

**Sources of international investment data in
the Longitudinal Business Database**

Lynda Sanderson

Motu Working Paper 13-15
Motu Economic and Public Policy Research

December 2013

Author contact details

Lynda Sanderson

The Treasury

lynda.sanderson@treasury.govt.nz

Acknowledgements

I would like to thank Geoff Mead, Ranjith Nanayakkara, Brian Torrey, Upul Paranawithana, Mark Gordon and Mike Faire for their assistance in understanding the intricacies of the data, and Richard Fabling, Hamish Hill, Talo Talosaga and James Beard for feedback on the paper. This paper was completed as part of the author's secondment to Statistics New Zealand, and is also published as Treasury Working Paper 13/31.

Disclaimer

The results in this paper are not official statistics, they have been created for research purposes from the Integrated Data Infrastructure (IDI) managed by Statistics New Zealand. The opinions, findings, recommendations and conclusions expressed in this paper are those of the authors not Statistics NZ, the Treasury, or Motu Economic and Public Policy Research.

Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business or organisation and the results in this paper have been confidentialised to protect these groups from identification. Careful consideration has been given to the privacy, security and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes. Any person who has had access to the unit-record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Motu Economic and Public Policy Research

PO Box 24390

Wellington

New Zealand

Email info@motu.org.nz

Telephone +64 4 9394250

Website www.motu.org.nz

© 2013 Motu Economic and Public Policy Research Trust and the authors. Short extracts, not exceeding two paragraphs, may be quoted provided clear attribution is given. Motu Working Papers are research materials circulated by their authors for purposes of information and discussion. They have not necessarily undergone formal peer review or editorial treatment. ISSN 1176-2667 (Print), ISSN 1177-9047 (Online).

Abstract

The Longitudinal Business Database (LBD) links together firm-level data held by Statistics New Zealand from a combination of administrative and survey data sources. This linking has opened up a wide range of research opportunities. In many cases, there are now multiple sources of information on a single area of firms' activities, often capturing different aspects or a different population, requiring a choice to be made about the most appropriate source of data for any given research question. This note outlines the available firm-level data sources for research on foreign direct investment, describes the data available, and sets out some of the opportunities and challenges for using these data for research purposes. It also provides detail on maintenance procedures for one of the core elements of the LBD, the Longitudinal Business Frame, which is applicable to a wide variety of firm-level research topics.

JEL code

C81; F21; F23

Keywords

Foreign direct investment (FDI); Outward direct investment (ODI); Longitudinal Business Database

1 Introduction

The Longitudinal Business Database (LBD) links together firm-level data held by Statistics New Zealand from a combination of administrative (primarily Inland Revenue) and survey data sources.¹ It constitutes the firm-centered component of the recently developed Integrated Data Infrastructure (IDI), which links firm-level data from the LBD with individual-level data from the Linked Employer-Employee Database and a range of other administrative sources. The development of the LBD has opened up new research opportunities, allowing firm characteristics to be identified and tracked over time. In many cases there are now multiple sources of information on a single area of firms' activities, often capturing different aspects or a different population, requiring a choice to be made about the most appropriate source (or sources) of data for any given research question.

This paper focuses on one specific area of research interest – foreign direct investment. Two forms are considered: inward foreign direct investment (FDI) in which a non-resident individual or firm holds complete or partial ownership of a firm located in New Zealand; and outward direct investment (ODI) in which a New Zealand firm has an ownership interest in a business located offshore.

In the LBD, information on firms' international investment activities can be identified from four main sources:

- The Longitudinal Business Frame (LBF)
- Company tax returns (IR4)
- The Business Operations Survey (BOS)
- The Quarterly and Annual International Investment Surveys (QIIS/AIIS)

As each of these datasets has been collected to address a different need, they differ in terms of both sampling methodology and definition of international investment. This note outlines each source, including the purpose of the collection, the population of interest and sampling strategy, and the aspects of international investment which are captured. It is designed to give new and potential users a broad understanding of the pros and cons of the various sources of investment data, in order to better identify the most appropriate source(s) for their purpose.

Section 2 describes each of the four data sources. A summary reference table is also provided in Appendix B. Section 3 compares the three enterprise-level data sources (BOS, LBF and IR4) and examines the aggregate implications of using alternative sources to identify foreign investment. Section 4 briefly describes potential changes

¹Fabling (2009) outlines the content and development of the Longitudinal Business Database.

to the availability of FDI data due to the upcoming redevelopment of the Business Frame. Section 5 recaps the key themes.

Throughout the paper we provide examples and descriptive statistics from the LBD. For the majority of these examples we define the population of interest as all private-for-profit firms with current labour input (either employees or working proprietors) and a current industry classification.² Table 1 reports the total number of in-scope firms per year and total employment in those firms.³

2 Sources of international investment data

2.1 Longitudinal Business Frame

The Longitudinal Business Frame (LBF) forms the backbone of the LBD, to which all other firm-level data sets are linked. It captures basic information on all economically significant firms in the New Zealand economy since 1999, including information on employment, location, industrial activity and parent-subsidiary relationships.⁴ The LBF is a longitudinal representation of Statistics New Zealand's primary sampling frame, the Business Frame (BF). That is, it unwinds the historical information available in the BF to create a longitudinal (panel) dataset. The primary purpose of the Business Frame is to maintain a representation of all firms in the economy from which relevant survey populations can be identified (eg, for the Agricultural Production Survey or the International Trade in Services and Royalties Survey). It is also used directly for the construction of business demography statistics.

²These firm characteristics are drawn from the Longitudinal Business Frame and the Linked Employer-Employee Database (LEED). Firms are excluded from the population if they have ever been in the central or local government sector (with the exception of SOEs), or if they are ever classed as private non-profit organisations. These restrictions lead to the exclusion of around four percent of employing firms, or 19 percent of total employment. This is mainly due to the exclusion of Central Government, which accounts for 64 percent of the excluded employment across the period. *Incorporated and unincorporated societies and associations* and *Charitable trusts* jointly account for a further 23 percent.

³All firm counts reported in this paper have been random rounded base three and employment counts have been graduated random rounded in accordance with Statistics New Zealand confidentiality protocols. As the sampling of the QIIS and AIIS surveys is based on groups of parent and subsidiary firms, rather than individual enterprises (see discussion in section 2.4), the standard population criteria are not applied to those data.

⁴Although the definition of economic significance covers all firms that have non-zero employment and/or annual turnover of at least \$30,000, there may be some undercoverage of firms with turnover below the mandatory GST filing threshold, which increased from \$30,000 to \$60,000 between 1999 and 2011.

The LBF provides a single indicator of foreign ownership (*bop_ownership_rate*)⁵ based on firms' responses to the question "Does any individual or business located overseas hold any ownership interest or shareholding in this business?" and the follow-up "Please give the total percentage."⁶

The LBF also includes a binary indicator of firms' outward investments (*bop_ownership_ind*), based on the question "During the last 12 months did this business hold any ownership interest or shareholding in any overseas located business (including its own subsidiaries, branches or sales offices)?"⁷ Until 2008, firms were also asked to provide an indication of whether they owned any tangible assets located overseas, such as land, buildings or equipment (excluding stock held overseas) (*bop_asset_ind*).

The BF indicators of foreign investment are primarily collected to enable the production of national accounts, particularly Balance of Payment statistics. As such, maintenance procedures for collecting and updating firm-level information emphasize firms which will have significant influence on the aggregate value of investment stocks and flows. Information on ownership is originally sourced from the Birth Survey or Monthly Frame Update Survey (MFUS), and is updated over time through the Annual Frame Update Survey (AFUS).⁸ These two surveys, together with administrative data from Inland Revenue and the Companies Office, provide the core information needed to maintain the BF.⁹ The frequency at which firms are surveyed is determined by the maintenance tier (size) of the enterprise.

⁵The LBF also includes one variable which, at face value, appears to provide foreign ownership information. However, this is not generally the case. The *country_name_text* field reports the final line of the respondent's contact address as provided to Statistics New Zealand, rather than the source country of foreign investors. Among firms which are reported as being majority foreign owned, only 20 percent provide an offshore address. When firms do report a foreign contact address, it is not possible to discern whether this relates to the global head-office or to a regional branch (eg, an Australasian head-office).

⁶Prior to 2004 these questions were worded as "Does any overseas located enterprise or individual directly hold any ownership interest or shareholding in your enterprise?" and "What is the total percentage (of your enterprise's shareholding or ownership) directly held by overseas located enterprises and individuals?"

⁷This question has been asked consistently since 2004. A follow-up question requests that firms provide the name and country of any subsidiaries in which the business has greater than 50 percent shareholding, but this information is not available in the LBF. From 1998 to 2004, this indicator of overseas shareholdings appears to have been derived from the question "If this business or enterprise has a greater than 50% shareholding in any other businesses or enterprises in New Zealand or overseas, please list the name(s) below (or attach own list) i.e. subsidiaries."

⁸Where firms transition into or out of foreign ownership between surveys, these changes are recorded as occurring at the date of the survey, not the date of the ownership change.

⁹ There is also some manual updating based on media reports and other publicly available information.

A minimum response rate is then applied to ensure that respondents represent at least 85 percent of industry GST sales.¹⁰

Since 2004, large and complex (Tier 1) firms have been surveyed at birth and receive an update survey annually. Medium sized firms (Tier 2) are surveyed at birth and updated at least once every three years.¹¹ Smaller firms (Tier 3) are surveyed at birth only if they are registered for both GST and PAYE (ie, they are above the mandatory GST filing threshold or voluntarily register for GST, and have at least one employee), and are not re-surveyed unless they reach the threshold for Tier 2. As such, foreign ownership information is never updated for most small firms (where “small” is currently defined as those with less than \$1 million in annual turnover), and may never be collected if the firm is not employing when they are birthed onto the Business Frame.

Table 2 describes three snapshots of the conditions for membership of each maintenance tier, indicating how these have changed over the period covered by the LBD. In addition to changes in maintenance tier boundaries in 2007 and 2009, there have also been a range of adjustments to the sample, largely reflecting increased use of administrative data.¹² These changes have resulted in substantial reductions in the AFUS sample over time (table 3).¹³

Recording conventions for AFUS respondents have also changed over time. Prior to 2004, AFUS and MFUS responses were coded manually by Business Frame operators. In 2004, Statistics New Zealand shifted to automatic scanning and coding of returns. At this time, the update rules were changed so that zero values were consistently entered for AFUS respondents that indicated that they had no foreign ownership, many of which had previously been left blank. This resulted in a substantial increase in the apparent coverage of the FDI indicator (table 4, columns 1 & 2). In contrast, most MFUS respondents that report no foreign ownership continue to have their ownership status left blank.

Meanwhile, the apparent coverage of the outward investment indicator increases slowly over time, and is broadly representative of the population in terms of firm size (table 4, columns 3 & 4). Unfortunately, rather than reflecting a more consistent capture of AFUS and MFUS responses, this is due to assumptions imposed within the Business Frame processing system. Specifically, firms which were born after the ODI indicator was introduced in February 1998 and did not complete an MFUS survey have a “no” response imposed on them at birth. This assumed value remains

¹⁰Firms are legally required to complete official statistics surveys under the Statistics Act 1976.

¹¹Update surveys may also be triggered if the business shows a significant change in tax flows.

¹²Administrative data (eg, IR4s) are not currently used to update LBF investment indicators.

¹³Firm counts on the LBF exceed those used in this paper due to the exclusion of non-employing firms and certain industries and firm types as discussed in section 1.

with the firm until they complete an AFUS survey. Thus, while “yes” values can be taken as an actual firm response, “no”s may indicate either an actual response or simply that the firm has never completed a survey.¹⁴

These changes imply that while the proportion of firms with a recorded ownership status on the BF has increased, this recorded status has become less up-to-date over time for all but the largest firms. Moreover, it is not clear from the data whether a firm received and returned an AFUS form, so the vintage of the FDI information recorded for any given year and the veracity of recorded “no” responses to the ODI question are unknown.¹⁵

Further reductions in coverage of the AFUS and MFUS surveys are intended in future as Statistics New Zealand moves towards more extensive use of administrative data. In particular, a new Business Register is under development, which will replace the current Business Frame from 2014 onwards. This change is discussed in section 4 and is likely to increase the available information on foreign ownership among smaller firms as additional administrative data sources come into use. In addition, a clean-up of the historical data is proposed as part of the refresh process which would, among other things, repair the anomalies in the ODI data.

2.2 Company tax returns (IR4)

A second source of data on inward FDI is the annual company tax return, or IR4. IR4s are completed annually by “all active New Zealand resident companies” (with the exception of look-through companies) including body corporates and unit trusts. As the IR4 is designed purely for determining the appropriate tax treatment of responding firms, the indicator of foreign investment reflects the tax legislation. Respondents are asked a series of disclosure questions, relating primarily to the firm’s international transactions and interests, including “Is the company controlled or owned by non-residents?”.

This question is used to identify situations where companies may be able to transfer profits internationally through related-party transactions such as transfer pricing.

¹⁴Firms born prior to 1998 have a null value for this variable unless they have subsequently completed an AFUS survey.

¹⁵Work is currently underway to provide more information about AFUS updating to LBD users. Initial exploration of this data confirms that LBF direct investment data is indeed outdated for a substantial share of firms. For example, of the 155,000 firms which employed in either 2000 or 2001 as well as in 2010, 48 percent had not responded to an AFUS survey since before 2002 (including those that had never responded). Restricting to those with a recorded FDI indicator in 2010, 20 percent had not responded to AFUS since 2005 or earlier, implying that their FDI indicator may be more than 5 years out of date.

The definition of non-resident control is quite broad, including both New Zealand subsidiaries owned by foreign companies and also New Zealand companies owned or controlled by non-resident natural persons.¹⁶ Non-resident ownership/control is distinct from identification of the tax residence of the company itself.¹⁷ As firms are expected to indicate any form of non-resident ownership or control, the IR4 indicator is less clearly defined than other sources of FDI data, where firms are asked to provide percentage shareholdings (LBF and BOS) or a dollar value (QIIS/AIIS).

As completing the IR4 is a compulsory annual requirement for all active companies, it is more regularly updated than other sources in the LBD. Response rates for the population of interest are consistently high – around 94 percent among employing registered limited liability companies (LLCs), 79 percent among co-operative companies and 74 percent among branches of companies incorporated overseas.

The data presented here focus on limited liability companies, as LLCs account for 40 percent of all in-scope observations (72 percent of in-scope employment), compared to less than 0.5 percent for the other two groups combined. The high annual response rate and wide coverage makes the IR4 data more suitable for looking at transitions into and out of foreign ownership/control in the population than other sources. In contrast, other sources have either a relatively small sample (BOS) or a selective sample with only partial coverage (LBF, AIIS/QIIS).

From a population perspective, coverage of the IR4 data is driven primarily by the extent of corporatisation. This differs substantially across industries, from over 70 percent in Mining, Wholesale Trade, and Finance & Insurance to less than 20 percent in Agriculture, Forestry and Fishing, and Communication Services (table 5). In addition, the population of LLCs has changed markedly over time due to increasing corporatisation. Between 2000 and 2010, the share of LLCs in the population increased from 28.8 percent to 52.0 percent (63.2 to 77.9 percent of total employment, table 6). This is due both to transitions into corporate structures by existing firms (primarily sole-proprietorships and partnerships) and higher entry rates of LLCs over time (table 7). Of the 176,661 employing LLCs observed in 2010, four percent had previously transitioned from other legal structures, 69 percent entered the population as LLCs over the past 10 years, and 27 percent were

¹⁶This covers a range of situations including non-resident companies, majority shareholdings by non-residents (including their own and associated persons' direct and indirect interests) and situations where a non-resident has "control of the company by any other means".

¹⁷A company is defined as tax resident in New Zealand if: it is incorporated in New Zealand; the head office or centre of management is in New Zealand; or the directors control the company in New Zealand. If none of these conditions holds, the company is non-resident for tax purposes (Inland Revenue, 2012)

continuing LLCs over the full period.¹⁸ As such, while the IR4 data provides a more comprehensive means of identifying transitions into and out of foreign ownership among LLCs, comparisons both within the LLC population and aggregate statistics calculated from this data need to take account of changes in the population itself.

These changes in coverage may, however, be less meaningful than they appear at first glance. In particular, the definition of sole-proprietorships (which account for around half of the non-LLC population of firms – table 6) requires that a sole trader must control, manage and own the business, and is personally entitled to any profits and liable for any debts or taxes incurred by the business. As the business itself is not separable from the owner/manager (and the business is tax resident in New Zealand), there is very little scope for a sole-proprietorship to be foreign owned or controlled. The scope for foreign involvement is greater among partnerships, particularly since the passing of the Limited Partnerships Act 2008. This act enables businesses to be registered as Limited Partnerships or Overseas Limited Partnerships, with two classes of partners - General Partners (the owner/managers, responsible for the debts and liabilities of the business) and Limited Partners (who are liable only to the extent of their capital contribution), and was specifically introduced to facilitate venture capital and private equity investment in New Zealand firms (Companies Office, 2010). However, reported foreign ownership rates from LBF and BOS are low among both sole-proprietor and partnerships (effectively zero for sole-proprietorships and less than 0.5% for partnerships among firms with 6 to 10 employees, compared to five to six percent among similarly-sized LLCs). This, combined with their relatively small size and the constraints of their legal structure, suggests that treating sole-proprietors and partnerships as domestically owned is likely to be a close approximation of the truth.

2.3 Business Operations Survey (BOS)

The Business Operations Survey (BOS) is a large-scale sample survey administered annually by Statistics New Zealand since 2005. The survey generally consists of three modules. Module A covers general questions on Business Operations and is conducted annually. Module B alternates between Business Use of ICT (even years) and Innovation (odd years). Module C is a contestable module, sponsored

¹⁸Changes in legal status are one event which may trigger a firm to be given a new enterprise number by Statistics New Zealand. Enterprise number breaks have been repaired where possible, using the method developed by Fabling (2011). However, some breaks likely remain, particularly for firms employing less than 3 people, leading to an upward bias in the number of ‘entering’ LLCs and ‘exiting’ sole-proprietor and partnerships.

annually by one or more government departments.

The primary source of FDI/ODI data in BOS comes from a set of questions on firms' "international presence" in Module A.¹⁹ These questions have been asked consistently through nine waves of BOS (2005-2013), and provide information on percentage foreign ownership in the New Zealand enterprise, and the existence and method of ODI (eg, joint ventures, acquisitions of existing firms, greenfields investment).²⁰

In addition, the contestable modules for 2007 and 2011 focused on firms' international engagement, capturing information on the types of international activities firms were engaged in as well as their motivations for, and barriers to, those activities. The modules are organised around the types of activity the firm undertakes, distinguishing between generation of overseas income, overseas production, and overseas purchasing. For the former two categories, firms were also asked about the means through which the activity is undertaken (eg, whether production is undertaken through ODI, a joint venture, or via agents/contractual arrangements), providing an indication of the broad purpose of ODI.²¹

The advantage of BOS over other firm-level foreign investment data for the production of longitudinal statistics is the consistent coverage of small to medium-sized firms. The BOS survey population includes all private-for-profit firms with six or more employees (roughly 35,000 firms). Of these, a sample of around 7,000 firms is surveyed each year, with a required minimum response rate of 80 percent. The survey is approximately full coverage for large firms, with a stratified random sample of small and medium firms.²² This sampling strategy allows for comparison of the aggregate proportion of firms with FDI and/or ODI over time across a clearly and consistently defined population.

In addition, Statistics New Zealand's sampling strategy leads to substantial repeat

¹⁹See Appendix A for BOS investment questions and response categories.

²⁰Survey results, broken down by industry and firm size, are available at http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/business-operations-survey-info-releases.aspx.

²¹While these data are potentially of interest, there are some concerns about their quality due to internal inconsistencies in responses. In particular, in the 2007 survey almost half the firms which identified as having an ownership interest in an overseas production facility in Module C did not identify as having overseas shareholdings in Module A. Similarly, firms which report ODI in Module A may validly not respond to Module C questions if their overseas investments are not currently generating overseas income or producing goods or services overseas (eg, research facilities).

²²Further information on the sampling methodology can be found in the annual Hot Off the Press releases at http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/business-operations-survey-info-releases.aspx

sampling of firms over two or more years. This is enhanced by an explicit panel element in the BOS, through a top-up sample which re-surveys all respondents to the 2005 survey, whether or not they would otherwise have been surveyed in later years.²³ Table 8 reports the longitudinal coverage of the BOS data, showing the number of respondents in each year conditional on responding to the 2005, 2007 and 2011 surveys respectively (columns 1 to 3), and the total number of responses per firm, conditional on responding in those same years (columns 4 to 6). For example, column 1 shows that of the 7,440 BOS respondents in 2005, 4,218 also responded in 2008. Column 4 divides those same 7,440 2005 respondents into groups according to the total number of BOS surveys they have completed – 1,734 only have information for the 2005 year, while 2,271 responded in each of the 7 years to 2011. This panel component provides an opportunity to examine characteristics associated with transitions into and out of foreign ownership, albeit for a relatively small population.²⁴

2.4 Quarterly and Annual International Investment Surveys (QIIS/AIIS)

The Quarterly and Annual International Investment Surveys (QIIS & AIIS) provide significant detail about the international investment stocks and flows of New Zealand firms which: are wholly or partly foreign owned, including New Zealand branches of overseas businesses; have ownership interests in businesses located overseas, including branches; and/or have financial asset and liability positions with overseas residents. These surveys form the basis of the Balance of Payments (BoP) and International Investment Position (IIP).

Information on the value of FDI and ODI stocks are captured in both surveys, while QIIS also provides details of the composition of changes in investment values (financial accounts, market price revaluations, exchange rate adjustments, and other changes). Investments are distinguished according to source or destination country, and are divided into equity capital, re-invested earnings, and “other capital”, which includes permanent or long-term loans to and from overseas parent or subsidiary companies.²⁵

²³The panel component was re-set in 2012. This will reduce the overlap with earlier years, but improves the representativeness of the forward-looking panel.

²⁴Producing longitudinal statistics at the aggregate level (eg, transitions into and out of FDI/ODI) would also require creation of longitudinal survey weights which are not currently provided by Statistics New Zealand.

²⁵QIIS and AIIS also contain data on non-direct forms of international assets, including portfolio investment and reserve assets.

The survey methodology of QIIS and AIIS is designed to capture the value of New Zealand’s international balance sheet in a cost effective manner. The sample strategy therefore focuses on those firms known to account for the majority of the overseas assets and liabilities. These firms are primarily identified through the Business Frame maintenance process, with AFUS including a series of questions on firms’ international investments and transactions, as discussed in section 2.1. Additional firms may also be identified using administrative data or through other information sources.

QIIS is conducted quarterly and is designed to capture 95 percent of New Zealand’s total international financial assets and liabilities. It collects data on the breakdown of foreign investment in New Zealand and New Zealand’s investment abroad by country, industry, type of instrument, maturity, currency and by type of asset and liability. The QIIS population includes banks, corporate enterprises, the Reserve Bank and the Treasury. A response rate of 100 percent of “key” and 80 percent of “non-key” enterprises is required.

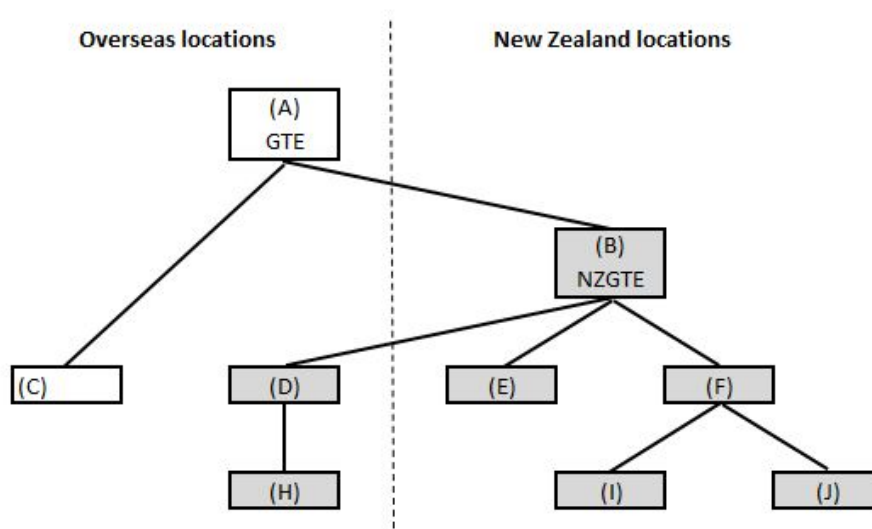
AIIS is conducted annually as a stratified sample survey to estimate the remaining five percent of international assets and liabilities, with a census of the known QIIS/AIIS population conducted every three years. While QIIS collects income earned from international investments (profits, dividends and interest), as well as stock measures of international assets and liabilities, AIIS collects only stock values. Table 9 reports the number of AIIS and QIIS respondents in each year, distinguishing firms which respond to at least one QIIS survey and those which respond to all four quarterly surveys within the year.²⁶

Both surveys are sampled at the group level, rather than the individual enterprise. The survey goes to the “New Zealand Group Top Enterprise” (NZGTE) – the highest enterprise within the group which has a geographic unit located in New Zealand – and that firm is expected to respond on behalf of all its subsidiaries, including those located offshore. For example, in figure 1, firm B would respond on behalf of itself and firms D through J.

This survey method provides the extensive detail required to produce the IIP and BOP aggregates efficiently, reducing both processing costs and respondent burden, as well as the potential for double-counting of assets and liabilities by multiple members of an enterprise group. However, it creates substantial challenges for micro-economic research. First, any analysis using linked data from other sources must take account of the grouping structures in the data, including the potential

²⁶Unlike BOS, where sample weights are provided for each respondent based on the inverse probability of being included in the sample, weighting in QIIS and AIIS is applied through a macro adjustment to the aggregate figures.

Figure 1: QIIS structure



for restructuring or mergers and acquisitions to affect the structure of respondent firms.²⁷ Second, as the sampling method is focused on firms which are known to have substantial international assets or liabilities, it cannot be accurately used to identify a comparison group of firms without international holdings or to examine transitions into and out of international investment activity. Finally, due to the small number of firms with international investments, the level of detail which can be reported is limited to protect the confidentiality of respondents.

However, there are still a range of firm-level estimates which could be produced using QIIS/AIIS responses. These include comparisons of characteristics of firms with investment from different source countries, examination of within-firm investment dynamics, and associations between investment and other international assets and liabilities.

²⁷For example, in recent years, almost 30 percent of AIIS responses and 45 percent of QIIS responses come from enterprises with no recorded employment in New Zealand. Even at the group level, as many as 15 percent of AIIS respondents appear to be from non-employed groups. However, many of these groups appear to employ at some point over the sample period, and the share of non-employed groups is lower in early years (5-8 percent), suggesting that respondent enterprise identifiers may not be kept fully up to date with the changing structure of the group.

3 Comparisons across data sources

This section compares coverage and implied FDI and ODI rates across the three enterprise-level data sources: the LBF, IR4 and BOS. QIIS/AIIS is excluded due to the nature of the sampling and substantive differences in the range of applications for which the data are suitable.

As all three enterprise-level sources have higher coverage rates among large firms (by design in the case of the BOS and LBF samples, and due to the characteristics of LLCs in the case of the IR4 data), there is substantial overlap in the availability of FDI data.²⁸ In particular, almost all firms which have BOS data also have at least one of the other sources, and most have all three (table 10). Taking the 2010 year as an example, 27.7 percent of firms have a recorded ownership status in the LBF, with approximately two-thirds of those (18.4 percent) also having ownership information sourced from IR4s in that year (panel A, columns 3 & 5). A little over a third of all employment (33.7 percent) is in firms which respond to BOS, of which nearly all (32.6 percent) also have LBF indicators available (panel B, columns 4 & 6). Notwithstanding issues of timeliness discussed above (section 2.1), since 2005 at least one indicator of foreign ownership has been available for between 48 and 58 percent of firms (over 80 percent of total employment). The share of firms which are not included in any of the three sources fell from 72.0 percent in 2000 to 42.2 percent in 2010, with the employment share of those firms falling from 40.4 percent to 13.7 percent (panels A & B, column 1).

Coverage rates are strongly correlated with firm size. Figure 2 plots the share of firms covered by each data source for each percentile of the population employment distribution. Coverage rises rapidly with firm size in both the IR4 and post-2004 LBF, reaching 80 percent for firms with more than 10 employees. The impact of improvements in data capture post-2004 are clearly visible in the LBF data, with substantial increases in coverage across the population but particularly in larger firms. Similarly, increasing corporatisation over the decade shows up in the increasing level of IR4 coverage in the smaller size groups.

The substantial overlap allows for an assessment of the consistency of responses across sources. Restricting to the population of firms for which both sources are available, table 11 reports the comparison of banded ownership percentages from the LBF and BOS data, while table 12 compares the IR4 indicator variable with each of the BOS and LBF bands.

Comparing LBF and BOS responses (table 11), 90.2 percent of all observations

²⁸As discussed above, “coverage” for the LBF indicates that information on foreign ownership has been collected at some time in the past, but this information may not be recent.

fall within the same ownership percentage band across the two sources.²⁹ This consistency is driven almost entirely by two groups of firms – those that record no FDI in either source (79.6 percent of observations) and those that record 100 percent foreign ownership in both sources (8.3 percent of observations). Of the 10 percent of observations where the two sources are inconsistent, rather than being concentrated in cells which are immediately off diagonal (ie, where the reported FDI percentages are close but not identical), the most common situation is for firms to report positive levels of foreign investment in the LBF, but not to report having FDI in BOS (5.3 percent of observations).

Table 12 reports the share of firms in each ownership band from the LBF and BOS that also report foreign ownership or control in their IR4 returns. Here the responses are most consistent for ownership levels above 50 percent. For example, among firm-year observations with 100 percent recorded foreign ownership in the LBF, 67.8 percent also indicate foreign ownership or control in IR4. In contrast, recorded ownership rates below 25 percent tend to elicit negative responses to the IR4 question, while recorded foreign shareholdings of 26 to 50 percent are associated with moderate probabilities of a positive response in corporate tax returns. The level of consistency is higher between the two annual data collections (BOS and IR4). However, there are still a large number of firms which report conflicting information regarding their foreign ownership status, even in data collected annually.³⁰

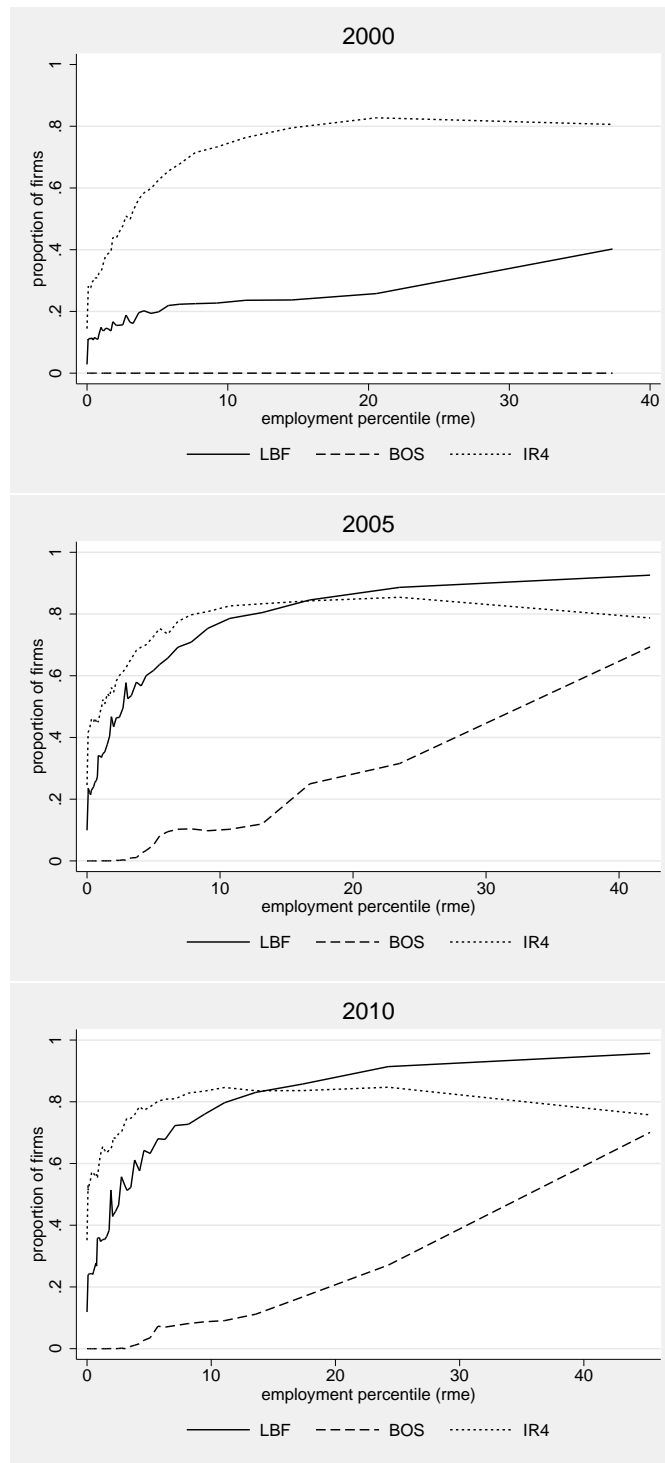
Outward investment indicators from the LBF and BOS show a similar degree of inconsistency (table 13). While in total over 96 percent of observations are consistent across the two sources, this is primarily due to the large share of firms which report no ODI in either source. In contrast, if we compare those firms which report ODI in at least one source, only a little over half are consistent across the two sources (3.8 percent of all observations, compared to 3.6 percent with conflicts)

Although it is not possible to determine which source is more correct in any particular case, due to conceptual differences in the questions as well as the potential for differences in interpretation and for respondent error, less frequent updating through AFUS surveys means the LBF is less likely than other data sources to pick up transitions between foreign and domestic ownership. Table 14 suggests that this is likely to be one source of difference in the FDI data, with the combined foreign-to-domestic and domestic-to-foreign transition rate observed in the LBF data (0.9-1.8 percent, depending on definitions) substantially lower than

²⁹Correlation coefficient for the raw percentages is 0.882.

³⁰While differences in timing between the BOS survey and filing of IR4 returns may account for a portion of this gap, this cannot be the major explanation, as transitions between domestic and foreign ownership are rare.

Figure 2: Apparent coverage of FDI indicators, by employment percentile



Plot of rolling mean employment percentiles (x-axis) against the percentage of firms within that percentile for which the relevant data source is available (y-axis).

that for the BOS or IR4 (1.6-3.2 percent and 2.9-3.0 percent respectively).³¹

Aggregate estimates of ODI propensity from LBF and BOS suggest that the imposition of “no” indicators for new firms and the relatively infrequent updating of ODI indicators for small and medium firms may also be affecting the aggregate recorded ODI propensity in these firms. Table 15 reports the aggregate share of firms with six or more RME with a recorded ‘yes’ response to the LBF and BOS indicators.³² While the LBF statistics report a fairly constant proportion of firms with outward investments and share of employment accounted for by those firms since 2004 (at around 2 percent and 10 percent respectively), BOS results suggest a slight increase in both the share of firms with ODI (from 3 to 4 percent) and the employment share of those firms (from 12 to 15 percent of employment in 6+ RME firms). The common sample comparison is also consistent with delayed updating of the LBF data, as inconsistencies between the two sources are more commonly due to a positive response in BOS for firms with no recorded ODI in the LBF.

3.1 Implications of sampling method for aggregate FDI statistics

The combination of within-firm inconsistencies and differences in sampling strategies leads to significant differences in the observed share of foreign-owned firms in each source. Table 16 reports the proportion of foreign ownership among those firms which have a non-missing value for the FDI indicator. As discussed above, manual capture of AFUS and MFUS responses prior to 2004 often failed to record zero values, significantly increasing the apparent share of foreign-owned firms. Similarly, ongoing corporatisation lead to a fall in the apparent share of foreign ownership or control reported in the IR4 over time, as more small (owner-operated) domestic firms entered the LLC population. In contrast, BOS data, which are collected on a consistent basis over time, present a more consistent statistic, displaying moderate growth in foreign ownership since 2005.

³¹Measurement error may also have an amplified effect on transition rates in annual data. For example, if a firm gives an inconsistent response in one year of the BOS or IR4 this would show up as a transition into, and then out of, foreign ownership. While there is no reason to expect measurement error to be more of a problem in BOS/IR4 than in the AFUS survey, the same level of misreporting would have less impact on observed transitions in the LBF data as the average inter-reporting period is longer. For this reason, Fabling and Sanderson (2013b) perform sensitivity tests to ensure their results are not strongly affected by “transitory” foreign acquisitions, while Maré et al. (forthcoming) adjust indicators of foreign ownership to allow for some misreporting in IR4 responses.

³²Firms with missing or “don’t know” responses treated as “no”.

As the main differences across sources are driven by sampling, restricting to something akin to a consistent population and variable definition provides a more consistent picture of foreign ownership both across sources and over time. Table 17 reports the implied aggregate level of foreign ownership where missing values in the LBF (ie, firms which have never responded to an AFUS or MFUS survey, or which submitted a negative response prior to 2004)³³ and null values from the IR4 (primarily sole-proprietors and partnerships) are assumed to be under domestic ownership. Columns 1 and 2 report implied proportions from the LBF and IR4 across all firm sizes, columns 3 to 5 restrict to firms with at least six RME for consistency with the BOS population, while columns 6 and 7 impose a majority ownership definition on the LBF and BOS data, to provide an alternate comparison with IR4s.

Finally, table 18 reports a “best guess” estimate of the share of firms and employment under foreign ownership or control, combining information from LBF and IR4. Firms are classed as foreign-owned based on either a positive response to the IR4 question on foreign ownership or control, or a majority foreign shareholding recorded in the LBF (following Fabling and Sanderson, 2013a).³⁴ These numbers are closely comparable to BOS results for those firms with 6 or more employees, though the combined population estimate is slightly higher than that from the BOS survey.

4 Future developments

As noted above, Statistics New Zealand are currently engaged in a redevelopment of the Business Frame (BF). This process is designed to reduce the cost of maintaining a full-coverage sampling frame, while maintaining an appropriate level of coverage and data quality for the production of National Accounts and other official statistics. One of the key aspects of this redevelopment is formalising the use of administrative data as a core means of maintaining the BF in future.

Statistics New Zealand has already made substantial moves in other areas (such as

³³There is no clear way to distinguish between these two cases. Inferring a ‘no’ response from the presence of other AFUS-only variables is of limited value as (a) these variables are also likely to not be recorded if the response was negative or may have been assumed negative in the case of new births and (b) in some cases these variables may have been updated via manual changes based on media reports or responses to other surveys

³⁴Future work could integrate information on the vintage of AFUS responses to guide the choice of which source to prefer in each year. Maré et al. (forthcoming) take this approach in defining foreign ownership status over time (distinguishing between firms which are ‘always’, ‘never’, or ‘sometimes’ foreign owned).

the auto-coding of industry classifications), shifting the balance away from direct data collection towards the use of administrative data sources collected by other agencies (especially Inland Revenue). This is clear in the reduced use of AFUS and MFUS surveys. As administrative data is able to provide much of the same information as surveys, this does not imply a reduction in data quality for many variables of interest. However, in the case of foreign investment, currently used administrative data sources do not hold information about FDI or ODI.

As part of the redevelopment, Statistics New Zealand is looking to make greater use of shareholder data collected by the Companies Office. This could provide more detail on the characteristics of foreign investors currently captured only by the IR4 indicator, including information on investor source countries and percentage of foreign ownership, for the population of registered companies. Integration of the available historical data would be particularly valuable to support empirical research.

5 Conclusion

The development of the LBD has dramatically expanded the options available to empirical researchers with an interest in international investment. Linking existing data sources opens up a wider range of potential questions and provides new challenges to make appropriate use of the data available.

Recent firm-level research has utilised a range of different data sources, variable definitions and methods to account for sample selection, depending on the research question at hand. These include restricting attention to limited liability companies (IR4 filers) where large samples and frequent updating are required, such as when examining the performance impacts of foreign acquisition (Fabling and Sanderson, 2013b); combining LBF and IR4 annual data to provide a simple indicator of foreign ownership with wide coverage, as used in examinations of differences across foreign and domestically-owned firms in effective marginal tax rates (Fabling et al., 2013) and exchange rate pass-through behaviour (Fabling and Sanderson, 2013a), and research on productivity spillovers from foreign-owned to domestic firms (Doan et al., forthcoming); and categorizing firms by ownership status over all time to allow for differing vintages of LBF information, as used by Maré et al. (forthcoming) in their examination of the earnings impacts of employment in foreign-controlled firms.

This paper has set out some of the factors that researchers need to consider before embarking on firm-level research on FDI and ODI. How each of these factors affect

methodology and feasibility depends on the specifics of the research question at hand. However, some broad themes emerge:

- From 2006 onwards, over half of all employing firms, employing over 80 percent of workers, have at least one indicator of their foreign ownership status (though the recorded information is not necessarily timely).
- Coverage of small firms is limited, with only IR4 data being collected across all firm sizes. Where data is available, sole-proprietors and partnerships are seen to have very low reported rates of FDI, suggesting that an assumption of domestic ownership in the non-corporate small-firm population is likely to be close to the truth.
- Transitions into and out of FDI, required to examine the dynamics of acquisition and divestment, are best considered through either the IR4 data (if a broad definition of foreign control is sufficient) or BOS (if a more specific understanding of the level of ownership is required).
- Information on ODI is more limited than FDI data, particularly where smaller firms are concerned. Limited updating and the imposition of a negative indicator among firms birthed since 1998 suggests that current LBF indicators may underestimate the extent of ODI by New Zealand firms. While this problem is expected to be partially mitigated as part of the redevelopment of the Business Frame, the BOS is likely to remain the most useable source of ODI data in the foreseeable future.
- The recent addition of AIIS and QIIS data to the LBD opens up new opportunities for research on international investment dynamics. However, given the sampling structure (small, non-representative sample), these are largely limited to exploration of within-respondent changes in investment activity, and will involve a range of challenges associated with small samples (including both generalisability of results and the ability to design research questions which do not conflict with confidentiality requirements).

Tables

Table 1: Size of in-scope population

	Firms	Employment
2000	343,461	1,532,500
2001	344,052	1,556,000
2002	341,184	1,576,900
2003	344,577	1,614,100
2004	348,981	1,658,700
2005	350,301	1,700,200
2006	352,599	1,736,100
2007	356,055	1,757,700
2008	358,830	1,790,900
2009	353,871	1,773,400
2010	339,762	1,703,000

Table 2: Maintenance tiers, selected years

	2004	2008	2011
<i>Tier 1: Large and complex businesses</i>			
<i>Criteria:</i>			
Turnover threshold	>\$1.5m	>\$4.3m	>\$65m
plus:	(A)	(B)	(C)
<i>Economic contribution:</i>			
Number of businesses	45,000	22,000	8,000
Share of businesses	0.10	0.05	0.02
Share of total GST turnover	0.82	0.75	0.58
<i>Tier 2: Medium-sized simple businesses</i>			
<i>Criteria:</i>			
Turnover threshold	\$200K-1.5m	\$295K-4.3m	\$1m-65m
plus:		(D)	(E)
<i>Economic contribution:</i>			
Number of businesses	120,000	90,000	78,000
Share of businesses	0.30	0.20	0.17
Share of total GST turnover	0.13	0.20	0.32
<i>Tier 3: Small simple businesses</i>			
<i>Criteria:</i>			
Turnover threshold	\$30K-200K	\$30K-295K	\$30K-\$1m
<i>Economic contribution:</i>			
Number of businesses	227,000	329,000	377,000
Share of businesses	0.60	0.75	0.82
Share of total GST turnover	0.05	0.05	0.10

Note: Proportions of firms and turnover are approximate. RME = rolling mean employment.

(A) All enterprises with multiple geographic units (multi-geo enterprises), and members of an enterprise group.

(B) Businesses with $RME > 7$ that do not file their own GST return (due to group-filing arrangements).

(C) Multi-geo enterprises, except those below the tier 1 GST and RME thresholds with 2 or 3 geos that are all in the same Territorial Local Authority. Businesses with $RME > 20$ that do not file their own GST return.

(D) Businesses with $2 < RME \leq 7$ that do not file their own GST return, and members of an enterprise group which do not qualify for tier 1.

(E) Enterprises that don't qualify for tier 1, but are members of an enterprise group, have more than 1 geographic unit, or are identified as having an unusual reporting system for employment (eg, group-level payroll reporting). Businesses with $5 < RME \leq 20$ that do not file their own GST return and do not qualify for tier 1.

Table 3: Sample size of AFUS postout, 2002-2011

	AFUS postal sample	LBF population	Proportion surveyed
2002	111,000	424,600	0.26
2003	93,000	439,500	0.21
2004	94,000	459,600	0.20
2005	93,000	481,400	0.19
2006	82,000	491,300	0.17
2007	72,000	498,800	0.14
2008	61,000	505,900	0.12
2009	41,000	498,200	0.08
2010	30,000	487,900	0.06
2011	30,000	481,500	0.06

LBF population defined as the count of live, economically significant enterprises as at February.

Outline of changes to AFUS sample over time

2003: Extended use of Inland Revenue data to maintain the Business Frame reduces AFUS sample, and increases total number of businesses on BF through better coverage of small businesses (realised in 2004).

2006: Postal sample reduced due to increased use of Companies Office data to establish company ownership information, and reduced surveying of large, single location businesses with stable attributes which are included in other Statistics New Zealand Surveys.

2007: Tier boundary changes, and exclusion of superannuation funds, commercial and residential body corporates, and non-complex (single location, non-employing, not part of a group with common ownership) commercial property operators and developers.

2008: One-off exclusion of around 7,000 Agriculture firms because firms surveyed for the Agricultural Production Survey (APS) are excluded from AFUS, and the 2007 APS was a full-coverage census.

2009: Tier boundary adjustments come into effect.

2010: Dropping of “tax triggers” for tier 2 enterprises. Previously, a substantive change in GST activity or employment triggered a firm to be included in AFUS when they otherwise wouldn’t. Changes to industry classification in the Inland Revenue register still trigger inclusion in AFUS.

Source: Business Frame metadata: Annual Frame Update Survey Postal Sample Size.

Table 4: Apparent coverage of FDI and ODI variables in the Longitudinal Business Frame, 2000-2010

	Non-missing FDI indicator		Non-missing ODI indicator	
	Proportion of:			
	Firms	Employment	Firms	Employment
2000	0.083	0.313	0.345	0.301
2001	0.078	0.303	0.404	0.366
2002	0.074	0.301	0.457	0.420
2003	0.069	0.293	0.508	0.461
2004	0.194	0.559	0.630	0.695
2005	0.259	0.664	0.703	0.806
2006	0.272	0.674	0.742	0.846
2007	0.269	0.672	0.769	0.867
2008	0.279	0.691	0.790	0.893
2009	0.279	0.702	0.805	0.908
2010	0.278	0.703	0.815	0.914
Total	0.195	0.543	0.635	0.691

Table 5: Population share of limited liability companies, by industry (2000-2010)

	Proportion of:	
	Firms	Employment
Agriculture, Forestry and Fishing	0.156	0.297
Mining	0.722	0.763
Manufacturing	0.613	0.899
Electricity, Gas and Water Supply	0.620	0.454
Construction	0.449	0.731
Wholesale Trade	0.701	0.886
Retail Trade	0.531	0.825
Accommodation, Cafes and Restaurants	0.579	0.797
Transport and Storage	0.437	0.732
Communication Services	0.194	0.486
Finance and Insurance	0.713	0.813
Property and Business Services	0.434	0.673
Education	0.487	0.794
Health and Community Services	0.370	0.727
Cultural and Recreational Services	0.357	0.639
Personal and Other Services	0.331	0.564

Table 6: Population share by legal structure, 2000-2010

	Share of Firms:				Share of Employment:			
	Sole	Part	LLC	Other	Sole	Part	LLC	Other
2000	0.356	0.344	0.288	0.013	0.113	0.214	0.632	0.041
2001	0.343	0.333	0.309	0.014	0.105	0.202	0.650	0.042
2002	0.336	0.316	0.332	0.016	0.100	0.186	0.670	0.044
2003	0.328	0.296	0.360	0.017	0.096	0.171	0.684	0.050
2004	0.319	0.275	0.389	0.017	0.091	0.155	0.705	0.049
2005	0.313	0.252	0.417	0.018	0.086	0.140	0.724	0.051
2006	0.300	0.237	0.445	0.018	0.081	0.128	0.740	0.051
2007	0.293	0.222	0.467	0.019	0.077	0.119	0.756	0.048
2008	0.285	0.209	0.488	0.019	0.073	0.111	0.767	0.049
2009	0.278	0.199	0.504	0.020	0.070	0.105	0.773	0.052
2010	0.268	0.192	0.520	0.020	0.067	0.101	0.779	0.053

Sole: sole-proprietorship. Part: partnership. LLC: Limited Liability Company.

Table 7: Transitions in legal form, 2000-2010

		2010					Total
		Non-emp	Sole	Part	LLC	Other	
2000	Non-emp	–	49,119	24,117	122,121	4,434	199,791
	Sole	76,959	41,457	597	3,093	108	122,214
	Part	73,218	453	40,347	3,762	192	117,975
	LLC	51,099	48	99	47,553	177	98,979
	Other	2,217	6	24	129	1,920	4,296
Total		203,490	91,086	65,184	176,661	6,831	543,252

		2010					Total
		Non-emp	Sole	Part	LLC	Other	
2000	Non-emp	–	0.09	0.04	0.22	0.01	0.37
	Sole	0.14	0.08	0.00	0.01	0.00	0.22
	Part	0.13	0.00	0.07	0.01	0.00	0.22
	LLC	0.09	0.00	0.00	0.09	0.00	0.18
	Other	0.00	0.00	0.00	0.00	0.00	0.01
Total		0.37	0.17	0.12	0.33	0.01	1.00

Population includes all in-scope firms that employed in 2000 and/or 2010. Non-emp: Firm not employing (ie, captures entries/exits). Sole: sole-proprietorship. Part: partnership. LLC: Limited Liability Company. Other: other firm types.

Table 8: Longitudinal panel element of the BOS, conditional on responding in specific years

	Number of firms:				Number of BOS observations:		
	2005	2007	2011		2005	2007	2011
2005	7,440	4,452	3,549	1	1,734	474	567
2006	4,797	4,635	3,459	2	678	543	492
2007	4,452	6,711	3,972	3	582	705	537
2008	4,218	5,040	4,335	4	528	660	543
2009	3,945	4,581	4,713	5	588	951	765
2010	3,738	4,224	5,070	6	1,056	1,104	1,041
2011	3,549	3,972	6,216	7	2,271	2,271	2,271

Includes all responses which meet a threshold quality standard. Population restrictions outlined in section 1 are not applied to this table. The imposition of these restrictions (in particular, the exclusion of firms which are ever in the government or non-profit sectors) reduces the population used elsewhere in the paper by approximately 50 observations per year. Imputation rates for simple FDI indicators are relatively low (< 2% on average in the core BOS population). Due to random rounding, columns 4-6 may not sum to the relevant totals shown in columns 1-3.

Table 9: Number of AIIIS/QIIS respondents per year

	AIIIS	QIIS (any)	QIIS (4 quarters)
2000	–	192	–
2001	642	459	168
2002	1,116	453	255
2003	1,881	489	261
2004	570	660	279
2005	561	690	312
2006	2,439	636	309
2007	681	660	309
2008	690	678	318
2009	2,517	648	330
2010	726	621	339

Table 10: Availability of FDI data sources

Panel A: Share of firms by available FDI data sources

Year	None	LBF	IR4	BOS	LBF+	LBF+	IR4+	All
					IR4	BOS	BOS	
2000	0.720	0.083	0.232	0.000	0.035	0.000	0.000	0.000
2001	0.707	0.078	0.250	0.000	0.034	0.000	0.000	0.000
2002	0.690	0.073	0.270	0.000	0.033	0.000	0.000	0.000
2003	0.667	0.068	0.296	0.000	0.032	0.000	0.000	0.000
2004	0.588	0.194	0.328	0.000	0.110	0.000	0.000	0.000
2005	0.519	0.259	0.380	0.021	0.159	0.018	0.017	0.015
2006	0.486	0.272	0.411	0.016	0.170	0.015	0.013	0.012
2007	0.467	0.269	0.432	0.018	0.169	0.016	0.015	0.013
2008	0.448	0.279	0.455	0.017	0.182	0.016	0.014	0.013
2009	0.433	0.279	0.472	0.017	0.185	0.016	0.014	0.013
2010	0.422	0.277	0.483	0.017	0.184	0.016	0.014	0.013
Total	0.558	0.195	0.365	0.010	0.118	0.009	0.008	0.007

Panel B: Share of employment by available FDI data sources

Year	None	LBF	IR4	BOS	LBF+	LBF+	IR4+	All
					IR4	BOS	BOS	
2000	0.404	0.313	0.456	0.000	0.173	0.000	0.000	0.000
2001	0.397	0.303	0.474	0.000	0.174	0.000	0.000	0.000
2002	0.380	0.301	0.490	0.000	0.171	0.000	0.000	0.000
2003	0.366	0.293	0.501	0.000	0.160	0.000	0.000	0.000
2004	0.263	0.559	0.525	0.000	0.347	0.000	0.000	0.000
2005	0.194	0.664	0.588	0.308	0.449	0.295	0.205	0.195
2006	0.171	0.674	0.599	0.306	0.453	0.288	0.185	0.176
2007	0.162	0.673	0.607	0.293	0.450	0.274	0.178	0.168
2008	0.154	0.690	0.621	0.277	0.471	0.266	0.174	0.168
2009	0.143	0.702	0.626	0.330	0.476	0.319	0.190	0.185
2010	0.137	0.702	0.619	0.337	0.464	0.326	0.191	0.186
Total	0.247	0.542	0.558	0.175	0.351	0.167	0.106	0.102

Table 11: Consistency across sources – LBF and BOS

		BOS					
		0	1 - 25	26 - 50	51 - 75	76 - 99	100
LBF	0	0.796	0.005	0.003	0.001	0.000	0.002
	1 - 25	0.019	0.010	0.000	0.000	0.000	0.000
	26 - 50	0.009	0.000	0.006	0.001	0.000	0.000
	51 - 75	0.018	0.001	0.001	0.005	0.001	0.027
	76 - 99	0.001	0.000	0.000	0.000	0.002	0.001
	100	0.006	0.000	0.000	0.000	0.000	0.083

Proportions of all firms by foreign ownership percentage bands (0, 1-25, 26-50, 76-99, 100), as shown by BOS responses and LBF indicators. Sample restricted to those firms which have a reported percentage in both sources in a given year.

Table 12: Consistency across sources – IR4 compared with LBF and BOS

LBF ownership percentage	Proportion IR4=yes	BOS ownership percentage	Proportion IR4=yes
0	0.002	0	0.018
1 - 25	0.019	1 - 25	0.055
26 - 50	0.107	26 - 50	0.264
51 - 75	0.533	51 - 75	0.516
76 - 99	0.415	76 - 99	0.516
100	0.678	100	0.822
Total	0.016	Total	0.016

Proportion of firm-year observations in each foreign ownership percentage band (in BOS and LBF) for which firms also report foreign ownership or control in IR4. Sample restricted to those firms which have a reported status in both sources in a given year.

Table 13: Consistency of ODI indicator across sources – LBF and BOS

		BOS	
		No	Yes
LBF	No	0.926	0.024
	Yes	0.012	0.038

Proportion of firm-year observations by recorded ODI status in LBF and BOS. Sample restricted to those firms which have a reported status in both sources in a given year.

Table 14: Comparison of observed transitions between foreign and domestic ownership – LBF, BOS and IR4

	F→F	F→D	D→F	D→D
<i>A: 50%+ foreign ownership</i>				
LBF	0.134	0.003	0.006	0.858
BOS	0.112	0.007	0.009	0.871
IR4	0.104	0.013	0.016	0.867
<i>B: Any foreign ownership</i>				
LBF	0.178	0.006	0.012	0.804
BOS	0.143	0.014	0.018	0.825
IR4	0.109	0.014	0.016	0.861

Transitions reported for observations of firms which have all three sources of data in two consecutive years. Panel A: Foreign ownership defined as > 50% ownership in BOS, LBF, or a positive indicator in IR4. N=17,016. Panel B: Foreign ownership defined as > 0% ownership in BOS, LBF, or a positive indicator in IR4. N=17,262. IR4 shares differ slightly across panels due to firms which report having some FDI in BOS but do not specify the level of foreign shareholding.

Table 15: Aggregate estimates of ODI propensity – LBF and BOS, firms with 6+ RME

	Share of firms:		Share of employment:	
	LBF	BOS	LBF	BOS
2000	0.015		0.072	
2001	0.015		0.088	
2002	0.015		0.101	
2003	0.015		0.097	
2004	0.020		0.111	
2005	0.022	0.028	0.112	0.115
2006	0.021	0.028	0.096	0.128
2007	0.023	0.034	0.091	0.134
2008	0.021	0.027	0.108	0.141
2009	0.021	0.040	0.103	0.145
2010	0.022	0.036	0.105	0.150
Total	0.019	0.032	0.099	0.136

Missing and “don’t know” responses treated as “no”.

Table 16: Within-source proportions of foreign ownership

	Share of firms:			Share of employment:		
	LBF	IR4	BOS	LBF	IR4	BOS
2000	0.152	0.023		0.671	0.177	
2001	0.165	0.022		0.672	0.177	
2002	0.181	0.020		0.680	0.169	
2003	0.195	0.019		0.705	0.142	
2004	0.069	0.017		0.369	0.145	
2005	0.053	0.015	0.066	0.313	0.138	0.258
2006	0.053	0.014	0.067	0.314	0.127	0.224
2007	0.056	0.014	0.067	0.318	0.142	0.245
2008	0.056	0.014	0.068	0.310	0.146	0.252
2009	0.058	0.015	0.072	0.307	0.138	0.243
2010	0.060	0.015	0.078	0.311	0.134	0.277
Total	0.073	0.016	0.070	0.388	0.146	0.250

Population for each column is the firms which have non-missing FDI information for that source (null and “don’t know” values are dropped). BOS column reports weighted share of in-scope respondents and may differ slightly from official estimates due to population restrictions.

Table 17: Share of firms with some foreign ownership, alternative population restrictions

	All firms:		6+ RME:		6+ RME, 51%+:	
	LBF	IR4	LBF	IR4	LBF	BOS
2000	0.013	0.005	0.089	0.043	0.072	
2001	0.013	0.005	0.088	0.043	0.069	
2002	0.013	0.006	0.089	0.042	0.069	
2003	0.013	0.005	0.086	0.040	0.066	
2004	0.013	0.005	0.082	0.037	0.063	
2005	0.014	0.006	0.080	0.038	0.062	0.048
2006	0.015	0.006	0.084	0.039	0.064	0.047
2007	0.015	0.006	0.085	0.041	0.064	0.046
2008	0.016	0.006	0.087	0.042	0.065	0.049
2009	0.016	0.007	0.090	0.044	0.068	0.049
2010	0.017	0.007	0.092	0.044	0.069	0.056
Total	0.014	0.006	0.086	0.041	0.066	0.049

Table 18: “Best guess” estimate of foreign ownership (combined LBF 51%+ and IR4)

	Share of firms:		Share of employment:	
	All firms	6+RME	All firms	6+RME
2000	0.010	0.075	0.177	0.301
2001	0.010	0.074	0.168	0.282
2002	0.011	0.073	0.167	0.275
2003	0.011	0.070	0.158	0.257
2004	0.011	0.066	0.164	0.264
2005	0.011	0.065	0.166	0.262
2006	0.011	0.068	0.17	0.266
2007	0.012	0.068	0.171	0.265
2008	0.012	0.069	0.169	0.261
2009	0.013	0.071	0.171	0.261
2010	0.013	0.073	0.172	0.262
Total	0.011	0.070	0.168	0.268

References

- Companies Office (2010). Introducing limited partnerships. available from <http://www.business.govt.nz/companies/learn-about/other-entities/limited-partnerships/introduction>. Accessed 30 May 2013. Last updated 17 June 2010.
- Doan, T., K. Iyer, and D. Maré (2014). Linkage spillovers of foreign direct investment on domestic firm productivity in New Zealand industries. Occasional Paper 14/01, Ministry of Business, Innovation and Employment.
- Fabling, R. (2009). A rough guide to New Zealand's Longitudinal Business Database. Global COE Hi-Stat Discussion Papers No. 103, Institute of Economic Research, Hitotsubashi University.
- Fabling, R. (2011). Keeping it together: Tracking firms in New Zealand's Longitudinal Business Database. Working Paper 11-01, Motu Economic and Public Policy Research.
- Fabling, R., N. Gemmell, R. Kneller, and L. Sanderson (2013). Estimating firm-level effective marginal tax rates and the user cost of capital in New Zealand. Working Paper 13/29, New Zealand Treasury.
- Fabling, R. and L. Sanderson (2013a). Export performance, invoice currency and heterogeneous exchange rate pass-through. Working Papers 13/03, New Zealand Treasury.
- Fabling, R. and L. Sanderson (2013b). Foreign acquisition and the performance of New Zealand firms. *New Zealand Economic Papers* DOI: 10.1080/00779954.2013.773600.
- Inland Revenue (2012). Company tax return guide 2012. Technical Report IR4 GU, www.ird.govt.nz, Inland Revenue.
- Maré, D., L. Sanderson, and R. Fabling (2014). Earnings and employment in foreign-owned firms. Working paper 14-16, New Zealand Treasury.

Appendix A: Survey questions

Figure A.1: Business Operations Survey Module A questions

International presence		
26	As at the end of the last financial year, did any individual or business located overseas hold ownership interest or shareholding in this business?	A2600
<input type="radio"/>	1 yes → please give the total percentage <input type="text"/> <input type="text"/> <input type="text"/> %	A2601
<input type="radio"/>	2 no	
<input type="radio"/>	3 don't know	
27	As at the end of the last financial year, did this business hold any ownership interest or shareholding in overseas located business (including its own branch, subsidiary or sales office)?	A2700
<input type="radio"/>	1 yes → go to 28	
<input type="radio"/>	2 no	
<input type="radio"/>	3 don't know → go to 29	
28	Mark all that apply. Through which of the following methods did this business gain those overseas ownership interests or shareholdings?	
<input type="radio"/>	joint ventures	A2801
<input type="radio"/>	acquisitions of existing overseas businesses	A2802
<input type="radio"/>	greenfields (ie establishment of new overseas businesses)	A2803
<input type="radio"/>	other methods	A2804

Figure A.2: Business Operations Survey Module C questions, 2007 and 2011

13 Mark all that apply. In the last financial year, what arrangements did this business have for undertaking sales, marketing and distribution overseas?

- marketing and distribution managed from New Zealand C1301
- overseas agents or distributors C1302
- overseas collaborations involving cost and profit sharing C1303
- overseas operations, minority owned by this business C1304
- overseas operations, majority or wholly owned by this business C1305
- not applicable C1306

36 Look for the → go to instruction after you answer this question.
 Mark all that apply. In the last financial year, which of the following arrangements did this business have for overseas production of goods or services?

- a majority owned overseas operation producing goods or services C3601
- a minority owned overseas operation producing goods or services C3602
- participated in an overseas joint venture operation producing goods or services C3603
- had overseas businesses produce goods or services under contract which have been designed or developed by this business C3604
- no overseas production of goods or services → go to **46** C3605

} → go to **37**

Small changes to these questions were made between the 2007 and 2011 surveys. The questions above are from the 2011 survey.

Appendix B: Summary of data sources

	LBF	BOS	IR4	QIIS	AIIS
FDI					
Basic indicator	✓	✓	✓		
Percentage foreign ownership	✓	✓			
Source country				✓	✓
Stock value of investment				✓	✓
Decomposition of investment stock values				✓	✓
Decomposition of investment flow values				✓	
ODI					
Basic indicator	✓	✓			
Destination country				✓	✓
Form of investment		✓			
Stock value of investment				✓	✓
Decomposition of investment stock values				✓	✓
Decomposition of investment flow values				✓	
Population/Sample					
LBF – All firms covered in principle, but maintenance aimed at larger firms. Indicators may be out-of-date for small/medium sized firms, and for larger firms which have not responded in one or more years.					
BOS – Annual stratified sample survey of approximately 7,000 firms with 6+ RME.					
IR4 – Annual administrative data for almost all limited liability companies and a substantial share of other corporate entities.					
QIIS – Quarterly survey of approx 500 firms, responsible for 95% of known international assets and liabilities.					
AIIS – Annual sample and triennial census of firms responsible for the remaining 5% of known international assets and liabilities (based on AFUS indicators).					

Recent Motu Working Papers

All papers in the Motu Working Paper Series are available on our website www.motu.org.nz, or by contacting us on info@motu.org.nz or +64 4 939 4250.

13-14 Fabling, Richard, Norman Gemmell, Richard Kneller and Lynda Sanderson. 2013. "Estimating Firm-Level Effective Marginal Tax Rates and the User Cost of Capital in New Zealand".

13-13 Kerr, Suzi. 2013. "Managing Risks and Tradeoffs Using Water Markets".

13-12 Grimes, Arthur, and Sean Hyland. 2013. "Housing Market Dynamics and the GFC: The Complex Dynamics of a Credit Shock".

13-11 Anastasiadis, Simon and Suzi Kerr. 2013. "Mitigation and Heterogeneity in Management Practices on New Zealand Dairy Farms".

13-10 Grimes, Arthur and Sean Hyland. 2013. "Passing the Buck: Impacts of Commodity Price Shocks on Local Outcomes".

13-09 Allan, Corey, Arthur Grimes and Suzi Kerr. 2013. "Value and Culture."

13-08 Maré, David C., and Richard Fabling. 2013. "The Incidence and Persistence of Cyclical Job Loss in New Zealand".

13-07 Grimes, Arthur, and Nicholas Tarrant. 2013. "A New Zealand Urban Population Database".

13-06 Fabling, Richard, and David C. Maré. 2013. "Firm-Level Hiring Difficulties: Persistence, Business Cycle and Local Labour Market Influences".

13-05 Crichton, Sarah, and David C. Maré. 2013. "The Impact of Wage Subsidies on Jobseekers' Outcomes and Firm Employment".

13-04 Crawford, Ron, and David C. Maré. 2013. "Investigation of Options for a New Longitudinal Household Survey: Issues and Options Paper".

13-03 Dixon, Sylvia, and David C. Maré. 2013. "The Costs of Involuntary Job Loss: Impacts on Workers' Employment and Earnings".

13-02 Grimes, Arthur, and Sean Hyland, with Andrew Coleman, James Kerr and Alex Collier. 2013. "A New Zealand Regional Housing Model".

13-01 Fabling, Richard, and Lynda Sanderson. 2013. "Export Performance, Invoice Currency, and Heterogeneous Exchange Rate Pass-Through".

12-14 Motu Economic and Public Policy Research. 2012. "Roadmap for Implementing a Greenhouse Gas Emissions Trading System in Chile: Core Design Options and Policy Decision-Making Considerations".

12-13 Fabling, Richard, Arthur Grimes and David C. Maré. 2012. "Performance Pay Systems and the Gender Wage Gap."

12-12 Kerr, Suzi. 2012. "The Economics of International Policy Agreements to Reduce Emissions from Deforestation and Degradation."

12-11 Coleman, Andrew. 2012. "Pension Payments and Receipts by New Zealand Birth Cohorts, 1916–1986."

12-10 Tímár, Levente. 2012. "Spatial and Temporal Responses to an Emissions Trading System Covering Agriculture and Forestry: Simulation Results from New Zealand."

12-09 Grimes, Arthur, Les Oxley and Nicholas Tarrant. 2012. "Does Money Buy Me Love? Testing Alternative Measures of National Wellbeing."

12-08 Woods, Darian, with Andrew Coleman. 2012. "Price, Quality, and International Agricultural Trade."

12-07 Olssen, Alex, Wei Zhang, David Evison, and Suzi Kerr. 2012. "A Forest-Profit Expectations Dataset for New Zealand, 1990–2008".