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Pitfalls in the Use of Foreign Direct Investment Statistics

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Abstract:

Foreign direct investment (FDI) statistics are widely used to study the impact of international capital movements and multinational enterprise (MNE) activities. FDI-intensity is also an important indicator of globalisation and economic integration. Datasets spanning long time periods and with broad country coverage have been employed in numerous studies to analyse various aspects of the determinants and consequences of FDI. Focusing on a relatively homogeneous group of six Western European EU countries, the present study finds major inconsistencies in the construction and coverage of these data both through time and across countries, leading to large discrepancies. Asymmetries will be far greater for broader groups of more economically and institutionally diverse countries. This study recommends extreme caution in drawing conclusions based on FDI data.

JEL Code: F21

Keywords: FDI; FDI Statistics; Special Purpose Entity; Balance of Payments

“These data are not clean... One thing that would help is more information about the data and how they are collected. What procedures do ...countries follow to collect these data? What are the pitfalls?”

Charles Engel (2003, p.115). Comment on International Financial Integration,
IMF Staff Papers.

1. INTRODUCTION

Because of their ease of accessibility and extent of coverage, foreign direct investment (FDI) data – which derive largely from the balance of payments – are widely used both for international comparative purposes and to track the performance of individual economies over time. Although these data measure financial flows and stocks of FDI, they are also used to proxy for multinational enterprise (MNE) activity data, which are less widely available and lack standardisation.¹ FDI data are also included in international metrics such as globalisation indexes and macroeconomic performance measures.²

In the empirical literature the FDI data have been used to study the impact of inward investment on growth (see Alfaro, Kalemli-Ozcan & Sayek., 2004; Borensztein, De Gregorio & Lee, 1998; Durham, 2004; Li & Liu, 2005; van Hulten & Webber, 2010) and on other outcomes of interest (see Demir, 2016; Pica & Rodríguez-Mora, 2011). The determinants of FDI flows have also been extensively studied (see Cleeve, Debrah & Yiheyis, 2015; De Ménil, 1999; Globerman & Shapiro, 2002; Head & Ries, 2008; Petroulas, 2007; Razin & Sadka, 2007; Schiavo, 2007; Stein & Daude, 2007; Wei, 2000; Wood, Yin, Mazouz & Cheah, 2014).

The main international sources of FDI data are the International Monetary Fund (IMF), the Organisation for Economic Cooperation and Development (OECD), the United

¹ Though Clegg (1992) describes FDI and MNE activity data as ‘two sides of the same coin’, the relationship between the two is in fact very tenuous (Lipsey, 2003). Barry and O’Mahony (2005) and Griffith (1999) find MNE investments to be larger and less volatile than the FDI data for US investment in Irish manufacturing, and the UK transport equipment industry, respectively. Investments funded from host country sources are not counted as FDI. Dunning and Lundan (2008) are incorrect in suggesting however that FDI can be regarded as a lower bound on MNE investment, since much current FDI passes through conduit entities without impacting on local investment. Blanchard and Acalin (2016) look at this latter issue in relation to emerging markets. Geographic allocations have also become increasingly problematic as conduit entities proliferate, partly driven by the increasing importance of intangible assets (Lipsey, 2010).

² For example, in addition to the inclusion of the Net International Investment Position in the European Union’s Macroeconomic Imbalances Procedure (MIP), the European Commission uses various measures of FDI flows and stocks as auxiliary indicators of economic performance (O’Farrell, 2015).

Nations Conference for Trade and Development (UNCTAD), and the European Statistical Agency (Eurostat). OECD data are popular in studies that focus on industrialised countries or where geographically disaggregated data are required (see Borensztein et al., 1998; De Ménil, 1999; De Sousa & Lochard, 2011; Durham, 2004; Hatzius, 2000; Head & Ries, 2008; Pica & Rodríguez-Mora, 2011; Razin & Sadka, 2007; Stein & Daude, 2007; Wei, 2000). Eurostat data are often used when the focus is on the EU or on the effects of monetary union (see Petroulas, 2007), while IMF or UNCTAD data allow for the inclusion of developing countries. Alfaro, Kalemli-Ozcan and Sayek (2004), Durham (2004) and van Hulten and Webber (2010) use IMF data; Cleeve, Debrah and Yiheyis (2015), Globerman and Shapiro (2002), Gui-Diby and Renard (2015), Li and Liu (2005), and Wood, Yin, Mazouz and Cheah (2014) employ UNCTAD data. Some studies, such as Demir (2016), Durham (2004), and Taylor (2008), combine data from two or more sources.

Large datasets are often preferred covering a large a number of countries for as long a time period as possible. Alfaro et al. (2004) have 72 countries in their dataset, Borensztein, De Gregorio and Lee (1998) 69; Demir (2016) 134; Durham (2004) 80; Gui-Diby & Renard (2015) 47; and Li & Liu (2005) 84. Of these studies, each of which spans at least two decades, only Li & Liu (2005, p.393) refer to concerns about data quality, partly attributing the mixed results in the literature to “data insufficiency.”³

The present paper examines the consistency in the construction and coverage of the FDI data. To minimise the extent of methodological variation, we focus on six Western EU economies as a reasonably homogenous group of countries with well-developed data collection and dissemination systems. Asymmetries in datasets containing broader ranges of countries are expected to be far greater than those unearthed here. In an earlier study on

³ Gaps in the data are sometimes filled by substituting partner-reported outward data for missing inward data (see Hatzius, 2000), the consequences of which are explored below.

Ireland's inward FDI, Barry & O'Mahony (2005) found a large number of structural breaks and a lack of comparability between the various international FDI data sources due to methodological differences, inconsistencies in items included, and varying treatments of financial intermediation. Similar concerns have been raised by Bellak (1998), Fujita (2008) and Stephan and Pfaffmann (2001).

Among our selection of countries, we include the France, Germany and the United Kingdom, typically the three largest EU recipients of FDI. Since FDI can be more significant for smaller economies, we also include three small economies: Belgium, Luxembourg and the Netherlands.⁴ Prior to 2002, Belgium and Luxembourg produced a common balance of payments as the Belgium-Luxembourg Union (BLEU).⁵

The paper is organised as follows. The next section details the major pitfalls that arise in comparing FDI data through time and across countries.⁶ Section 3 highlights incompatibilities for individual countries while cross-country asymmetries are discussed in Section 4. The final section discusses the implications of our findings.

2. PITFALLS: OVERVIEW

The international standards are set out in the IMF's *Balance of Payments Manuals* with detailed operational guides provided by the OECD *Benchmark Definition of Foreign Direct Investment* (various issues). The current international standard is set out in the sixth

⁴ While each has a tax regime that is conducive to FDI, they differ in other significant ways. Conduit investment is particularly important for Luxembourg and the Netherlands. UNCTAD (2006) estimates that pass-through FDI accounted for 95 per cent of FDI inflows into Luxembourg in 2002-2005. Our calculations based on Dutch Central Bank data suggest that, for the Netherlands, inflows including Special Financial Institutions (SFIs) were, on average, more than four times higher per annum over 1999-2012 than those reported by the OECD, which did not include this type of FDI.

⁵ The BLEU sometimes appears as 'Belgium' in datasets and in empirical papers.

⁶ Similar problems arise in the case of both stocks and flows. As most of the papers cited employ flow data we concentrate on these. Stock data have poorer coverage and also additional discrepancies arise from their valuation. On pitfalls in the use of the stock data see Beugelsdijk, Hennart, Slangen and Smeets (2010), O'Mahony (2015). Cantwell and Bellak (1998) and Damgaard and Elkjaer (2014) discuss stock valuation.

edition of the IMF's *Balance of Payments Manual* ('BPM6'). Although published in 2009, this was only adopted by most European countries in 2014.⁷ Therefore, most data used in empirical studies nominally conform to earlier standards. The direct precursor to BPM6 is BPM5, as set out in the fifth edition of the IMF's *Balance of Payments Manual* (1993) and the OECD's (1996) *Benchmark Definition of Foreign Direct Investment* (third edition). BPM5 is therefore our main focus in this paper.

For a direct investment relationship to exist, the parent must hold equity of at least 10 per cent in a direct investment enterprise (DIE).⁸ The main methodological sources of spatial and temporal incompatibilities we identify include differences in data collection methods, in the interpretation and application of international standards, in the treatment of Special Purpose Entities (SPEs) and in the geographic allocation of investments.⁹ We consider each of these in turn.

2.1 Differences in Data Collection Methods

FDI data are generally collected through either a settlements or a survey system. Settlements systems involve the reporting of balance of payments transactions usually via the banking system while survey systems record FDI transactions reported by resident enterprises. Settlements systems cannot measure reinvested earnings (RIE), as these do not cross country boundaries. Supplementary enterprise surveys are therefore often used to provide estimates of RIE.

⁷ The Coordinated Direct Investment Survey published annually by the OECD since 2010 and covering direct investment from 2009 follows BPM6.

⁸ A further distinction between FDI and MNE activity data: The latter commonly pertain to majority ownership.

⁹ Different countries have also applied different ownership criteria at various points in time, though a 10 per cent ownership rule is the norm. These differences may not be hugely significant as FDI holdings tend to be majority owned (Lane & Milesi-Ferretti, 2007).

Of the countries in our study, only the United Kingdom has always used a survey system. The Netherlands, Luxembourg, and Belgium switched to survey systems, while Germany and France have relied mainly on settlement systems. Survey systems have several advantages. They can more easily distinguish between FDI and portfolio investments (Connolly, 2005; Stephan & Pfaffmann, 2001). They allow for the inclusion of estimated levels of RIE, which settlement systems do not, and they make it easier to capture all intra-company loan components (Connolly, 2005).¹⁰ Furthermore, they can deal more easily with situations where investments need to be reclassified when the parent subsequently owns more than 10 percent of the equity in the DIE (Stephan & Pfaffmann, 2001).

Data from Industrial Promotion Agencies (IPAs) and tax authorities are sometimes used as an alternative to balance of payments data, especially for developing countries. Barry and O'Mahony (2005) and Fujita (2008) find these can differ widely from the corresponding FDI data.

2.2 Measurement and Treatment of the Components of Direct Investment

Of all the components of FDI, measurement of RIE has been the most variable, particularly for countries that use settlement systems. The 1992 IMF/OECD *Report on the Measurement of International Capital Flows* ('the Godeaux Report') indicated that 11 of the industrial countries in its sample did not compile RIE at that time, noting that this was likely to be the main reason for the global imbalance between outflows and inflows of FDI. According to IMF/OECD (2000), six of these had done so by 1997 but international recommendations continued to be poorly adhered to. The timing of the recording of RIE also varies, with some countries allocating them to the period when they are earned, according to

¹⁰ As RIE do not cross borders, they are not captured by settlements systems. RIE are therefore calculated, leading to inaccuracies (Stephan & Pfaffmann, 2001). Many countries supplement their settlements systems with enterprise surveys to provide estimates of RIE, but coverage varies across countries.

the accrual principle which is recommended in the international standards, and others to the period when they are used.¹¹ RIE are more significant for the Netherlands than for the other countries examined. For the most part they are included from 1994. For the BLEU countries, they began to be included only in 1999 (UNCTAD 2000, 2001, and 2004), while the RIE of SPEs were not reported by Luxembourg.

There has also been considerable variability in the measurement of intra-company debt. Such loans can be very substantial but difficult to distinguish from other loans when settlements systems are used (Connolly, 2005). The IMF and OECD conducted a survey in 2001 on the implementation of international standards which showed that the BLEU countries did not report long-term loans or trade credits as FDI, France did not report financial leases or trade credits, and neither Germany nor the Netherlands reported financial leases (IMF/OECD, 2003). The *Godeaux Report* suggested that the failure to include short-term loans between affiliates as FDI and the failure to record cross-border real estate transactions were further reasons for the large global asymmetries between inward and outward data (IMF/OECD, 1992).¹² The IMF/OECD (2000) *Report on the Survey of Implementation of Methodological Standards for Direct Investment* found substantial improvements in the inclusion of short-term financing but little improvement in recording of cross-border real estate transactions.

Trade credits continued to be excluded from intra-company loans in the Belgian data (IMF, 2003) while Germany began to include short-term loans from 1996 (Deutsche Bundesbank, 1995 and 1999; IMF, 1996). Jungnickel (1995, p.95) argues that the exclusion

¹¹ The accrual accounting principle requires that the transactions are recorded in the period when the economic events that give rise to them occur, not when they are settled (OECD, 2008).

¹² The Godeaux Report was the first of a number of surveys, undertaken by the IMF and OECD, on the implementation of the international standards on direct investment. It examined possible reasons for the imbalance between global outflows and inflows of direct investment by looking at the implementation of the standards by individual countries. It concluded that possible reasons for the imbalance were the failure of many countries to compile RIE, include short-term loans made by affiliates to each other, record and properly classify SPE activities, record cross-border real estate transactions, and properly classify investment by affiliates in their parents.'

of some intra-firm loans caused German FDI inflows to be “systematically underestimated.” As will be seen later, the inclusion of short-term loans and trade credits in German FDI data from 1996 caused the average annual inward flow into Germany to more than double, in 2005 terms, for the period 1996-2011.¹³

2.3 Measurement and Treatment of Reverse and Indirect Investments

Reverse investment occurs when a DIE that owns less than 10 per cent of its parent invests in the parent, through a loan for example. The *Godeaux Report* suggested that differing treatments of reverse investments were one reason for the global asymmetries between inward and outward data. The ‘directional principle’ recommended by BPM5 requires that reverse investment be treated as a disinvestment rather than as an outward investment. This made reverse investment invisible in the data, affecting the measured size of FDI and also its geographical allocation. Additionally, reverse investments have occasionally been classified as ‘portfolio’ or ‘other investments’ in Belgium, Luxembourg, France and Germany (ECB, 2001; IMF, 2001 and 2003).

An indirect investment is an investment by one DIE in another in the same group. According to Terrien (2009) only a minority of countries, including the US, Ireland and Sweden, applied techniques to extend the directional principle to such transactions, as now recommended by BPM6. BPM5 required countries to operate a Fully Consolidated System (FCS) of accounting. The FCS covers all enterprises in which the direct investor has a direct

¹³ We use the host-country GDP deflator on the assumption that the primary issue of interest is the real-economy effect of inward FDI on the host country. Deflators are sourced from *World Development Indicators*. Various deflators are used in the empirical literature: host-country GDP deflators (Pain, 1997), host-country capital formation deflators (Hatzius, 2000), home-country GDP deflators (Egger & Pfaffermayer, 2004), the US GDP deflator (De Mnil, 1999; Demir, 2016; Schiavo, 2007), investment deflators (Mold, 2003) and the US CPI (Buch, Kokta & Piazzolo, 2003; Razin & Sadka, 2012). Real exchange rates are also occasionally used (Petroulas, 2007).

investment interest, including all subsidiaries, associates, and branches of the direct investor, in order to record all direct investment relationships.

In 1997, OECD countries had a poor record in applying these recommendations (IMF/OECD, 2000). Of the six countries studied here, only the Netherlands (and the United Kingdom from 2003) fully applied FCS (IMF, 2001 and 2003). The United Kingdom only partially applied FCS before 2003, as consolidated accounts were not legally required, while France lacked the data on the indirect relationships between affiliated enterprises necessary to apply FCS (IMF, 2001). Belgium, Germany and Luxembourg fully applied FCS to equity and intra-company loan transactions but not to RIE.

2.4 Treatment of the Transactions of Special Purpose Entities

Broadly, SPEs are entities established in economies other than the country of residence of the parent company, with little or no employment and few or no local operations (OECD, 2008). They are often foreign-owned financial holding companies, though not all holding companies are SPEs (ECB/Eurostat, 2004).¹⁴

SPEs can be used for both pass-through and round-tripping investments. If one DIE receives funds from abroad from another enterprise in its group which it then lends on to another group company also based overseas, BPM5 recommended that this be recorded in both inward and outward FDI data, although there was no real contribution to the local economy. This therefore overstates the level of MNE activity in an economy. Furthermore, the inward and outward funds may be recorded differently in the balance of payments,

¹⁴ There is no one unique commonly accepted definition of SPEs, but they have been defined as majority foreign-owned entities, organised or established in economies abroad, which are engaged primarily in international transactions but in few or no local operations (ECB/ Eurostat, 2004) with little or no contribution to employment or production (DNB, 2008; OECD, 2012). Holding companies may be used for the efficient organisation of a firm's overseas activities and may not be deemed to be SPEs when they have a physical presence through buildings and employees, for example.

appearing variously as portfolio flows and as FDI.¹⁵ The use of SPEs for conduit investment is growing and UNCTAD (2013) has attributed the increased volatility of FDI flows to SPEs.

An enterprise established in a small country is more likely to qualify as an SPE because small countries have a larger ‘rest of the world’ (DNB, 2008). UNCTAD (2013) describes the Netherlands, Belgium, Luxembourg and Ireland as “SPE-favourable” economies.¹⁶ BPM5 recommended that, in general, SPEs should be treated the same as other DfEs with the exception that, for SPEs established for the sole purpose of financial intermediation, only transactions associated with equity and permanent debt should be included as direct investment (IMF, 2003).¹⁷

Although the 1997 IMF/OECD survey on the implementation of international standards found major improvements in the treatment of SPE transactions, Belgium, France and Germany did not make this exclusion (IMF, 2001 and 2003; Patterson, Montanjes, Motala & Cordillo, 2004). Only the United Kingdom fully followed BPM5 in its treatment of SPEs (IMF, 2001 and 2003). SPEs are likely to have been largely omitted from earlier BLEU data as holding company transactions were recorded under ‘Other Investment’ rather than direct investment (Eurostat, 1984).

Since their separation for balance of payments purposes in 2002, Belgium and Luxembourg have differed in their treatment of SPEs. In Belgium, special tax status was granted in 1982 to coordination centres (subsidiaries or branches of MNEs locating certain activities or invisible transactions in Belgium) (NBB, 2007). According to Bisciari and Piette

¹⁵ Forfás (2002) comments that inflows to the Irish International Financial Services Centre (IFSC) – which roughly approximate to SPE flows – are recorded as direct investment while outward flows tend to be made up of portfolio investment. For Belgium, inflows tend to be equity and outward flows mainly intra-company loans, which the National Bank of Belgium (2007) attributes to the existence of coordination centres.

¹⁶ Tax regimes in small countries may focus more on attracting FDI because small countries lack the advantage of large domestic markets.

¹⁷ According to OECD (2008), SPE transactions were not to be included in the detailed geographical and sectoral data produced by the OECD under BPM6. However, the 2015 OECD data show that of the six countries in this study only two (Belgium and the Netherlands) provided disaggregated detail by resident SPEs/non-SPEs.

(2007), coordination centres became the major source of corporate investment in Belgium from 1986, with the help of a special tax status, subsequently phased out under pressure from the European Commission. Inclusion of these centres caused inward FDI flows for the period 2003-2005 to almost double, from around 5.8 per cent to 10.6 per cent of Belgian GDP (Bisciari & Piette, 2007). Luxembourg initially omitted SPEs from its national FDI flow data. Consequently, Eurostat began to collect these data from 1999 to add to the national data disseminated for Luxembourg. Luxembourg excludes SPE RIE transactions from its flow data and all SPE transactions from its position data (ECB/Eurostat, 2004). However, more recently, the UNCTAD and aggregate OECD series began to exclude all SPE transactions from the Luxembourg flow data.

In the Netherlands, SPEs are known as Special Financial Institutions (SFIs). FDI flows associated with SFIs are substantial but have relatively little impact on the Dutch economy (DNB, 2003). For this reason, they omitted or ‘neutralised’ in the Dutch balance of payments data (ECB/Eurostat, 2004) but recorded in partner countries’ balance of payments.

2.5 Differences in Geographical Allocations

Differences in geographical allocations are particularly relevant for gravity models which use bilateral FDI data (see De Ménil, 1999; Razin & Sadka, 2007). BPM5 recommended use of the ‘debtor/creditor principle’ whereby FDI flows are allocated to the economies of residence of the DIE or the direct investor. France, Germany, the Netherlands and the United Kingdom (IMF, 2003) used this principle. Belgium and Luxembourg on the other hand mainly used the ‘transactor principle,’ whereby flows are allocated to the economy that funds are payable to or from, even if this is not the economy of residence of the DIE or the direct investor (OECD, 2008).'

3. INCONSISTENCIES IN THE FDI DATA FOR INDIVIDUAL COUNTRIES

We now turn to an examination of the time-series data for individual countries. We find numerous structural breaks due to methodological changes and considerable variation across the series produced by the various international and national agencies.

The IMF publishes annual FDI flow data, including component breakdowns, in the *Balance of Payments Statistics Yearbooks* and online, and in summary form in *International Financial Statistics* (IFS). These derive from the balance of payments data reported by individual countries and suffer inconsistencies when countries use different collection and compilation methodologies.

The OECD publishes data on both aggregate flows and data disaggregated geographically and by sector in its *International Direct Investment Statistics Yearbooks* and online. Compared with the aggregate data, the disaggregated data may have different sources and, because of the greater level of detail, be less frequently revised. In this section we report the online aggregate data.

UNCTAD data are published in annual *World Investment Reports* and online. Although largely consistent with the IMF series, the source for EU-country data switched from the IMF to national agencies at various dates between 1986 and 1999.

Eurostat data focus mainly on EU member states. They are published in the agency's *EU Foreign Direct Investment Yearbooks* and online. Some earlier data are estimates and can be quite different from those produced by other agencies. Eurostat (1994) referred to a 'major lack of coherence' in the data as a result of differing concepts, classifications and collection systems of member states, while Eurostat (1995) warned that its figures should be treated with caution due to the extent of estimation and harmonisation.

In compiling the data, we came across numerous revisions, some very substantial. The frequency of revision varies across series with the UNCTAD data, in particular, showing less frequent revision than other sources.

3.1 Germany

Methodological changes affecting the German time-series for the period under discussion include changes in qualifying ownership percentages and reporting value thresholds in 1989, 1993, and 1999, as well as in the various items included as FDI. Also from 1989, Germany began to include direct loans of associated enterprises other than the direct investor (Grosch, 2003). BPM5 changes made to the German data included the implementation of the 10 per cent ownership rule, the inclusion of short-term loans and trade credits under FDI (IMF, 2003), the application of the directional principle and the adoption of the accrual principle in the calculation of RIE. Despite the substantial backdating of these changes to 1996 or earlier (Deutsche Bundesbank, 1999; IMF, 2003), the Bundesbank (1999, p.54) noted that methodological changes meant “recent figures are not fully comparable with those of previous years.”

The various series include different components of FDI and can differ considerably. Patterson, Montanjees, Motala & Cordillo, (2004) cite an IMF/OECD survey in 2002 that found that Germany excluded real estate and reverse investment from data reported to the OECD but not from that reported to the IMF. All of the series increase sharply from 1996. We estimate that the inclusion of short-term loans and trade credits in the German data from 1996 increased the recorded German inward FDI flows by an annual average of \$52.20 billion (in 2005 terms) over 1996-2011. Hence, the flows recorded in the new series are more than double those recorded in the old series. Figure 1 shows the discrepancy between the IMF and

Eurostat series for 1985-1999. The omission of RIE from the Eurostat series until 1992 explains it being lower than the other series until then. This position reversed after 1993.

Put figure 1 here

Deflation and averaging make the various series more compatible but differences remain, as shown in Table 1. Deflated to 2005 prices, the inflows recorded by Eurostat for 1994-1998 were an annual \$14 billion higher on average – or more than double – the flows reported by the IMF.

Put table 1 here

3.2 France

Figure 2 shows French FDI inflows as recorded by various agencies for the period 1990 to 1994. Up to 1992, the UNCTAD and IMF series were equal and more than 30 per cent higher than the Eurostat series. For large economies, even minor differences can be substantial in monetary terms. In 1992, for example, the UNCTAD/IMF data exceeded the Eurostat data for France by \$7 billion in 2005 prices. All series show recorded inflows increasing from 1995 onwards, for which a contributory factor is likely to be the inclusion from 1994 of short-term credits and RIE (Eurostat, 2001).

Put figure 2 here

3.3 United Kingdom

The United Kingdom is the only country in our sample that used an enterprise survey system throughout the period. Nevertheless, there are several structural breaks in the United Kingdom data. First, oil company direct investment transactions began to be included only in 1984. Thus, the dip in recorded FDI flows in 1984 suggests a stronger reduction in FDI inflows or disinvestments elsewhere in the economy than is apparent in the data (Bellak, 1998). Second, short-term capital flows between security-dealing concerns in the United Kingdom and their overseas-related companies were excluded in 1989 with this change revised back to 1988. Third, the adoption of BPM5 lowered the ownership threshold from 20 per cent to 10 per cent in 1997 and removed the Channel Islands from the United Kingdom FDI statistics.

Figure 3 shows three of the main international series for the period 1983-1997. The OECD series is generally lower than the IMF data. The Eurostat series is much lower than the other two until 1992 when Eurostat began to include RIE. Although the series all move broadly together, discrepancies are large in dollar terms. In 1986, the inflows to the United Kingdom recorded by the IMF were over \$6 billion more (in 2005 prices) than those recorded by Eurostat and \$3 billion higher than those in the OECD series. In 1997 inflows reported by the IMF were almost \$5 billion (at 2005 prices) greater than those recorded by the OECD and Eurostat.

Put figure 3 here

3.4 Netherlands

As discussed earlier, a significant difference between Dutch FDI data and that for other countries in our study is the exclusion of the transactions of SPEs/SFIs from the Dutch data as reported to the international agencies.¹⁸ Since 1999, the Dutch central bank, De Nederlandsche Bank (DNB), has published FDI data both inclusive and exclusive of SFIs. On average over the period 1999-2012, FDI inflows including SFI transactions were more than four times the inflows as reported with these transactions excluded.

Figure 4 compares the OECD series for 1999-2012 with DNB data that includes SFI transactions. Deflating, the average annual difference between the two series for the period 1999-2012 is over \$120 billion in 2005 prices.

Put figure 4 here

Although the Netherlands is a relatively small economy, its FDI flows are of global significance. When SPE transactions are included, inward FDI flows to the Netherlands made up 13 per cent of global FDI inflows over 1999-2012.¹⁹ Their exclusion severely compromises comparisons between the Netherlands and most other countries, and biases any dataset that includes the Netherlands without controlling for this issue.

3.5 Belgium and Luxembourg

Until 1998 the main international series reported for the BLEU are broadly similar, with small deviations attributable to differences in updating periods or currency conversion rates. The UNCTAD data deviated sharply from the other sources from 1999, when that

¹⁸ Among EU members, Austria, Cyprus and Hungary also exclude SPE transactions from their FDI data.

¹⁹ Authors' calculations based on data from De Nederlandsche Bank and various *World Investment Reports*.

agency began to source data from Belgian's central bank, the National Bank of Belgium (NBB), rather than from the IMF as had been done heretofore.

From 2002, Belgium and Luxembourg have reported their payments balances separately. The NBB continued to compile the Belgian data according to the pre-2002 methodology, while the Luxembourg central bank (Banque Centrale du Luxembourg, BCL), which assumed compilation duties for that country, introduced a number of changes, causing a break in the series.

SPEs are of huge significance for Luxembourg. According to ECB (2007) and IMF (2003) they account for around 85 per cent of total inward transactions, though other sources suggest a figure of around 95 per cent. Table 2 shows the average for 2002-2012 at over 91 per cent, excluding the RIE of SPEs.

Put table 2 here

UNCTAD no longer included SPE transactions in their Luxembourg flow data, giving rise to a huge discrepancy between it and the OECD series, for example, as seen in Figure 5. Deflating to 2005 prices, the OECD flows averaging almost \$158 billion per annum over the period 2002-2012 are vastly higher than the average annual UNCTAD flows of US\$23 billion.

Put figure 5 here

4. CROSS-COUNTRY ASYMMETRIES IN THE FDI DATA

Examination of the ‘mirror’ or counter-party data demonstrates the extent of discrepancies resulting from differences in how countries measure FDI. The most extensive time-series for these purposes is the OECD *International Direct Investment Statistics* database, which contains geographically disaggregated flow and stock data from 1985.²⁰ More recently, UNCTAD has begun to publish online bilateral flow and stock data from 2001 and the IMF has produced mirror stock data from 2009 in its *Coordinated Direct Investment Survey* (CDIS).²¹ We use the OECD data because of our concentration on flows, in addition to the lengthier time series and wider usage. Large discrepancies arise in the vast majority of bilateral cases we study, a selection of which is reported upon below. Figure 6 shows that for most of the period 1985-2012, Germany’s recorded inflows from the Netherlands are higher than the corresponding outflows recorded by the Netherlands.

Put figure 6 here

As differences in the timing of the recording of transactions, particularly those occurring close to the beginning or end of a reporting period, account for some proportion of bilateral discrepancies (Timmermann, 1997), we also average the data, deflated to 2005 prices. Overall, the German data are higher on average by \$2.82 billion per annum in 2005 prices (Figure 7). The German figures are double the Dutch figures for 1985-1997 and more than three times higher for 1998-2012.

²⁰ Connolly (2005) and Stephan and Pfaffmann (2001) point out that disaggregated FDI data are less reliable than aggregated data.

²¹ The OECD and IMF mirror stock series differ in that the latter includes SPEs for all countries (Weyzig, 2013). There are other discrepancies as well however. For example, for 2010 the Netherlands reports an inward direct investment position of \$46.9 billion with Germany in the OECD data compared with \$114.5 billion in the CDIS data, while the figure reported by Germany in both cases is \$82.5 billion.

Put figure 7 here

As the Netherlands at this time omitted SPE transactions from its data, it is to be expected that the Dutch figures were lower than those reported by partner countries.²² The growing discrepancy between the two series, as seen in Figures 6 and 7, is attributable to the increasing importance of SPE transactions in Dutch FDI.

IMF (1996), based on work undertaken by the DNB, also points to differences in estimation procedures employed by the two countries, and to differences in how FDI is defined. As noted earlier, the German data prior to 1996 omitted short-term loans, and the equity share required for inclusion as DI was 20 per cent rather than 10 per cent until 1999. Germany also recorded reverse investments differently, with equity transactions recorded as portfolio investment until 1996, for example. The IMF report also suggested that large discrepancies in recorded RIE could be attributable to “fiscal considerations” (IMF, 1996).²³

Figure 8 shows that the German-reported outward flows to the Netherlands are also higher and more volatile than the mirror flows reported by the Netherlands. In 2005 prices, the German data are on average \$1.1 billion higher per annum than the Dutch data.

Put figure 8 here

Similar discrepancies arise between the Netherlands and United Kingdom counterparty data, as shown in Figure 9. As expected, the United Kingdom data are generally higher (by an average of almost \$3 billion per annum, when deflated). According to Patterson et al. (2004, p.16), the main difference between the Netherlands and United Kingdom data

²² Subsequently, under BPM6, the Netherlands has disseminated data inclusive of SPE transactions.

²³ The IMF does not elaborate, but this is likely to refer to the US tax deferral system, which incentivises RIE in low-tax jurisdictions.’

pertains to the transactions of Dutch SPEs. They conclude, “in effect the Dutch data suggest that most of the large United Kingdom investment in the Netherlands is ultimately employed in third countries, with the Netherlands acting as a conduit for tax or other reasons.”

Put figure 9 here

Turning now to flows between large economies, Figure 10 compares the mirror data for French inflows from the United Kingdom. The French-reported data are generally higher by an average of \$1.55 billion (in 2005 prices).

Put figure 10 here

A small number of empirical studies use three-year or five-year averages to smooth out volatility in the data (see Globerman & Shapiro, 2002; Razin & Sadka, 2007; Taylor, 2008). Figure 11 shows three-year averages for the two series, deflated by the French GDP deflator.²⁴ Much of the volatility disappears but substantial discrepancies remain.²⁵ On average, for the period 1985-2011, France reported its annual inflows from the United Kingdom as \$1.85 billion higher on average than those reported by the United Kingdom.

Put figure 11 here

²⁴ Rather than making this comparison for each pair of countries, for brevity we provide an example of the discrepancies that arise even in the averaged data.

²⁵ For 1985-2011 the standard deviation for the annual French data was \$5.5 billion. This fell to \$4.4 billion when three-year averages were used. Corresponding figures for the UK data were \$3.2 billion and \$2.3 billion respectively.

There are large differences in the raw United Kingdom-Germany mirror data, particularly from 1998. Deflating and averaging the data smooths out some of this volatility, removing almost all of the discrepancy for United Kingdom inward flows from Germany for the entire period 1985-2012, although substantial discrepancies remain across sub-periods (Figure 12).²⁶

Put figure 12 here

Table 3 summarises the larger asymmetries in counter-party flows for 1985-2012 for countries other than Belgium and Luxembourg.²⁷ Unsurprisingly, many involve the Netherlands, though there are also substantial discrepancies between the larger economies.

Put table 3 here

5. CONCLUSIONS

Despite focusing on a relatively homogeneous group of countries, our study has unearthed major differences in how countries compile and report their FDI statistics. Discrepancies will be greater for more diverse groups of countries. Pooling across large numbers of countries will increase the heterogeneity in the data. Changes in methodology, the timing of which is not uniform across countries, can cause large structural breaks, suggesting that the FDI data are also not directly comparable across time. Using long time series

²⁶ The time-series are split at 1998 due to the substantial increase in the volume and volatility of FDI from the late 1990s.

²⁷ Belgium and Luxembourg are excluded due to data limitations. Calculations for these countries unearthed large asymmetries, mainly attributable to Luxembourg, but these cannot usefully be compared with those reported in Table 3.

increases the number of structural breaks present in the data. Bilateral data, used in gravity models, suffer from asymmetric methodologies, particularly with respect to geographical allocation of investment and conduit investments.

There are also differences between published series and data revisions can be very substantial. National sources are the most up-to-date but these should be treated with care in cross-country studies, as they are more likely than international agency data to display methodological variation. A number of empirical studies mix together data from different sources that are not necessarily comparable.

Methodological coherence has improved over time but so too has conduit investment. As the extent of conduit investment varies across countries and over time, it reduces the usefulness of the measured FDI data for comparative purposes.

Our study recommends extreme caution in drawing conclusions based on FDI data. Problems are reduced when data are aggregated across time periods and discounted using an appropriate deflator, but this of course severely reduces sample size and hugely restricts the range of hypotheses that the data can be used to explore.

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Tables

Table 1: Average Annual Inward FDI Flows to Germany:
(US \$ billion, deflated to 2005)

	IMF	UNCTAD	OECD	Eurostat	National Series
1985-2010	29.0	26.1	28.5	30.4	28.9
1985-1997	5.3	5.8	5.3	7.1	5.3
1998-2010	52.6	46.4	51.6	53.7	52.4

Sources: As in the text, other than national data from the Deutsche Bundesbank database.

Table 2: SPE Transactions as Percentage of Inward FDI Flows to Luxembourg

Year	SPE per cent of Equity	SPE per cent of Intra-Company Loans	SPE per cent of Total
2002	97.2	172.3	96.3
2003	99.3	82.9	95.3
2004	97.5	79.7	93.4
2005	89.7	99.9	96.0
2006	69.0	123.7	75.0
2007	123.3	82.9	115.6
2008	81.0	110.1	93.0
2009	94.7	170.3	87.1
2010	92.2	114.3	82.6
2011	95.5	117.4	97.8
2012	63.4	93.0	73.9
Annual Average	91.2	113.3	91.5

Source: Authors' calculations based on data from BCL/STATEC Balance of Payments of Luxembourg.

Note: RIE of SPEs are excluded from these figures.

Table 3: Largest Absolute Asymmetries Found in Mirror FDI Flows, 1985-2012

Flows	Average Annual Discrepancy (\$ billion, 2005 Prices)
Netherlands Inward Flows from Germany	10.13
Netherlands Inward Flows from the United Kingdom	7.94
Germany Inward Flows from the United Kingdom	7.64
United Kingdom Inward Flows from Germany	6.72
United Kingdom Inward Flows from the Netherlands	5.65
Germany Inward Flows from the Netherlands	5.05
Netherlands Inward Flows from France	4.99
United Kingdom Inward Flows from the France	4.41
France Inward Flows from the United Kingdom	4.28

Note: These are average discrepancies regardless of direction.

Figures

Figure 1: Inward FDI Flows to Germany, 1985-1999:
Comparison of Reporting Agencies

Note: Eurostat data converted to US\$ using Eurostat period average exchange rates.

Figure 2: Inward FDI Flows to France, 1990-1994:
Comparison of Reporting Agencies

Sources: As in the text.

Figure 3: Inward FDI Flows to the United Kingdom, 1983-1997:
Comparison of Reporting Agencies

Sources: As in text.

Figure 4: Inward FDI Flows to the Netherlands, 1999-2012:
Effect of the Exclusion of SPE Transactions

Sources: OECD International Direct Investment Statistics database, De Nederlandsche Bank Balance of Payments database.

Figure 5: Inward FDI Flows to Luxembourg, 2002-2012:
Comparison of Reporting Agencies

Sources: As in text.

Figure 6: Inward FDI Flows to Germany from the Netherlands, 1985-2012:
Comparison of Mirror Data

Source: OECD International Direct Investment Statistics database.

Figure 7: Average Annual Inward FDI Flows to Germany from the Netherlands (Deflated to 2005)

Source: OECD International Direct Investment Statistics database, World Development Indicators (base year: 2005).

Figure 8: Netherlands Inward FDI Flows from Germany, 1985-2012:
Comparison of Mirror Data

Source: OECD International Direct Investment Statistics database.

Figure 9: Inward FDI Flows to the Netherlands from the United Kingdom, 1985-2012: Comparison of Mirror Data

Source: OECD International Direct Investment Statistics database.

Figure 10: Inward FDI Flows to France from the United Kingdom, 1985-2012:
Comparison of Mirror Data

Source: OECD International Direct Investment Statistics database.

Figure 11: Inward FDI Flows to France from the United Kingdom, 1985-2011:
Three-Year Averages, Deflated to 2005

Source: OECD International Direct Investment Statistics database, World Development Indicators (base year 2005).

Figure 12: Average Annual Inward FDI Flows to the United Kingdom from Germany (Deflated to 2005)

Source: OECD International Direct Investment Statistics database, World Development Indicators (base year 2005).