitiveness of individual Irish companies translates into strengthening the Irish comparative advantages stemming from specialisation.
		Facilitating knowledge spillovers in the IT sector	The IT industry appears to be positively affected in terms of the potential for knowledge spillovers. Case evidence shows examples where such spillovers have taken place, resulting in the creation of new successful Irish IT companies.
	Low	Better recognition of Ireland abroad	The 'country-of-origin' effect may boost demand for Irish products from overseas. Furthermore, successful presence of Irish companies abroad makes it easier for other companies to follow suit.

Source: Copenhagen Economics

Note: The effects have been ranked according to their 'potential impact' on the economy, which represents an assessment of the significance and probability of occurrence of each effect.

* Benefits on the economy-level are to be understood as accruing outside the investing firm.

3.2. CASE STUDY EVIDENCE OF NEGATIVE SPILLOVERS

Loss of jobs in low value activities

The creation of high-value added jobs in the context of ODI is often accompanied by a loss of low skilled jobs in low-value added activities, such as low-level assembly or manufacturing. This is an important consequence of ODI as low-value added job losses typically occur in the context of factory closures, meaning that a large number of jobs are lost simultaneously. This may have greater impact where it happens in regional areas of the country, where alternative employment opportunities may be less readily available (cf. *Manufacturing 1*).

Potential impacts on market power

Since ODI companies are on average larger in terms of employment than their non-ODI counterparts, it is possible to anticipate increasing concentration of market shares in specific Irish industries. Too high a concentration of market share may generate welfare losses, as dominant companies are able to mark up prices significantly above costs, to the detriment of consumers. While welfare loss due to too high concentration can be measured, calculating the effect of ODI on industry concentration is beyond the scope of this study. Case evidence, however, suggests that ODI has not resulted in significant market share adjustments, at least not among the surveyed companies.

Foregone tax revenue

Operating abroad gives the Irish headquarters/parent company an option to expatriate their foreign profits to any destination outside of Ireland. Should this occur, the Irish exchequer would be affected due to forgone tax revenues. Again, while quantitative evidence is notoriously difficult to collect, our case evidence together with the low corporate tax rate in Ireland seem to suggest that the magnitude of this cost for Ireland is low.

Impact on local networks of suppliers and distributors

Relocating parts of their productive activities abroad, Irish companies may reduce or discontinue relationships with some local networks of indigenous suppliers and distributors with whom they had been transacting prior to relocation. Foreign expansion is generally accompanied by greater size, which in turn means that companies are more able to internalise certain aspects of operations previously outsourced to intermediaries, for example in the area of procurement or distribution in foreign markets.

Threat to 'Made in Ireland' brand

Another effect concerns the image of Irish products in the eyes of international consumers, driven by the 'country of origin' effect. If an Irish company compromises

the quality of its products by e.g. taking advantage of cheaper but lower quality inputs in offshore locations, there is a risk diluting the ‘country of origin’ effect – not only for their own product but also for other Irish products.

Regulatory ‘race to the bottom’

Finally, on the domestic scene, companies providing a large amount of typically unskilled jobs may attempt to use sustaining these jobs as argument when lobbying for more favourable laws. If such laws are of lower standard than the current ones (e.g. environmental laws), certain jobs would be protected at an overall cost to the rest of society. While we cannot rule this out, we find no evidence of this behaviour taking place to date.

Table 3.2: Costly ODI spillovers

Spillover effects from ODI	Potential impact	Cost	Driver
	High	Loss of jobs in lower value activities	Irish companies use ODI to move low value added jobs offshore. While this is positive for the company, negative consequences are borne by a range spanning the individual employees to entire communities.
		Economic insecurity and instability of employment	The possibility of moving workplaces outside of Ireland may instil feelings of insecurity and instability among employees.
	Medium	Foregone profit tax revenues	Locating offshore companies may seek the possibility of tax diversion, e.g. through the use of transfer pricing schemes. While collecting information on this issue is hard, low Irish corporate tax rates suggest that the cost of ODI due to tax optimisation is likely to be marginal.
		Less demand for intermediation	Going abroad, Irish companies may choose to internalise certain functions previously provided by Irish suppliers or distributors engaged in international activities. While we find evidence confirming this, we have also come across evidence to the contrary.
		'Made in Ireland' threatened	Investing abroad for cost optimisation purposes threatens the perception of the quality of Irish products.
		Market structures more concentrated	By becoming more productive and profitable, ODI companies may displace smaller domestic competition, increasing the concentration of industries in Ireland. Too high concentration is unfavourable, as it creates the possibility of welfare losses due to higher prices or corporate behaviour abusing dominance.
	Low	Regulatory 'race to the bottom'	Sustaining workplaces in Ireland is a political objective. ODI companies may use their bargaining power to lobby for favourable regulation in particular areas, in exchange for sustaining jobs.

Source: Copenhagen Economics

Note: The effects have been ranked according to their 'potential impact' on the economy, which represents an assessment of the significance and probability of occurrence of each effect.

Benefits on the economy-level are to be understood as accruing outside the investing firm.

3.3. ECONOMETRIC EVIDENCE OF SPILLOVERS

The econometric research undertaken suggests that ODI has a weak, albeit positive effect on employment in non-ODI investing firms in the economy. The analysis indicates weak but positive employment spillover effects within the industry value chain, i.e. accruing to distributors and suppliers. However, the empirical analysis found no evidence of productivity spillovers. This absence of productivity spillover effects is not uncommon, and is consistent with the literature and other studies commissioned by Forfás¹⁴.

¹⁴ See: http://www.forfas.ie/publications/forfas070321_productivity_book/index.html.

Furthermore, the econometric analysis found that non-ODI investing companies on the same level in the value chain (competitors) do not change their employment in response to higher employment in the investing companies. In other words, there are no horizontal employment spillovers to non-ODI investing companies. The lack of employment changes among competitors can be intuitively explained in the following way:

- Competitors who have not invested abroad may be at a stage where their productive capacity has been sufficient to meet Irish demand and exports. These non-ODI companies may not have experienced a change in domestic demand for their products to warrant an increase or decrease in indigenous employment.
- Competitors also may not have experienced greater competitive pressures in the international market. Prior to the investment decision, both the investing and non-investing firms could have already been competing on the world markets via exports from Ireland, most likely holding onto relatively small market shares. Investment abroad by one part of Irish firms would not necessarily reduce the output of its non-investing competitors in Ireland, as the marginal increase in market shares would be small from the industry point of view.

Though employment remains unchanged among competitors, companies that are in the vertical value chain of the investing firm – i.e. its suppliers and distributors – increase their employment, even if not investing overseas. We offer the following suggested explanation for the employment increases registered among the members of the vertical value chain:

- Investing firms increase their indigenous employment in response to greater demand from abroad.¹⁵ The additional demand generated abroad requires specialised inputs, such as semi-finished components or specialised distribution, such as just-in-time delivery. Crucially, production of at least some of such inputs or services remains localised in Ireland. With more inputs and services demanded by the investing company, there is greater demand for employment among the indigenous providers of these inputs and services. A case in point is the cooperation between *Services 1* or *Manufacturing 3* and their Irish logistics partners. Intensity of their cooperation increased in both cases following the companies' investments in the UK market.

¹⁵ This demand may stem from both end-customers as well as the subsidiaries of the Irish company.

The econometric research indicates that that the net measurable employment effect of ODI on the Irish economy is positive. The increases in employment are experienced by both the firm engaging in ODI (cf. section 2.3), and to a certain extent also by non-ODI investing companies

In contrast, the research finds no significant evidence of productivity spillovers to other enterprises in the economy resulting from ODI. Finding no productivity spillovers we conclude that non-investing companies are neither positively nor negatively affected by ODI. While ODI makes the investing companies more productive than non-investing counterparts, the productivity of both horizontal competitors, as well as members of the vertical value chain remains unchanged. Productivity enhancements among non-investing companies could be realised through knowledge spillovers from the more productive counterparts. However, the occurrence of such spillovers is not warranted by the mere presence of more productive companies in the economy. And in this specific case, there are no empirically measurable productivity spillovers accruing to the non-investing companies. This could be due to a number of reasons:

- Since ODI requires capital expenditure, the investing companies may wish to protect access to that knowledge or technology which makes them more productive, especially from horizontal competitors in Ireland who have not made an investment.
- Even if full protection of knowledge may not always be possible, especially in industries where knowledge sharing or emulation is the order of the day, non-investing Irish companies may experience difficulties in absorbing the knowledge to make them more productive. Knowledge and technology may be deeply embedded in the organisational contexts of the investing firm, and therefore not readily transferable to other companies.
- Productivity enhancements may stem from access to cheaper inputs that are tied to the specific investment location and non-transferable, as such. In this respect, the only beneficiary can be the parent company exercising control over its offshore subsidiaries.
- For members of the vertical value chain of the investing company, the knowledge about productivity increases within the ODI firm may be unusable and thus irrelevant.

3.4. STATISTICAL EVIDENCE OF ODI EFFECTS ON SKILL STRUCTURE

In this section the effect of ODI on the composition of skills is examined. This task is methodologically complex and the available data is rather constrained, see Box 3.1.

Box 3.1: Measuring changes in skill distribution

Stating the effect of ODI on the skill composition of the labour force in quantitative terms is an inherently complex problem due to the difficulty in ensuring that there indeed is a causal link between the two. The task is furthermore complicated by data availability, making it necessary to combine data from the Luxembourg Income Study with the Irish Central Statistical Office. We have been able to gather data documenting changes in low, medium and high skill employment, constructed according to the International Standard Classification of Education, cf. footnote 18, in 12 sectors of the Irish economy, in 2000-02.

To illustrate the skill-distributional effects of ODI, we calculate the growth in high-skill employment on the level of the specific sectors. We aggregate the sectors into two groups: 'Construction and manufacturing', consisting of 8 sectors, whose employment is generally low and medium skill-intensive, and 'Services and trade', comprising the remaining 4 sectors. We correlate the change in skill intensity with our measure of sectoral 'ODI intensity' defined as the ratio of foreign created in sector k to total k employment, cf. Table A.9 in Appendix 6. We find that there is a positive correlation between the change in the share of high-skilled employment and the intensity of ODI in both groups of sectors.

Source: Copenhagen Economics

Analysis of the data from the Luxembourg Income Study and CSO QNHS indicates a correlation between those sectors which experience the highest levels of ODI activity, and those sectors which experience the highest levels of growth in high-skilled indigenous employment.

The correlation between 'ODI intensity' and the change in the share of high-skilled employment is positive both within the broadly defined 'construction and manufacturing' group, as well as within 'trade and services' sectors, although the change per unit ODI appears systematically greater in the manufacturing and construction sectors than the services and trade sectors, cf. Figure 3.1.

Manufacturing & construction sectors

Illustrating the above correlation, the textile industry has offshored a large number of jobs (high ODI-intensity), and has experienced the largest increase in the share of high-skilled employees in Ireland.

This does not necessarily infer that the absolute number of employees or number of high skilled employees has increased within the industry, rather that the proportion of the total employment in the firm/sector which is made up of high skilled employees has increased. This trend can be created by the offshoring of low skilled jobs, while retaining high skilled jobs.

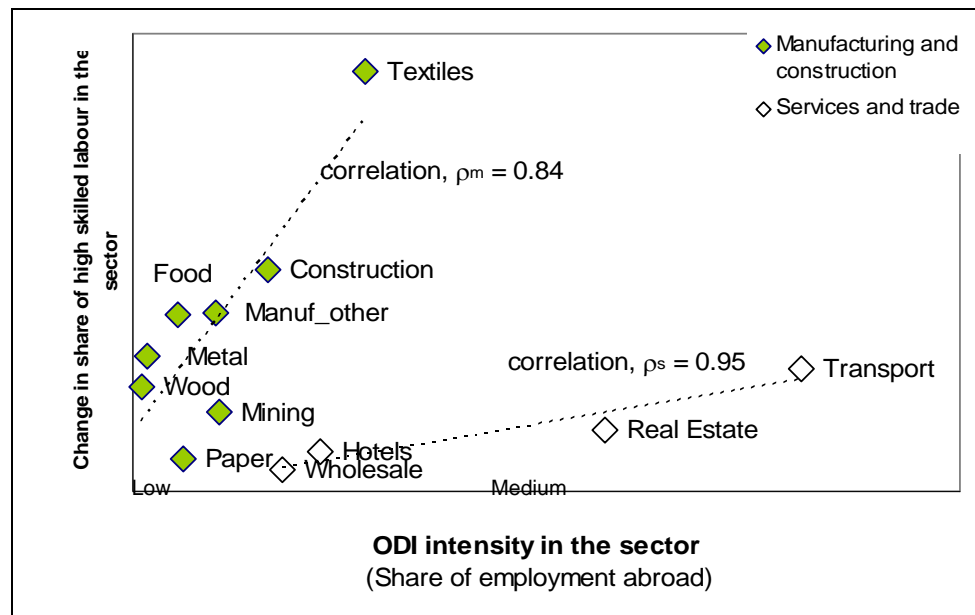
At the other end of the scale, the paper industry has relatively fewer jobs abroad, and the change in skill structure over time is smaller. Other manufacturing sectors (e.g. construction and food) are consistently found on a positive trend line between these two extremes, which weakly supports a claim about the influence of ODI intensity on skill distribution.

Trade and Services sectors

In comparison, the share of high-skilled employment does not increase by the same amount in the service sector, when comparing sectors with roughly the same ODI intensity, (e.g. construction and wholesale services). By similar reasoning as above, this may be explained by the fact that the share of high-skilled employment is already relatively high in services at the outset, hence less scope for further increases.

Moreover, it is hypothesised that in the case of trade and services sector, the lower growth in the high-skilled jobs is the result of the creation of a certain amount of low-skilled jobs which are possibly being taken up by those whose jobs were made redundant in manufacturing. In this respect, trade and services may provide employment opportunities to that part of the Irish labour force whose jobs are being made redundant due to ODI in the manufacturing industry.

Figure 3.1: Effect of ODI on skill structure¹⁶



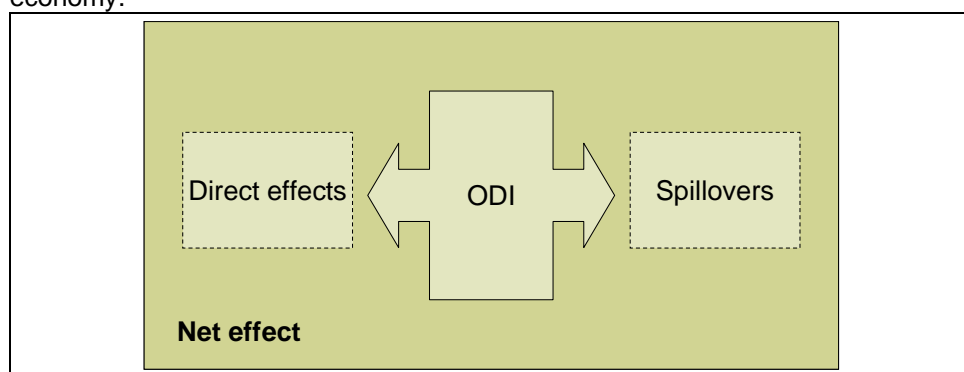
Source: Copenhagen Economics, Luxembourg Income Study and CSO Ireland.

¹⁶ Breakdown of employment into low, medium and high skilled groups is according to the Luxembourg Income Study methodology. “The concept for the standardised variable is based on the International Standard Classification of Education from UNESCO ; ISCED97 and uses highest attained level of education. Only completed training is taken into account. If the original survey contains categories like “started, incomplete, without leaving certificate”, etc. than the standardised variable is coded to the next lower level.”, see <http://www.lisproject.org/dataaccess/educlevel.htm> for more details.

Chapter 4 | CONCLUSION

The net effect of ODI on the Irish economy is a function of direct as well as indirect (spillover) effects, cf. Figure 4.1.

Figure 4.1: Direct and spillover effects of ODI for indigenous Irish firms and the economy.



Source: Copenhagen Economics

To derive the net effect, we consider the aggregate evidence about the direct and spillover costs and benefits we collected from the case studies and econometric estimations. Based on this aggregated evidence, we conclude that ODI has a net a positive effect on Irish firms and the Irish economy. Unfortunately, it is impossible to state quantitatively, with any conviction, the extent of the net positive effect.

The qualitative research illustrates that ODI is a natural stage in the growth and international expansion of an enterprise. The case studies illustrate that ODI can also be a necessary step in ensuring the competitiveness and long term survival of an internationally trading company (many of the interviewed companies have admitted they would have no business in Ireland today, at least not the same volumes, had they not invested abroad).

There are also other motivations for ODI. For some firms, ODI provides an opportunity to reach out to new markets or follow clients with their already existing products or services. For those facing competitive pressures, especially on the cost-side of operations, ODI makes it possible to stay in business by offering the chance to reduce their costs. Finally, innovative companies, typically with an already successful global product or service, may reach out to new sources of knowledge and technology not available in Ireland, in order to make even better products or services. Again, ODI gives a strategic option to reap benefits from the best available resources, irrespective of their location, in addition to cost optimisation at home. Finally, investing companies gain the opportunity to repatriate profits earned abroad. While this is clearly beneficial, the exact

extent of profit repatriation may vary due to the timing of the investment, tax structures, or growth opportunities (financing expansion).

In short, evidence from the cases supports the view that prospering companies have engaged in ODI as an opportunity to embark on international competition, while for others ODI has been more of a necessity to continue operating in Ireland.

Many of these stories translate into quantifiable results caused by ODI, which we have measured econometrically.¹⁷ While we followed econometric best practice in formulating and estimating our models, the quality of the results is inevitably connected to the quality of input data. In this respect, we are confident about the quality of employment and productivity estimates, we decided not to report results of profitability models, for reasons explained in Box 1.

On the company level, ODI sustains and creates more jobs than it offshores or makes redundant. Furthermore, ODI is linked to significant increases productivity in the investing companies. (We document that ODI could be responsible for sustaining up to a third of the current jobs among the investing companies, while making them up to 50% more productive than average non-ODI investing firms). While it was not possible to satisfactorily capture the exact effect on profitability, there are reasons to expect a beneficial effect as well.

The effects experienced by the investing companies do not significantly spill over to the remaining, non-investing companies in the Irish economy, with the exception of more employment in the vertical value chain. Again, we stress that the lack of spillovers is neutral: neither positive nor negative effects predominate. The net effect of ODI on the Irish economy is thus mildly positive.

Taken together, the effects the direct and spillover effects translate into a net positive effect for the Irish economy cf. Table 4.1.

¹⁷ Proving causality is the central yet the most challenging aspect of econometric estimations. Where possible, we have estimated matching models, where the causal link between the treatment (ODI) and the response, e.g. in terms of employment, is stronger than for OLS models. We advise, however, to interpret our quantitative findings as upper bound estimates of the specific effects.

Table 4.1: Summary of measurable economic effects of ODI

Impact of ODI on:	Investing indigenous Irish firm	Other indigenous firms	Net effect on the economy
Employment	Increases	Increases mildly	Positive
Productivity	Increases	Unchanged	Positive

Source: Copenhagen Economics

National enterprise policy aims to maximise the possibilities for Irish companies to reap the benefits from globalisation.

We stress that the greater the number of successful, internationally competitive Irish firms in specific sectors, the stronger the Irish comparative advantage. Competing internationally from an export base in Ireland can have limitations, not only on the cost-side of operations, but also in terms of understanding of world markets, technologies or ties to key foreign clients.

Therefore, and especially in times of historically low unemployment rates, a key policy priority could be given to improve productivity of the internationally traded industries.

A sound economic policy in a globalised knowledge economy should aim to provide good and undistorted access to foreign markets for all internationally traded industries, regardless of the preferred mode of supply.

Access to foreign markets is a key driver in delivering this productivity growth. We know from various studies, e.g. our study for the European Commission on the economic impacts of the proposed service directive (see Copenhagen Economics, 2005), that foreign establishment is the preferred mode of supply in many of the knowledge intensive and highly productive service sectors.

We see the current study as a starting point for further research and discussion on the the importance of ODI and its impact on Irish enterprises and the Irish economy. Such research and debate is particularly important in the context of developing a highly productive service based economy.

APPENDIX 1: LITERATURE SURVEY

Worldwide FDI flows have increased dramatically in the past decade [UNCTAD (2004, 2006)]. A large stream of research has considered the effects of increased FDI inflows, typically from developed to developing economies, on host countries. Most of the literature verifies the net impact of FDI inflows onto the host economy.¹⁸

Over time, this research has provided valuable contributions to policies regulating inward FDI on host economies. However, the debate about other side of the issue, i.e. the home country effects of ODI by multinational enterprises (MNEs), testifies to the need to formulate comprehensive policy advice on ODI [Konings and Murphy (2001) and UNCTAD (2004)]. The need for sound policy advice is especially evident in cases where relatively small investments can induce potentially large effects, as in small open economies like Ireland.

The literature has examined a number of distinct effects ODIs are likely to induce in the home economy. Most of the studies concentrate on the following effects:

- Absolute employment effects (aggregate employment)
- Relative employment effects (skill structure)
- Effects on corporate/industry profitability
- Wage effects

A key characteristic governing the direction and magnitude of the above effects is whether ODI complements or substitutes a range of activities at home. Furthermore, the literature points to the importance of contexts in which ODI takes place. Identifying a number of specific circumstances helps in disentangling an effect of interest more precisely. We shall consider:

- The development status of the foreign affiliate's host country
- The type of ODI strategy: horizontal or vertical ODI
- The type of spillover: inter-industry or intra-industry
- The geographical location of spillovers: within the home country or between the home and recipient countries
- Industry-specific characteristics of ODI within manufacturing and service sectors

The results of the available academic studies suggest that there are no clear answers, at the economy-wide level, to whether the net effect of ODI is positive or negative for the

¹⁸ Research typically concentrates on effects measured in terms of employment creation, technology transfer, enhanced specialised knowledge and skill acquisition, and not the least higher wages paid to foreign company employees. For example, see: Lewis, H., III and Richardson, D., (2001) and Markusen and Maskus (2001) for a survey on recent empirical work. Against this backdrop, the prominence of studies investigating negative impacts (e.g. profit repatriation, balance of payment crises, rise in prices, crowding out of domestic firms) has been markedly lower.

home economy, cf. Table A.1. Because conclusions seem to be deeply influenced by firm- and/or industry-level characteristics, it becomes essential for a complete understanding of ODI effects for Ireland to use a quantitative modelling approach rooted in Irish firm- and industry-level data.

Table A.1: Review of literature on home country effects of ODI.

Effect	Author	Findings	
Employment	Negative	Blomström et al. (1997)	For U.S. firms, larger foreign production is associated with smaller parent employment.
		Brainard and Riker (1997)	Foreign affiliate employment, only modestly, substitutes for U.S. parent employment.
		Görg et al. (2001)	Find weak evidence of a positive relationship between outsourcing and wage inequality at home.
		Cuyvers et al. (2005)	Manufacturing sectors experience a negative effect of foreign affiliate production in Central and Eastern Europe on parent country labour demand.
	Positive	Blomström et al. (1997)	Swedish parent firms employ more labour at home when production abroad increases, and the effects are especially due to the operations in the developing countries.
		Lipsey et al. (2000)	Japanese MNEs are similar to Swedish firms in the respect that, foreign affiliate production complements parent employment.
Konings and Murphy (2001)		Foreign employment substitutes for parent employment. Substitution mainly takes place between parents and their EU- based subsidiaries.	
Skill Intensity	Positive	Head and Ries (2002)	Additional foreign affiliate employment in low-income countries raises skill intensity at home.
		Blomström et al. (1997)	ODI by Swedish MNEs in developed countries increases blue-collar employment at home but not white-collar. Swedish MNEs FDI in developing countries increases both kinds of employment at home.
	Neutral	Slaughter (2000)	U.S. MNE transfers of production from the US parents to foreign affiliates have only a small and insignificant impact on the U.S. relative labour demand.
Wages	Positive	Feenstra & Hanson (1996) Feenstra & Hanson (1999)	US outsourcing (the import of intermediate inputs by domestic firms – alternatively viewed as non-equity FDI) can account for about one third of the increase in the relative wage of non-production workers at home.

Source: Copenhagen Economics

APPENDIX 2: QUALITATIVE METHODOLOGY

To source information about the non-economic effects, we have developed five illustrative case studies with Irish companies engaging in ODI. The companies have been chosen from Enterprise Ireland's client base and include enterprises with different knowledge (R&D) intensities, and different types of overseas operations (e.g. both horizontal and vertical ODI). Such an approach was to obtain information about a complete spectrum of possible positive and negative effects. Our particular results, however, should not be generalised to peers. The primary goal of the cases is to provide illustrations deemed indicative of ODI effects accruing from particular contexts.

Our case selection criteria encompass two parameters of ODI: the R&D intensity of activities and the type of investment overseas. The choice of R&D intensity has been motivated by Braunerhjelm et al. (2005), who documented this feature of industries involved in ODI is likely to determine the effect specific outward investments have on the allocation of capital through indigenous investment. ODI by R&D intensive industries is likely to substitute domestic investments while ODI by non-R&D investments is likely to complement them. The second criterion identifies the relation of the ODI to the Irish firm's value chain. Horizontal investments, replicating the entire value chain abroad, are likely to generate more negative effects than vertical investments, replicating only the upstream or downstream part of the value chain.

The two dimensions cf. Table A.2, serve to identify four indicative examples of ODI strategies. In this process, we choose to include cases involving unrelated industries, ODI locations in developing (China, Eastern Europe) and developed (UK, US) host economies, manufacturing and services. This strategy ensures maximum variation concerning the influence of the chosen characteristics. An in-between case is added to expose effects which are likely to be common for all types of ODI. Effects observed in the in-between case are likely to be found in other cases.

Table A.2: Profiles of case study companies

	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Dimensions of ODI	Low R&D intensity	Low R&D intensity	Intermediate R&D intensity	High R&D intensity	High R&D intensity
	Vertical investment	Horizontal investment	Horizontal and Vertical investments	Vertical investment	Horizontal investment
Company	Manufacturing 1	Services 1	Manufacturing 2	Manufacturing 3	Services 2
Investment in	Eastern Europe, China + multiple international acquisitions	Eastern Europe, China and the USA	Eastern Europe, US, China	Eastern Europe	Eastern Europe, US

Source: Copenhagen Economics

The detailed case studies are not available for publication for reasons of confidentiality.

We have interviewed key managers (CTO, CFO, CEO). Interviewing was based on an initial telephone interview lasting about 1 hour, which provided the basis for a brief case study presented in Phase A of this study. Thereafter, members of the project team conducted face-to-face interviews with the same company representatives, which provided an opportunity to probe deeper into selected aspects of corporate ODI strategies identified in Phase A.

Interviewing took place in Dublin between 12-14 February, 2007, at corporate headquarters. The interviews were open, although the members of the interviewing team have used an interview guide to ensure coverage of the relevant issues. The interview guide has been designed to source information on the effects of ODI developed in the ‘Typology of detailed ODI effects’ produced during Phase A of the study. It is reproduced below. Based on the input sourced during the interviews and Phase A material, we developed the five cases.

Guide for in-depth interviews with indigenous Irish companies engaging in ODI – Dublin 2007.

This interview guide has been constructed to achieve three objectives:

- Recapitulate the background for main foreign investments undertaken by indigenous Irish companies
- Source evidence to understand effects on the firm-level in Ireland
- Source evidence to understand effects on the economy-level in Ireland

While brief studies have already shed light on a number of the above issues, the purpose of in-depth interviews has been to systematically source information to develop a deep understanding of all effects explored in the typology.

Part A: Understanding the investment(s) abroad

- What three goals have motivated your decision to invest abroad?

[E.g. acquiring specific knowledge, using talent not available domestically, accessing new geographic markets, accessing specific resources not available domestically, exploiting low energy costs, using the country as launch pad for further expansion, closer ties to customers, following competitors, etc?]

- What is the scale and main activities of the subsidiary and how do they relate to the value chain of the headquarters in Ireland? Similarities and differences in operations and processes.

[Small, medium, large, growing, stagnant, vertical, horizontal, replica of the entire Irish HQ value chain]

- Are the headquarters in Ireland and the subsidiary abroad better described as competing or cooperating e.g. in terms of manufacturing cost, the quality of R&D, possession of key employees or clients, or financing of new investments?
- What happens to the earnings generated by the foreign subsidiary? Are they repatriated to Ireland or reinvested abroad?

Part B: Understanding the consequences for the indigenous Irish firm:

Table A.3: Effects for the firm (parent firm engaging in ODI)

	Benefits	Costs
Economic	<ul style="list-style-type: none"> • More revenues from market expansion • Cost savings from labour and inputs • Profit repatriation 	<ul style="list-style-type: none"> • Start-up costs abroad • Higher HQ overheads • Less demand for intermediation • Transaction and transportation costs
Non-economic	<ul style="list-style-type: none"> • Source new talent and technologies from abroad • Strengthen relations with key clients 	<ul style="list-style-type: none"> • Increased risk exposure • Risk of having technology and knowledge stolen by host country firms

Source: Copenhagen Economics

More revenues

- Has going abroad increased the amount of revenues accruing to the Irish HQ, e.g. in comparison to exports or licensing (where relevant)?

Costs savings

- Are you deriving cost savings from access to cheaper physical resources abroad? How significant are they (examples)?
- Following the investment abroad has there been an increase, a decrease, or no change, in the *overall level* of employment at the Irish HQ?

Profit repatriation

- To what extent are your profits from abroad repatriated to Ireland? Can you provide a geographic breakdown of profits / revenues?

Sourcing talent

- Are you faced with a shortage of talent (incl. managerial) in Ireland? Is expatriating key Irish employees abroad problematic (loss of key competencies or lack of will / suitable candidates to expatriate)?

Client relations

- Can you give examples of how investment abroad made you understand client needs better?
 - [Faster product-to-market time, leapfrogging competition with new product releases, better client loyalty]

Start up costs

- Have you had any concrete plans about investing in Ireland that have been changed by the decision to invest abroad?
 - [E.g. into new operations or expanding existing operations]

HQ overheads

- Have you expanded or contracted your headquarter functions in Ireland?

Intermediation

- In the aftermath of the investment abroad, have you lost or gained any supplier or sub-supplier of foreign production inputs, in Ireland? Have you internalised these activities successfully?
- In the aftermath of the investment abroad, have you lost or gained any exporters (distributors) of goods produced in Ireland? Have you internalised these activities successfully?

Transaction and transportation costs

- Have you been affected by unforeseen costs stemming from transport and logistics (late deliveries, production line stoppages, losses of cargo, etc.) Are these significant?
- Have travel costs become an issue?

Increased risk exposure

- Have you affected by any new sources of risk previously not existing in Ireland? What kind?
- Has managing these risks been a challenge or have you managed to diversify them?

Competence erosion / technology loss

- Have you experienced particular instances of where your core technologies have diffused to your competitors abroad?
- Have these competitors challenged you in your Irish market?

Part C: Understanding the consequences for the Irish economy.

Table: A.4 Effects for the firm (parent firm engaging in ODI)

	Benefits	Costs
Economic	More employment in high-value added functions and sectors Income taxes and corporate taxes Strengthening comparative advantage	Loss of jobs in manufacturing Market structures more concentrated Foregone profit tax revenues from repatriated profits Less demand for intermediation
Non-economic	Increasing recognition of Ireland abroad	'Made in Ireland' threatened Regulatory 'race to the bottom' Economic insecurity and instability of employment
Uncertain effects		
		Irish Exports Investment in Ireland

Source: Copenhagen Economics

Structure of employment

- Has employment in high-value adding activities increased?
- Has employment in low level manufacturing activities declined?

Taxes

- Has the base of profits taxable in Ireland increased or declined? How significantly?

Comparative advantage

- How important is sourcing new talent / knowledge from abroad? What form does it take (key employees, purchase of local assets, licenses, know-how, expertise?)
- Can you give examples of new technologies, processes sourced from abroad, previously not available in Ireland?
- Is this repatriated to Ireland? Successfully?

Concentration

- Has the size of your domestic operations expanded, following the decision to invest (e.g. have you made acquisitions of smaller suppliers / distributors)?

Intermediation

- Have you lost or gained relationships to any other parties in your external value network (e.g. universities)?
 - [If so, please identify them and comment briefly]
- What were the responses of your immediate peers within your value network in Ireland? Have any of your competitors, suppliers or distributors from Ireland, followed suit and invested in abroad or elsewhere in the region? Have they gone out of business?

'Made in Ireland'

- What role does your Irish origin play for your decision to invest abroad? Do you consider it an asset?

Regulation

- Have you lobbied for specific legislative amendments in Ireland to facilitate your investment strategies? Examples?

Employee motivation

- Have you surveyed employee motivation in response to your investments abroad? How do you interpret your findings? Have they generated any costs?

Exports

- Are you exporting more or less from Ireland?

Investments

- Are you investing more or less in Ireland?

APPENDIX 3: QUANTITATIVE METHODOLOGY

We apply our quantitative tools to calculate the effects on employment, productivity and profitability. We estimate direct effects for the investing firms as well as spillover effects to the accruing to the non-investing firms. For estimating the employment effect we make a novel adaptation of matching-estimator techniques, which allow to model the ‘what if no investment’ scenario. In other words, we estimate what would have happened to employment had the ODI companies not invested. The drawback of this approach is that it places high data requirements, so for productivity and profitability we only estimate the contemporaneous difference vis-à-vis the actual companies that have not invested. We use results from the two estimations to assess the quantitative effect for the Irish economy.

The purpose of this appendix to explain how econometric modelling can be used as advice on setting up adequate ODI policies, and secondly to provide details about the econometric models. Finally, we document the methodology implemented to calculate the effect of ODI on changes in the distribution of high, medium and low-skilled employment.

Interpreting the econometric results

In our context, econometric modelling will serve two purposes for policy-makers; first, it vastly reduces uncertainties about the existence of particular effects, and second, it helps to improve judgements where benefits and costs of ODI must be weighed against each other. Econometric models reduce uncertainties by measuring and testing the effects, and by assigning exact magnitudes to each effect it becomes much easier to weigh the different effects against each other.

From a more general point of view, econometric modelling has certain advantages for identifying and quantifying economic effects. First of all, it imposes a stringent and consistent way of thinking about the economic effects; else it could not be specified in an econometric equation. Second, it provides an acknowledged methodology of dividing relevant from irrelevant factors. Third, econometric modelling guarantees through its nature that a magnitude is assigned to each effect so that different effects can be compared on equal grounds.

In scientific research, econometric modelling is normally used for testing theories (or conjunctions of theories) or for measuring the exact magnitude of well established empirical relationships. This implies that the scientist looks for the precision of the estimate in terms of statistical significance and secondly the exact size of the estimate. We will need both aspects in our empirical investigations.

Following the set up of the typology in Chapter 1, we need to conduct a series of econometric estimations – all of them at the micro level. Thus, we need to test for the presence of ODI effects at the firm level and in order to gauge the macro level effects we have to compare the magnitude of each of the micro level effects.

We notice that all econometric models will be set up in a way to capture the long-run effects of ODI. This is important for the interpretation as short-run and long-run effects can be quite different in magnitude and even sign. For example, profitability may be influenced negatively in the setup period of subsidiaries, but positively in the long-run once profits begin to arrive in Ireland.

Details of the econometric methodology

The econometric modelling consists of three parts. The first part considers the employment effects of ODI, the second part the productivity effects, and the third part the effects on firm level profits. Below, we will present the details of each of these three parts after a short introduction to the data.

Description of the micro data

This section provides an overview of the Irish ODI database constructed by Copenhagen Economics. The database includes relevant firm level data from the Amadeus database. In our description of the data we focus on how to measure ODI, since the other variables included are standard accounting variables such as turnover, costs and profits.

The Amadeus database

The firm level ODI data is obtained from the Amadeus Database. Amadeus is a large scale pan-European database including more than 7.5 million firms collected by Bureau van Dijk, a European electronic publishing firm. Bureau van Dijk specialises in cleaning and organising data supplied by information providers across the world. In the early years Bureau van Dijk collected data from large firms, but recently they started to expand data coverage to small and medium sized firms. For a wide range of firms this results in up to ten years coverage.

The Amadeus database primarily consists of accounting data. These are variables such as sales, turnover, profits, and cost of employees, as well as capital costs, taxation, exports and many more. Moreover, we have detailed information on number of employees, geographical belonging, NACE codes etc. From these accounting variables we have constructed variables suitable for economic modelling. For instance, one measure of labour inputs would be the number of employees.

Finally and most importantly, Amadeus includes detailed ownership and subsidiary information. The basic information contained in the Amadeus ownership database is processed and analysed in order to:

- List the direct shareholders of a given company with their percentage of ownership;
- List the subsidiaries of a given company together with their percentage of ownership;
- Qualify such direct and indirect subsidiaries with regard to their ownership status (*Ultimately Owned, Controlled*, by the given company). Qualify companies according to their degree of independence with regard to their shareholders.

Apart from this there are several other details that describe the shareholder-subsidiaries types and inter-linkages.

Measures of outward direct investment

In economic models and applied econometric work on ODI the notion plays a crucial role. For this study we define two types of ODI variables:

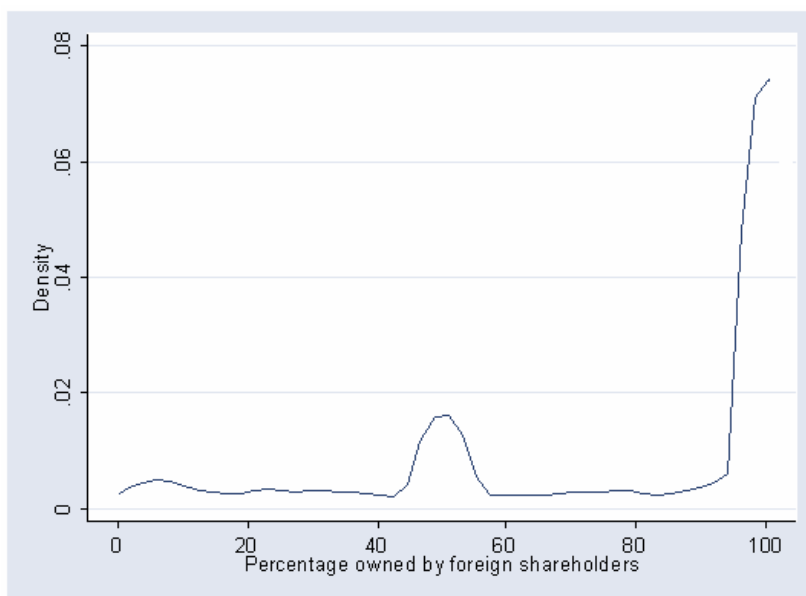
- The first type is a discrete firm level variable. This variable is a so-called zero-one variable, whereby all Irish firms are classified as firms with or without a foreign affiliate by some objective criteria.
- The second type of foreign ownership variable is a continuous variable measuring the degree of ODI. In our analysis we need information on the degree of horizontal and vertical ODI. These ODI variables are defined by comparing the number of employees in a given industry with the total number of employees. Such a variable can take any value from 0 percent to 100 percent.

In the following we describe the adequate definitions of these ODI variables. The first question is then: when is an Irish company classified as having ODI? Is it only when a company totally owns a foreign company (100%), when it controls a company (>50%) or simply when some kind of ownership is at hand (>0%)? The empirical literature has treated this issue somewhat differently depending on the purpose of the analysis; in case of spillover models would tend to favour a more restrictive view on ODI.

The definitions above are based on three thresholds. The thresholds are not arbitrary. Looking at the actual data of the investor's share of ownership in a foreign company, it shows that investors seem to cluster around certain focal points on the shareholder-percentage continuum, especially around 50% and 100%. This is illustrated in Figure 0.1 where we depict the distribution of foreign owners' shareholder percentage. Clearly the

vast majority of foreign investors seek a high degree of control in the host firm as most foreign shares are above the 50% threshold. Still, we conduct estimation exercises with lower thresholds than 50% to check the robustness of our results.

Figure 0.1: The distribution of foreigner shares in local companies



Source: Copenhagen Economics. Data are taken from Amadeus and are data for EU27.

Note: The foreign shares are the percentage of shareholder assets owned by the foreign firm.

Next question is how to design the shares of ODI. If we use the number of firms as the ODI measure, every firm counts equally regardless of size. We therefore construct ODI shares were size matters by using the number of employees. Again we construct three versions with increasing degree of control, cf. Table A.5.

Table A.5: Definitions of shares of ODI variables

Share of ODI (number of employees)
<i>ODI share</i> : Defined as the number of employees in Irish owned firms as a share of total employment. The classification of ODI is regardless of the subsidiary percentage in the foreign firms
<i>ODI control share</i> : Defined as the number of employees in Irish owned firms as a share of total employment. The classification of ODI is when the Irish firm owns percentage > 50%
<i>ODI full control share</i> : Defined as the number of employees in Irish owned firms as a share of total employment. The classification of ODI is when the Irish firm own all 100% of a foreign company

Source: Copenhagen Economics

Other firm level variables

Apart from the outward direct investment variable our empirical models will include other firm level variables. All firm level variables will be constructed on the basis of the detailed accounting information from the Amadeus database. To give an example we get capital input measures by taking the fixed assets from the balance sheet. In a few cases such accounting information can only proxy the economic variable of interest, but the large number of observations will serve to reduce any effects from extra variation. Finally it is worth mentioning the detailed information on industry relationship. This information is available on NACE4 level and makes it possible to calculate agglomeration index and ODI measures on industry level.

Setting up the relevant sample

The latest version of Amadeus (December 2005) contains information on 129,434 Irish firms. Information is collected each year – based on annual reports dating back to 1992. The sample becomes smaller as we move back in time.

The first reduction in the sample is made due to inclusion of inactive companies in Amadeus. Inactive companies are entities which have been closed or merged with other companies. In the next step we reduce the sample further because of missing information in the ownership database and/or in the accounting sections. Typically, these two are heavily correlated. For our purposes it is important to include the group of firms with the most complete ownership information. By analysing the data we have found a clear relation between not reporting on number of employees and not reporting on ownership structure. Therefore, we exclude companies with no information on the number of employees thereby also excluding most of the firms with no or limited ownership information.¹⁹ It is less clear whether a further reduction is necessary and we will leave this option open.

After excluding inactive companies and companies with no reporting on employees, the sample is reduced to approximately 20,000 companies.

Employment effects

Employment effects have already been investigated in the academic literature, see e.g. Blomström et al (1997). Unfortunately, this does not mean that a consensus has been reached of whether ODI creates or destructs jobs. On the contrary; some studies reach the conclusion that employment is hampered by ODI, other studies that it is stimulated by ODI.

¹⁹ Note that it is not preferable to include only the companies with ownership information as this could result in a bias in our sample towards higher frequency of ODI. If foreign investors are obliged to report we have a self selection problem, but using another criteria like company size we will avoid such problems.

At the centre of this debate lies an uncertainty as to what to compare the employment situation in each firm with. If one compares with the employment in the same firm before the date of ODI, the result is most likely to be negative, c.f. Cuywers et al (2005). On the other hand, if one looks at the relationship between affiliate and parent employment the link is more likely to be positive, c.f. Blomström et al (1997) and Lipsey et al (2000).

None of these two comparisons precisely address the interesting question: how would employment look in the parent firm had it not undertaken the ODI? Would jobs have been saved at home instead of moved to a foreign location? Or, would all jobs at home have been lost due to e.g. bankruptcy?

Here, we propose to apply a recently developed econometric technique which instead of defining a second-best counterfactual scenario mimics the first-best scenario. The econometric technique is called matching, c.f. Heckman et al (1998).

Matching techniques boil down to a comparison of a central indicator (employment) between subjects (firms) from the treatment group (firms having invested abroad) and from the control group (firms not having invested abroad). The ingenuity behind matching is that the comparison is only based on subjects with all the same characteristics.

In our case, the matching estimator will take the following form. We choose the logarithm of employees at the firm level as our indicator variable. We divide our dataset of Irish firms into two: N_1 firms having invested abroad after 2001 and N_0 firms not having invested. On the basis of firm level characteristics such as profitability, size, growth, industry, location, etc. we construct weights, W_{ij} , reflecting the similarity of firm i and firm j , where i is taken from the treatment group and j from the control group. Finally, we construct weights, w_i , taking account of the domain of interest and heteroskedasticity. The final estimator is defined as:

$$\hat{\beta} = \sum_i w_i [\ln L_i - \sum_j W_{ij} \ln L_j]$$

Since we estimate on logarithms, the resulting coefficient can be interpreted as a percentage change effect.

To gauge the spillover effects on other companies, we propose a more standard econometric model. Similar to a number of other studies, e.g. Arellano and Bond (1990), we define a labour demand specification that relies on the work of Layard and Nickell

(1986). The specification considers labour as a function of wages, potential output, and other relevant explaining variables:

$$l_{ijk} = f(w_{ijk}, y_{ijk}^*, firmage_{ijk}, comp.adv_{ij}, ODI_{ijk}, ODI_{ij}, ODI_{ij*})$$

where l_{ijk} is the logarithm of employees in firm k of sector j in country i . w represents wages, and y^* potential output being the two main explanatory factors. $firmage$ measures the age of the firm by applying four categories from “old” to “entrepreneur”, and $comp.adv.$ represent the comparative advantages (agglomeration) of a sector within a country. The ODI term enters in three forms; the first measuring the effect in the parent company (analogous to the matching estimator from above), the second measuring the horizontal spillover effects, and the third measuring the vertical spillover effects.

Productivity

Many of the hypothesised positive economic effects from ODI are linked to productivity. For example, management development, creation of high-value employment in head-quarter functions, and the development of internationally recognised brands are all subcomponents leading to higher productivity. Thus, one of the main indicators is productivity.

There are two types of productivity effects: direct and spillover c.f. Figure 4.1. First, we investigate the effects on the parent company, and second we investigate the vertical and horizontal spillovers. At least a priori, the first effect will be much larger than the second effect. If we assume that productivity increases by 15 percent in an average parent firm after the ODI, then we cannot expect to find an effect of more than 1 percent on firms with horizontal or vertical links to the parent. But from a macro perspective, the second effect may be equally important; in our example we only need app. 15 related firms to achieve the same effect as the direct.

The theoretical literature has considered three ways in which spillovers might arise. First, backward and forward linkages between the parent and local firms are likely to exist (see Lall, 1980, Rodriguez-Clare, 1996). Second, the parent might be a source of inspiration at a technological or managerial level for local firms (see Blomström and Kokko, 1996). Third, spillovers arise when trained employees will later join other local firms or set up their own companies, bringing with them part of the technological, marketing, and managerial knowledge that they have previously acquired (Fosfuri et al, 1998).

Based on these ideas we set up an empirical model that explains how much ODI contributes to local productivity. By using the information from Amadeus, our empirical

model will consider the determinants of firm level productivity. We will depart from standard specifications as found in the FDI literature, e.g. Aitken and Harrison (1999), but develop these to more adequate models for ODI analysis.

In previous work, we have estimated a range of different productivity models using various productivity measures and mathematical specifications. Since the results were very robust across specifications, we will focus on the standard version using a labour productivity measure in this study:²⁰

$$labprod_{ijk} = f(capitalint_{ijk}, firm\ age_{ijk}, comp.adv_{ij}, ODI_{ijk}, ODI_{ij})$$

where $labprod_{ijk}$ represents labour productivity in firm k of sector j in region i . $capitalint$ is a measure of the capital intensity, $firm\ age$ measures the age of the firm by applying four categories from “old” to “entrepreneur”, and $comp.adv.$ represent the comparative advantages (agglomeration) of a sector within a country. ODI is the share of employees employed in multinationals thereby measuring the effects from ODI. As in the labour demand model above, we have two ODI measures – one capturing the effects in the parent firm and one capturing the spillovers.

The model is linearised, and we take logarithms of labour productivity and capital intensity. This model can easily be estimated by least squares techniques, and we will apply robust standard errors since the firm level nature of the estimations seems to imply some heteroskedasticity.

Profits

One of the key drivers behind investing abroad is to increase the profitability of the investing company. Since we are looking at home country effects, we need to make an important distinction here: increased (or decreased) profitability at the consolidated level of the company is interesting from the point of view of the company itself, but not from our point of view. Instead, profitability must increase (or decrease) at the parent company to generate home country effects. In other words, if overseas profits are invested abroad there will be no home country effects.

One of the main issues here is how to measure profitability. Generally, there would be two approaches in empirical modelling: one focussing on increases in equity value, i.e. the market value of the company, and another focussing on the capability of generating accounting profits (or cash-flows), see e.g. Salmi and Virtanen (1997). On a theoretical

²⁰ Most importantly, there were no differences in the results between the labour productivity measure and the total factor productivity (TFP) measure.

level both approaches are just opposite sides of the same coin, but practically each of the methods imply inclusion of specific noise. Market valuations include various types of rational and irrational expectations about the future, and accounting standards and methods distorts the measurement of *economic* profits.

We have chosen to use the second approach basically due to compatibility with the data set. Actually, we do have information on both equity value and accounting profits, but the former is only reported for a limited number of companies, and it is not registered over time (as are accounting profits.) Thus, using accounting profits we get more observations and more flexibility in the empirical modelling allowing for better inference.

To standardise profits across firms, we construct the variables *return on capital employed* and *return on shareholders funds*. The only difference between the two measures is that the former is based on a broader definition of capital.

Econometrically, we will apply the same matching technique as suggested above in the employment analysis. Thus, the interpretation of the result will be the same, except that we are now looking at the effect on profitability and not number of employees.

We have determined how to estimate the ODI effect of employment, productivity and profitability in Ireland. The information of the estimates can explain the effect on the Irish economy and therefore be used as informed advice on setting up adequate ODI policies.

APPENDIX 4: ECONOMETRIC RESULTS

This appendix presents in detail the estimation results. The results are spilt up into three areas: employment effects, productivity effect and profitability effects. Familiarity with Appendix 3 – Details of quantitative methodology – is assumed throughout this Appendix.

First, we describe the rationale behind constructing foreign ownership proxies with employment data, and thereafter, we present the ODI variables used in the four models we estimate.

In our models we have included three different kinds of ODI proxies. The three variables, summarised in Table A.9, are designed to capture the direct effect on the level of the investing company, as well as spillover effects. The choice of employment to proxy ODI, as well as the specific construction of the ratios is in line with the theoretical literature, as well as our experience from modelling regional spillover effects in the EU; cf. Copenhagen Economics (2006).

There are four ways in the outward direct investment literature to construct proxies for foreign direct investment for use in econometric estimations. In most cases, the proxies are defined as ratios of the foreign to the domestic variable, such as employment. Taking a concrete example, one way to construct such a proxy is to divide the number of employees in Irish subsidiaries abroad by the number of employees in the parent company in Ireland.²¹

Sinani and Meyer (2005) have studied construction of proxies for foreign presence in the literature covering employment and productivity spillover effects from foreign direct investment in developed countries. They found that the proxy for foreign presence has been defined as employment shares in 6 out of the 13 papers investigating employment and productivity spillover issues. Alternative specifications included growth in sales (2), share in equity (3), share of value added (3), and share of capital (1).

The above example shows that the literature allows for multiple specifications of proxies for foreign presence. On theoretical grounds, the construction of the ODI proxy should be related to the type of spillover under investigation. Thus, employment-based proxies are more suitable for measuring spillovers from ODI on employment and labour productivity, than proxies defined using the share of sales or exports. The choice of employment for constructing proxies for foreign presence is theoretically correct for estimating the employment and labour productivity models. In other words, the number

²¹The same ratio can be specified on an industry level – this is our ODI_horizontal, cf. Table A.9.

of employees – or more precisely the ration of foreign to domestic employees – does provide a good measure foreign ownership for the purpose of our estimations.

In practice, the choice of one specification over another also depends on issues with the quality of available data. In the case of the Irish data available in Amadeus – the source of micro-data used in this project – information on the level of employment across parents and subsidiaries is the most widespread variable – and is to be preferred for the construction of ODI proxies. We stress proxies defined in this way can be used both in estimating employment as well as productivity measures, cf. Sinani and Meyer (2005). Therefore, we proceed with the details of the three proxies that we construct.

The first variable, ODI_dummy captures the within firm effect of having engaged in ODI, or said econometrically: the difference between companies which did engage in ODI and those which do not in terms of the dependent variable. As the criterion for engaging in ODI, an Irish company must own at least 15 % of equity of a company (subsidiary) outside Ireland. In another Copenhagen Economics study²², we have tested whether constructing ODI variables with alternative (higher) equity shares would affect our results and we found that this is not the case.

The second variable, ODI_horizontal, captures employment and labour productivity spillovers accruing to companies in the same industry.

In the employment model, we are testing whether more employment abroad causes more employment in Ireland. This can happen e.g. when demand for Irish production increases, triggering exports, a result of the investment.

In the productivity model, we are testing whether Irish industries become more productive the more employment they generate outside of Ireland. Knowledge spillovers can e.g. occur when mobile employees transfer knowledge from abroad is transferred back to Ireland.

In the profitability model, we measure whether greater employment abroad affects the profit before tax (or alternative accounting measures of profitability) in Ireland.

The ODI_cluster variable has been designed to capture both the horizontal and the vertical ODI spillovers. This way of modelling is most conducive to estimating net spillover effects from ODI, in terms of employment, productivity and profitability, given the accessible data.

²² European Commission, (2006): FDI and Regional Development.

By cluster we mean an industrial cluster and thereby a group of companies who operate within a specific field. The clusters we define therefore include an entire value network of specific goods and service producers. Our approach is motivated by Michael Porter’s theory of clusters.

The specific cluster code used in this project is done by Copenhagen Economics in a project on Danish clusters (the documentation is only in Danish²³). In practice, the cluster code is just a set of definitions, or a key, to group companies according to their NACE codes into several industrial categories, such as ‘foodstuffs’ or ‘transport’. We stress that these definitions are very closely approximating Porter’s original work, and therefore, their universality makes them applicable for this study. The clusters are defined such that both horizontal and vertical relationships are present among the firms included in a cluster: i.e. a wheat producer will be in the same cluster with other wheat manufacturers, but also mills and bakeries. The cluster will be of course ‘Foodstuffs’.

The purpose of grouping companies into clusters is to measure horizontal and vertical spillovers, *simultaneously*. Having defined the ODI_horizontal variable, we can infer the sign and magnitude of vertical spillovers, if present.

Table A.9: ODI variables

Variable name	Description	Employment (matching)	Employment (OLS)	Productivity (OLS)	Profit (matching)
<i>ODI_Dummy</i>	A dummy variable taking the value 1 if the company has done some ODI (earning more than 15 percentage of company outside Ireland) and 0 otherwise.	X	X	X	X
<i>ODI_Horizontal</i>	ODI-share by NACE2 (industry) level. Number of employees outside Ireland by NACE2 owned by Irish companies divided by the total number of employees in Ireland by NACE2		X	X	
<i>ODI_Cluster</i>	ODI-share by cluster. Number of employees outside Ireland by cluster owned by Irish companies divided by the total number of employees in Ireland by cluster		X	X	

Source: Copenhagen Economics

Note: Please refer to the previous page for detailed notes on the construction of these variables and their role.

23 Copenhagen Economics, (2006): The Danish cluster database (in Danish).

Employment effects

Investing abroad creates a range of possible employment effects on the Irish economy. First, we take a closer look at companies engaging in ODI. How would their employment be different if they did not invest? To this end we specify and estimate an employment model using a matching estimator. The model matches companies from the two groups of companies; ODI and non-ODI. They are matched by characteristics of the firm in the year 2000, which is assumed to be before the investment.²⁴ Firm characteristics included final model are; growth in turnover, level of turnover, date of incorporation (age of the firm), and the broad industry sector, defined on the NACE 1-digit level.²⁵

In our second employment model we estimate two other effects of ODI on employment. Firstly, the model accounts for the differences in size of indigenous Irish employment between ODI and non-ODI companies. This allows us answer whether larger companies are more likely to engage in ODI. Secondly, we examine the spillover effect on indigenous employment within the related industries/businesses. Knowledge of what spillovers are at play is crucial in generating an understanding of the net effect of ODI on the economy.

How would employment look if a company did not engage in ODI? (matching)

To answer this question we have used the first employment model estimated by means of the matching estimator (nearest neighbour). We find, on average, that Irish companies engaging in ODI have 61 percent higher level of indigenous employment compared to their industry peers not engaging in ODI. In other words, this means that companies engaging in ODI generate more employment in comparison to otherwise very similar companies (size, performance, industry), which have not invested abroad.

An alternative interpretation is also valid: Had an ODI-company not invested, its employment would have been $x/1.61$ where x is its current employment. In other words, this would mean that roughly a third of the jobs in the Irish investing companies would disappear.

²⁴ The matching model requires specifying the beginning of the treatment, i.e. ODI. Since Amadeus does not provide the date of entry into the foreign market, a standard practice in ODI research using Amadeus data is to assume a fixed reference year. The year 2000 for Ireland is chosen for Ireland. The dramatic growth in Irish ODI is attributable to the late 90s, early 2000s. In the year 2000, the stock of ODI was only twice the 1985 level but as much as 4 times less than in 2005 (UNCTAD, 2006). Furthermore, choosing the year 2000 maximises the number of complete observations in the sample – choosing 1999 or 1998 would compromise the quality of estimations and is not preferable.

²⁵ In matching models a models fit not important, the essential thing is to control for all feasible spurious relationships.

A word of caution when interpreting this result is in order. The robustness of the above results depends on the quality of the available matches, which is restricted by the data. Since finding two companies are *exactly* similar on the range of control variables used in our estimations is impossible, we suggest to treat these results as upper estimates. In other words, they are best interpreted as estimates of the order of magnitude of the employment effects, in the counterfactual scenario when all the currently investing companies had not made the investment.

Stata output 1: Employment effect – matching model

```

Matching estimator: Average Treatment Effect

Weighting matrix: inverse variance      Number of obs      =      1457
                                         Number of matches (m) =      4
-----
      lnemp |      Coef.   Std. Err.   z   P>|z|   [95% Conf. Interval]
-----+-----
      SATE |   .6123289   .2157491   2.84  0.005   .1894683   1.035189
-----+-----
Matching variables:  growth_turnover  earlyturn  incorb1960  incor196080  incor198095
incor1995  sector1  sector2  sector3  sector4
              Sector5  sector6  sector7  sector8  sector9
    
```

Source: Copenhagen Economics and the Amadeus database

Employment effect on indigenous Irish economy (OLS)

The second employment model takes a closer look at the Irish economy a whole. The model is extensive and accounts for both within-firm effects and between-firm effects, i.e. spillovers²⁶. Starting with the former effect, we can claim that in this model indigenous Irish employment is on average 75 percent larger in ODI companies vis-à-vis their non-ODI counterparts, see Stata output 2. But why is this different from the 61 percent above, since we should capture the same effect? The reason is that the matching model above is designed to capture the *causal effect* from ODI to indigenous employment, whereas the causal link in the OLS regression model is weaker, bringing its closer to that of a correlation. For that reason, we urge the reader to interpret results as upper bound estimates of possible effects.

Secondly, it is interesting to look at the effect of ODI on related Irish companies. Being in a cluster with a high share of ODI has a positive effect in general on the level of

²⁶ See Navaretti (2002).

employment in all companies. Said in another way, the higher level of ODI in the cluster, the greater is the level of employment among the members of the cluster. Investing abroad is not only affecting companies' own employment positively, but also contributes to larger employment among ODI and non-ODI firms. We estimate that one percent larger share of ODI in the cluster increases the level of indigenous Irish employment in the cluster by 0.30 percent²⁷.

The positive ODI cluster effect consists of both a horizontal and vertical effect.

- The horizontal effect has no effect. This indicates that there are no employment spillovers to companies engaged in the same activities as the investing company, i.e. its competitors.
- The vertical effect is positive (positive employment spillover), since the overall employment effect is positive and there is no significant horizontal effect. This means that ODI generates more employment among the members of the vertical value chain of the investing company, i.e. its suppliers and/or distributors.

²⁷ ODI proxy is interpreted as greater involvement overseas.

Stata output 2: Employment effects –OLS including ODI cluster effect

Linear regression, robust		Number of obs = 1887					
		F(7, 1879) = 49.82					
		Prob > F = 0.0000					
		R-squared = 0.1617					
		Root MSE = 1.3984					

		Robust				[95% Conf. Interval]	
Lnemp	Coef.	Std. Err.	t	P> t			

turnover	1.05e-06	3.40e-07	3.09	0.002	3.83e-07	1.72e-06	
wage_nace2	-.0012905	.0003311	-3.90	0.000	-.00194	-.0006411	
ODI_dummy	.7566787	.1294357	5.85	0.000	.5028259	1.010531	
ODI_cluster	.3086532	.1147104	2.69	0.007	.08368	.5336263	
incorb1960	.1947708	.1412553	1.38	0.168	-.0822629	.4718045	
incor196080	(dropped)						
incor198095	-.4124709	.0833607	-4.95	0.000	-.5759602	-.2489817	
incor1995	-1.137378	.0849448	-13.39	0.000	-1.303974	-.9707815	
_cons	4.580024	.2285505	20.04	0.000	4.131784	5.028263	

Source: Copenhagen Economics and the Amadeus database

Stata output 3: Employment effects – OLS including ODI horizontal effect

Linear regression, robust							Number of obs =	1887
							F(7, 1879) =	47.97
							Prob > F =	0.0000
							R-squared =	0.1587
							Root MSE =	1.4009
			Robust					
	logemp		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
turnover		1.07e-06	3.40e-07	3.14	0.002	4.02e-07	1.74e-06	
wage_nace2		-.0014391	.0003561	-4.04	0.000	-.0021375	-.0007407	
ODI_dummy		.7307145	.129828	5.63	0.000	.4760923	.9853368	
ODI_horizo~1		.5110838	1.179886	0.43	0.665	-1.802942	2.825109	
incor1960		.1893409	.1417931	1.34	0.182	-.0887476	.4674295	
incor196080		(dropped)						
incor198095		-.424651	.0835631	-5.08	0.000	-.5885372	-.2607648	
incor1995		-1.158509	.0862652	-13.43	0.000	-1.327694	-.9893229	
_cons		4.746764	.2320145	20.46	0.000	4.291731	5.201797	

Source: Copenhagen Economics and the Amadeus database

Productivity (OLS)

More productive companies can generate more value with the same amounts of inputs as less productive companies. Higher productivity can also via a variety of mechanisms spillover to other companies increasing the productivity of the economy overall. Given that OLS does not allow completely resolving causality between ODI and productivity, we urge the reader to interpret these results as upper bound estimates, i.e. estimates of the maximum potential effect of ODI.

In this estimation we find that:

- The OLS model specified with the ODI_dummy shows that ODI increases the productivity of the investing firm. In other words, firms that do not invest lose a possibility to be more productive.
- Testing for productivity spillovers to competitors with the ODI_Horizontal variable, we find no significant effect. The lack of technological spillovers means that ODI heightens horizontal competition, which may contribute to

unsuccessful firms close down in the medium- to long run. This happens e.g. if productivity increases come from factors located outside the reach of the indigenous competitors, e.g. cheaper resources abroad, cheaper labour force, or more efficient plants abroad. They are not easily transferable across boundaries.

- ODI cluster no effect. Vertically, the more productive ODI companies increase demand for inputs from the upstream part of the value chain – the suppliers increase output by increasing employment (positive vertical employment effect of ODI) but their productivity remains the same.

Reflecting on the above results, advantages from ODI appear to be due to tangible factors localised abroad and therefore not easily transferable between companies located in Ireland. On the other hand, the investing companies either protect access to intangible factors, such as access to better knowledge or technology that heighten productivity, which could be transferred to non-investing companies in Ireland, or these factors are deeply embedded in the investing firm such that their transfer is impossible, like in the case of company specific IT platforms. A final explanation is that Irish companies have limited absorptive capacity, meaning that they are not able to take advantage of the knowledge and technology their peers have repatriated to Ireland. This could be, for example, due to a lack of employees qualified to bring about productivity increases. Finally, the timing of investment can also be of importance: it may have taken not enough time yet for spillovers to show up in accounting data.

Stata output 4: Productivity effect – OLS including ODI cluster effect

Linear regression, robust						Number of obs = 1978	
						F(3, 1974) = 63.68	
						Prob > F = 0.0000	
						R-squared = 0.1171	
						Root MSE = 1.4531	

		Robust					
logYL		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	

logKL		.2619011	.0198155	13.22	0.000	.2230397	.3007625
ODI_dummy		.4787215	.1698735	2.82	0.005	.1455713	.8118717
ODI_cluster		.1316074	.1141781	1.15	0.249	-.0923148	.3555296
_cons		4.497386	.0644458	69.79	0.000	4.370997	4.623775

Source: Copenhagen Economics and the Amadeus database

Stata output 5: Productivity effect – OLS including ODI horizontal effect

Linear regression, robust							Number of obs =	1978
							F(3, 1974) =	62.15
							Prob > F =	0.0000
							R-squared =	0.1166
							Root MSE =	1.4535

			Robust					
	logYL		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	

	logKL		.2616324	.0199521	13.11	0.000	.2225031 .3007617	
	ODI_dummy		.4703376	.1696929	2.77	0.006	.1375417 .8031335	
	ODI_horizo~l		-.1554761	1.005141	-0.15	0.877	-2.126726 1.815773	
	_cons		4.531883	.0710726	63.76	0.000	4.392497 4.671268	

Source: Copenhagen Economics and the Amadeus database

Profits - How would profit look if a company did not engage in ODI? (matching)

Estimating our profitability model gave rise to no significant differences in the level of profit between ODI and non-ODI companies. We have conducted our estimations with different measures of profit: return on shareholder fund, return on capital employment, profit loss before taxes and a huge number of control variable specifications. All models find that investing in ODI does not have a significant effect on profitability. Typically, the output for most of the models looks very similar to Stata output 6.

Stata output 6: Profitability effect – matching model

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Matching estimator: Average Treatment Effect

Weighting matrix: inverse variance      Number of obs      =      363
                                         Number of matches (m) =      1

-----+-----
lnreturnsh-d |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----+-----
      SATE |   .3129444   .2938483     1.06  0.287    - .2629878   .8888766
-----+-----

Matching variables:  earlyemp  growth_turnover  incorb1960  incor196080  incor198095
incor1995
    
```

Source: Copenhagen Economics and the Amadeus database

The failure of the model to capture the expected difference in profitability between the investing and non-investing companies can be attributed to a number of issues, including problems with data, whose availability is more limited than in prior cases, accounting practices with respect to disclosure of information on profits, or economic mechanisms driving the development of profitability. We review them in turn:

Problems with data

- Profitability figures are incomplete in the sample – profit figures are much less readily available than employment or output figures.

Accounting practices

- Alternatively, the lack of higher profitability effects can be due to companies financing expansion of their overseas subsidiaries from retained earnings. This can involve acquisition of assets abroad, showing up as investment expenses lowering the profitability figures.
- At home, cash flows from abroad can be used for investment as well. In such cases, investment expenses would increase, while the impact on accounting measures of profitability would disappear.

Economic mechanisms

- We do not control for the timing of investment, as this information is not available. However, following the investment abroad and expatriation of capital abroad, profitability is likely to decline initially. This process can take up to a few years, depending e.g. on the magnitude of start-up costs abroad or the realised level of sales. In light of this, it is Irish companies with the established ODI, who are likely to indicate significant profitability effects. For the majority

of relatively new investors, on average, their profitability could both increase and decrease in the short run. So there can be no observable effect at this point in time.

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