Methodological improvements to foreign direct investment statistics: Dec 2016

The methodological improvements implemented in the Foreign Direct Investment Involving UK Companies: 2015 bulletin. These improvements include progress made towards recommendations published in the FDI National Statistics Quality Review and revised historical estimates to comply with international standards outlined in the Balance of Payments manual 6.

Contact:
Sami Hamroush
sami.hamroush@ons.gsi.gov.uk

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Claire Dobbins, Shane O'Connor and Sami Hamroush.

2 . Executive summary

This article details the methodological improvements that have been made to foreign direct investment (FDI) statistics, as published in the Foreign Direct Investment Involving UK Companies: 2015 statistical bulletin on 2 December 2016.

UK FDI statistics underwent a National Statistics Quality Review (NSQR) that was published in July 2016. While the FDI NSQR concluded that FDI statistics produced by the Office for National Statistics (ONS) are fit for purpose, 20 recommendations were published for improving current processes and, ultimately, the overall quality of FDI estimates.

In October 2016, we published an NSQR response commending the review and outlined high-level plans to implement these recommendations. This article details how the following recommendations have been addressed as part of the 2015 FDI statistical bulletin, and the impact they have on FDI statistics:

- Recommendation 14: Implement the proposed standard error calculation without delay, carrying out the necessary quality assurance of results: then resume the calculation and publication of measures of precision for the FDI output’s principal annual estimates as soon as possible

- Recommendation 11: Assuming no reason is found to retain use of the file, nor an updated version of it, ONS should discontinue use of the Chancellor’s Initiative data in FDI processing, and report fully on the impact of its removal on historical estimates

In addition to implementation of some of the NSQR recommendations, historical statistics presented in the 2015 bulletin have also undergone revision to achieve consistency with the latest international standards (as defined in the Balance of Payments Manual 6 (BPM6) and UK Balance of Payments.

3 . Reintroduction of FDI standard errors

Recommendation 14 of the foreign direct investment (FDI) National Statistics Quarterly Review (NSQR) stated that measures of precision for the FDI output’s principal annual estimates should be reinstated as soon as possible. FDI estimates of precision have not been published since the Business Monitor MA4: Foreign Direct Investment involving UK companies 2010 released in February 2012.

As discussed in the FDI NSQR, standard errors were temporarily removed from the annual FDI publication, as the methodology was under review. While the length of time that they had been absent was not intended, there have been many substantial developments taking place that took priority over implementing the new standard error methodology. This includes the migration to a new data processing platform and the development of new results processing systems. There were many challenges in managing the change of these business processes, which have been fully documented in the FDI NSQR. It has not been until the most recent annual FDI bulletin that we have been in the position to implement the new standard error methodology.

3.1. Improvements to the FDI standard error methodology

A standard error is a measure of precision for a survey estimate and is considered an estimate of the sampling error caused by observing a sample instead of the whole population. A low standard error indicates a precise estimate. To aid comparison, the standard error is also expressed as a percentage of the total value. This quantity is called the coefficient of variation (CV) and it allows the standard errors to be put into context. A high coefficient of variation indicates a greater relative variation.

A new standard error methodology was specified by in-house experts to align more closely with the prediction estimation method currently used. The new method also accounts for the presence of outlier data values as identified throughout the estimation process, rather than predefined thresholds within each stratum of potentially extreme values.

Since these measures of precision were last published, there have also been other changes that would impact on the production of standard errors, such as the overall calculation of total earnings, flows and positions becoming compliant with the latest international standards, as outlined in the Balance of Payments Manual 6 (BPM6).

The standard error method has been developed as a new module to be integrated within the new FDI SAS results systems. The system module has been thoroughly quality assured by methodology experts to ensure the new method has been implemented correctly and the newly published estimates are fit for purpose.

3.2. Standard errors for annual 2015 FDI estimates

Standard errors for 2015 FDI estimates are now available in the statistical bulletin. The new standard errors estimates are presented in Table 1.

Table 1: Standard errors for annual foreign direct investment estimates, 2015

	Annual Inward 2015			Annual Outward 2015		
Headline estimate	Published estimate (£ million)	Standard Error (£ million)	Coefficient of Variation (%)	Published estimate (£ million)	Standard Error (£ million)	Coefficient of Variation (%)
Total earnings	47,872	1,410	2.9	56,946	178	0.3
Total flows	21,599	3,114	14.4	-52,946	1,491	-
Total positions	950,315	8,706	0.9	1,052,081	1,331	0.1

Source: Office for National Statistics

Notes:

1. Coefficients of variation are not available for negative estimates

As expressed in the FDI NSQR, coefficients of variation for total flows should be treated with caution, in particular when the survey estimate is near zero or negative, as is the case for outward 2015 total flows. In this case, the standard error is a more appropriate measure of precision.

Given the coefficients of variation published in Table 1, we can conclude that high-level annual estimates of total earnings, flows and positions are of acceptable quality. It is expected that CVs are larger for total flows than for total earnings and positions, since this estimate consists of many volatile sub-components.

4 . The impact of removing the Chancellor’s Initiative data extract from historical estimates of inward Foreign Direct Investment

Recommendation 11 of the Foreign Direct Investment (FDI) National Statistics Quarterly Review (NSQR) was to discontinue the use of the Chancellor’s Initiative data in FDI results processing and to report on the impact of its removal on historical estimates. The Chancellor’s Initiative data extract is only used in the compilation of annual inward FDI estimates. In line with this recommendation, annual 2014 and 2015 FDI estimates published in the Foreign Direct Investment Involving UK Companies: 2015 statistical bulletin have been compiled with the removal of the Chancellor’s Initiative data extract.

The Chancellor’s Initiative data has not been removed from the historical time series since the negligible to no impact on most FDI outputs did not justify undergoing the long revision process to update historic balance of payments and national accounts statistics. Therefore, to maintain consistency with the balance of payments, the historic time series in the FDI statistical bulletin will not be revised until the next opportunity arises to revise historic balance of payments and national accounts statistics. Nevertheless, this note provides an indication of the magnitude of the revisions on the historic times series once the Chancellor’s Initiative data is eventually removed.

4.1. Background to the Chancellor’s Initiative data

A set of modeled UK branch data, referred to as the Chancellor’s Initiative extract, was introduced more than 15 years ago as part of the compilation process for annual inward foreign direct investment estimates. These data were used to ensure that a sufficient number of branches were included in the FDI population so that imputation methods worked correctly to account for companies that did not respond to the FDI survey.

Since the Chancellor’s Initiative extract was first introduced, an increase in the number of branches in the UK along with extensive redevelopments to the FDI systems and methods has made the extract no longer necessary for the compilation of FDI statistics. Despite this, the data continued to be used due to the historical processes that were in place.

As highlighted in the FDI NSQR, the data has negligible to no impact on most FDI outputs and therefore its use should be discontinued. In light of this, the Chancellor’s Initiative data has been removed from the compilation process of FDI estimates for 2014 and 2015, as presented in the 2015 statistical bulletin. To maintain consistency with the balance of payments, the historic time series in the FDI statistical bulletin will not be revised until the next opportunity arises to revise historic balance of payments and national accounts statistics. This note provides an indication of the magnitude of the revisions on the historic FDI time series removing the Chancellor’s Initiative data will have.

Please note that the 2015 bulletin has introduced a revised BPM6 back series to become consistent with estimates currently published in the balance of payments. Analysis to conduct the impact of removing the Chancellor’s Initiative data from historical FDI estimates refer to the most recent BPM6 compliant FDI time series published on 2 December 2016.

4.2. Chancellor’s Initiative data overview

The Chancellor’s Initiative data extract only impacts the calculation of annual inward FDI estimates – specifically, branch-related variables.

Table 2 provides a summary of the low level variables contained in the Chancellor’s Initiative extract. The data contains 3 branch variables: foreign companies’ share of UK branch profits, the branch opening balance of the loan and current account due to the parent company and the branch closing balance of the loan and current account due to the parent company.

Table 2: Overview of Chancellor's Initiative data extract

		Overall estimate (£ million)		
Foreign Parent Country	Total UK branches	Foreign companies' UK branch profits	Branch opening balance of the loan and current account due to parent	Branch closing balance of the loan and current account due to parent
Australia	3	0.2	14.4	14.4
Canada	3	8.6	753	753
France	3	4.8	624	624
Japan	3	0.4	13.7	13.7
Netherlands	3	3.1	1059.9	1059.9
Switzerland	3	0.7	28.1	28.1
USA	3	10.4	771.6	771.6
Total	21	28.2	3264.6	3264.6

Source: Office for National Statistics

The variables presented in Table 2 are low level subcomponents of components of total earnings, positions and flows:

- "foreign companies' UK branch profits" is used in the calculation of the "net foreign companies' UK branch profits" component of inward FDI earnings, referred to herein as "branch net profits"; a proportion of branch net profits are also used in the calculation of the "reinvested earnings" component of flows
- "branch closing balance of the loan and current account due to parent", referred to herein as "branch closing balance", is used in the calculation of the "branch net balance of assets and loans and current account with the parent company" component of inward FDI positions, referred to herein as "branch net closing balance"
- "branch opening balance of the loan and current account due to parent" is used, along with branch closing balance, in the calculation of the "net increase in the balance of assets and loans and current account with the parent company" component of inward FDI flows, referred to herein as "branch net increase in balance"
- since the Chancellor's Initiative data for branch opening and closing balances are equal, there is no impact on the "branch net increase in balance" component within flows; as such, the only impact on flows from removing the Chancellor's Initiative data is from reinvested earnings

All branches created by the Chancellor's Initiative extract are assigned to the "other services" industry, and are allocated across 7 countries: Australia, Canada, France, Japan, the Netherlands, Switzerland and the USA.

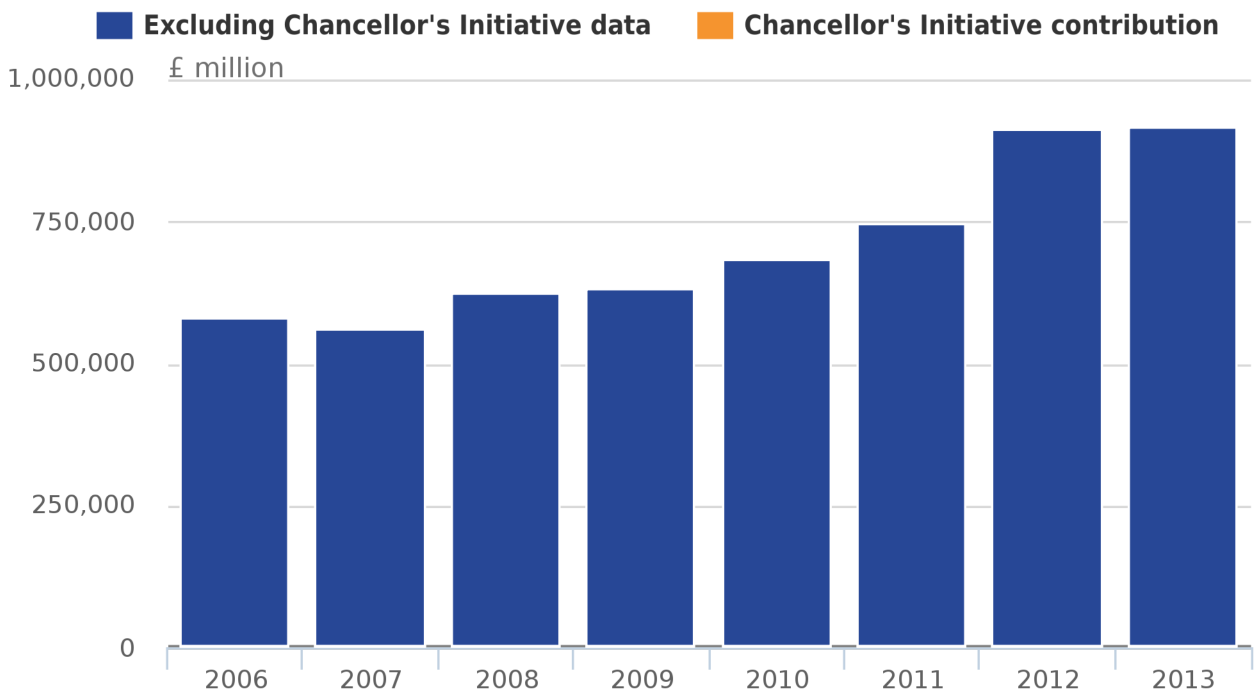
4.3. Impact analysis

At an aggregate level, removal of the Chancellor's Initiative data has minimal impact on headline FDI estimates. Between 2006 and 2013, removal of the data results in a decrease across total earnings, positions and flows by an average of 0.1%, 0.5% and 0.1% respectively.

4.3.1. Impact on total positions by component, geography and industry

Removal of the Chancellor’s Initiative data has little impact on FDI positions at an aggregate level, with an average downward revision of 0.5% between 2006 and 2013 (Figure 1).

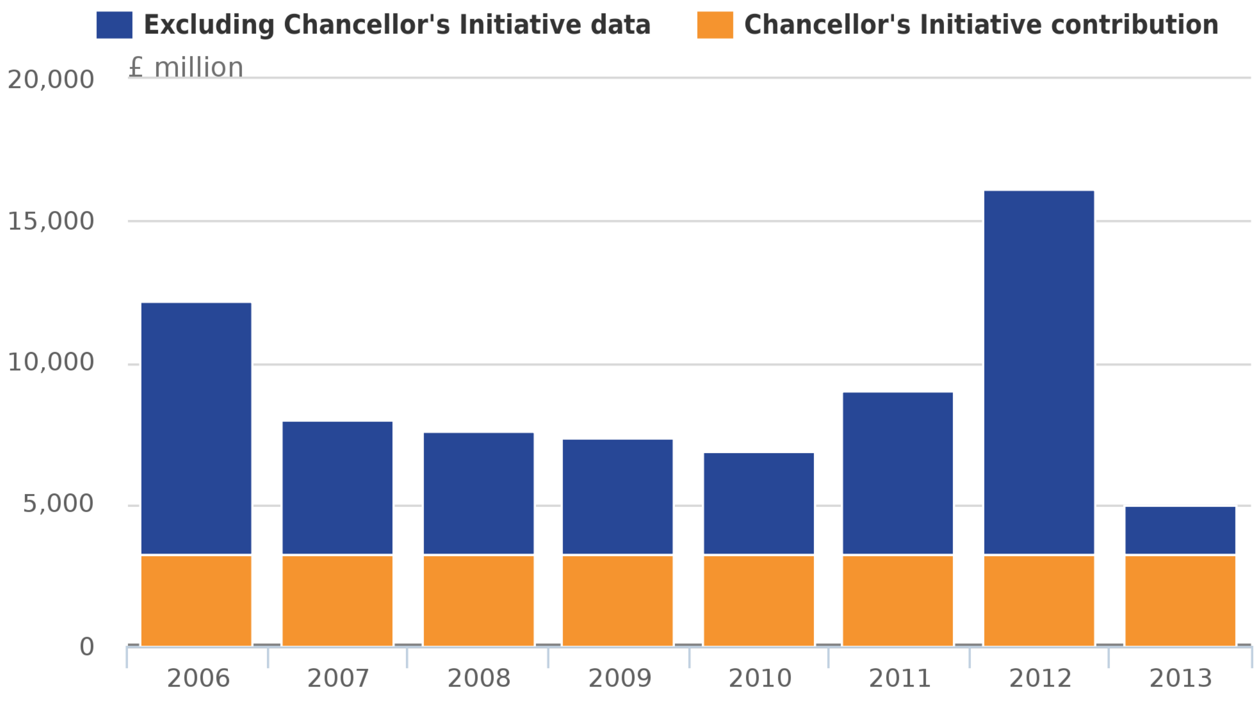
Figure 1: Total international investment position in the UK at end period, 2006 to 2013



Source: Office for National Statistics

Looking at the subcomponent of FDI positions, removal of the Chancellor’s Initiative data has a greater impact on the branch net closing balance, with an average decrease of 41% between 2006 and 2013 (Figure 2).

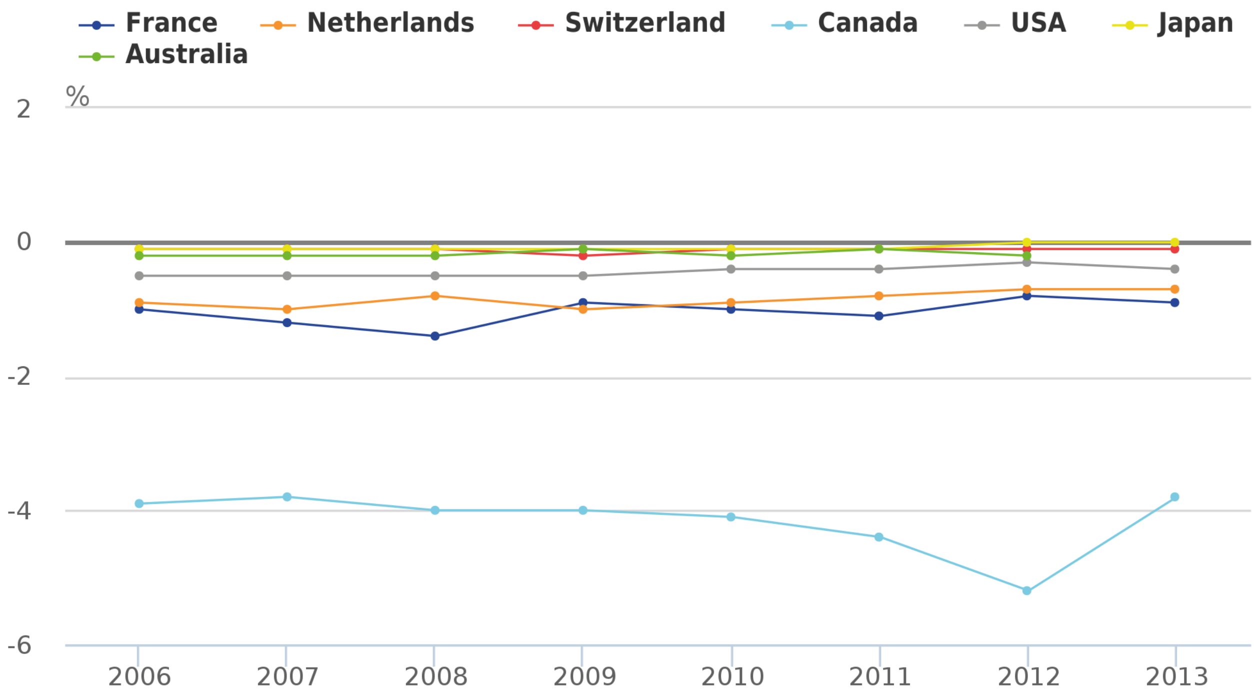
Figure 2: UK branch net closing balance due to parent at the end of the reporting period, 2006 to 2013



Source: Office for National Statistics

On a geographical basis, the removal of the Chancellor's Initiative data on inward FDI positions estimates is most notable for Canada. Between 2006 and 2013, Canada falls from an average total position of £18.3 billion to £17.5 billion with an average decrease of 4.2% across the overall period. France has an average decrease of 1.1% on its total inward FDI position, while all other affected countries experience downward revisions of less than 1% (Figure 3).

Figure 3: Revision to total international investment position in the UK due to removal of Chancellor's Initiative data by country, 2006 to 2013



Source: Office for National Statistics

Notes:

1. Please note that some time points have been omitted due to disclosure control.

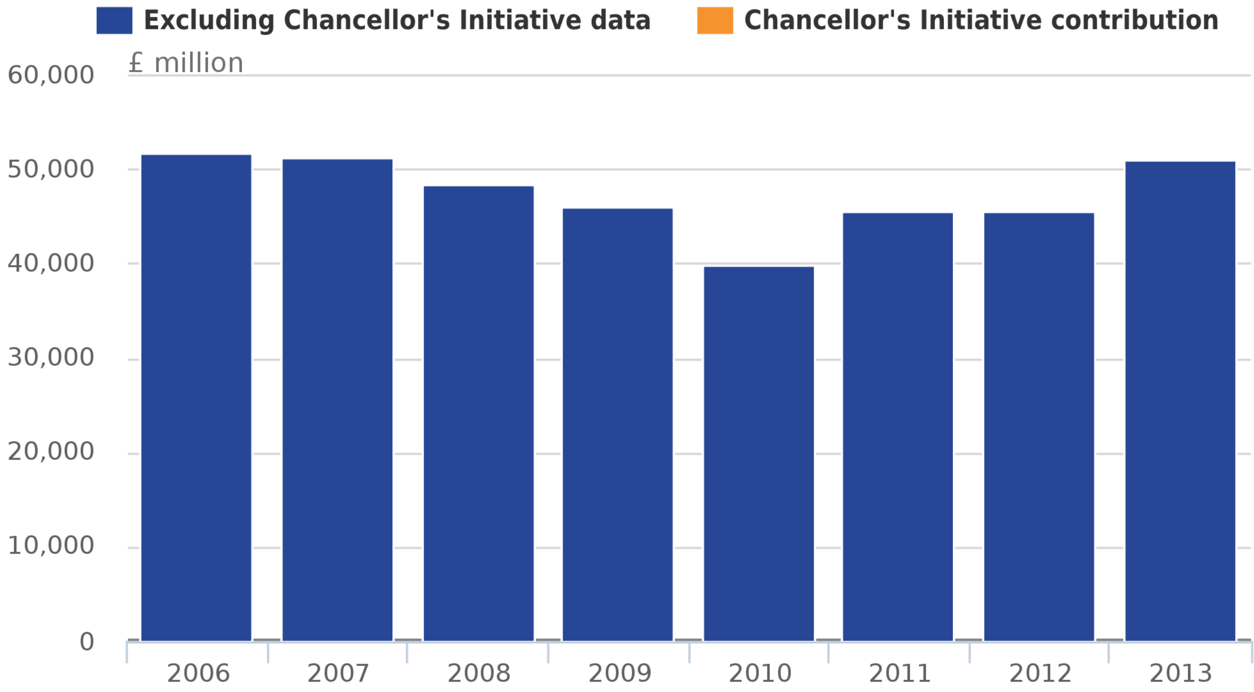
The Chancellor’s Initiative data only impacts branch data in the "other services" industry estimates, therefore, all revisions to total positions due to the removal of this data can be observed in that single industry breakdown. Within the Foreign Direct Investment Involving UK Companies: 2015 bulletin published on 2 December 2016, data at an industry level are only published as far back as 2012. Further back series data at this level of detail are not comparable with previous FDI publications due to the introduction of a newly revised BPM6 compliant back series in the December 2016 release. Therefore, for illustrative purposes, the impact of removing the Chancellor’s Initiative data is only considered for 2013.

The overall "other services" industry estimates for total inward FDI positions decrease by 12% in 2013, revised from total positions of £27.8 billion to £24.6 billion. At a country level, the greatest revision can be seen in Canada, with a decline of 67% from £1.1 billion to £0.4 billion. France and the Netherlands also experience large downward revisions of 32% and 34% respectively, while all other countries affected by the Chancellor’s Initiative data have downward revisions of less than 10%.

4.3.2. Impact on total earnings by component, geography and industry

Removal of the Chancellor’s Initiative data has minimal impact on total inward FDI earnings over the period 2006 to 2013, with an average downward revision of 0.1% to overall earnings over the period (Figure 4).

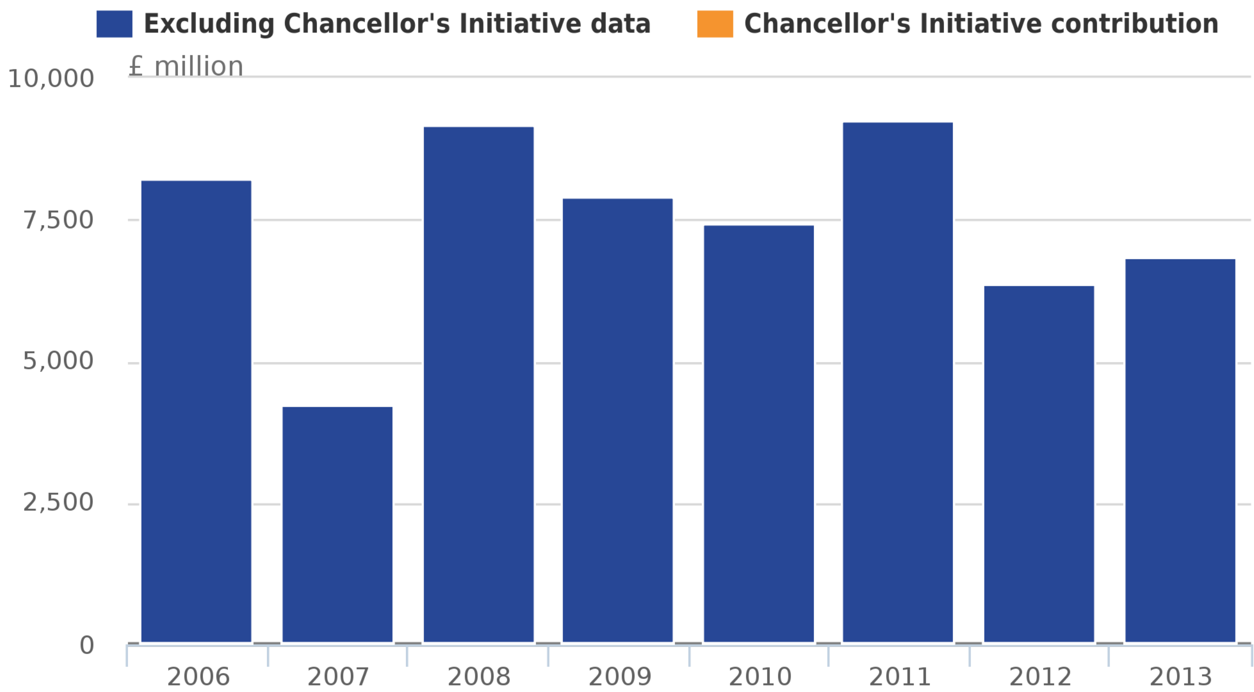
Figure 4: Total net earnings form foreign direct investment in the UK, 2006, to 2013



Source: Office for National Statistics

At the subcomponent level for FDI earnings, removing the Chancellor's Initiative data leads to an average decrease of 0.4% to branch net profits from 2006 to 2013 (Figure 5).

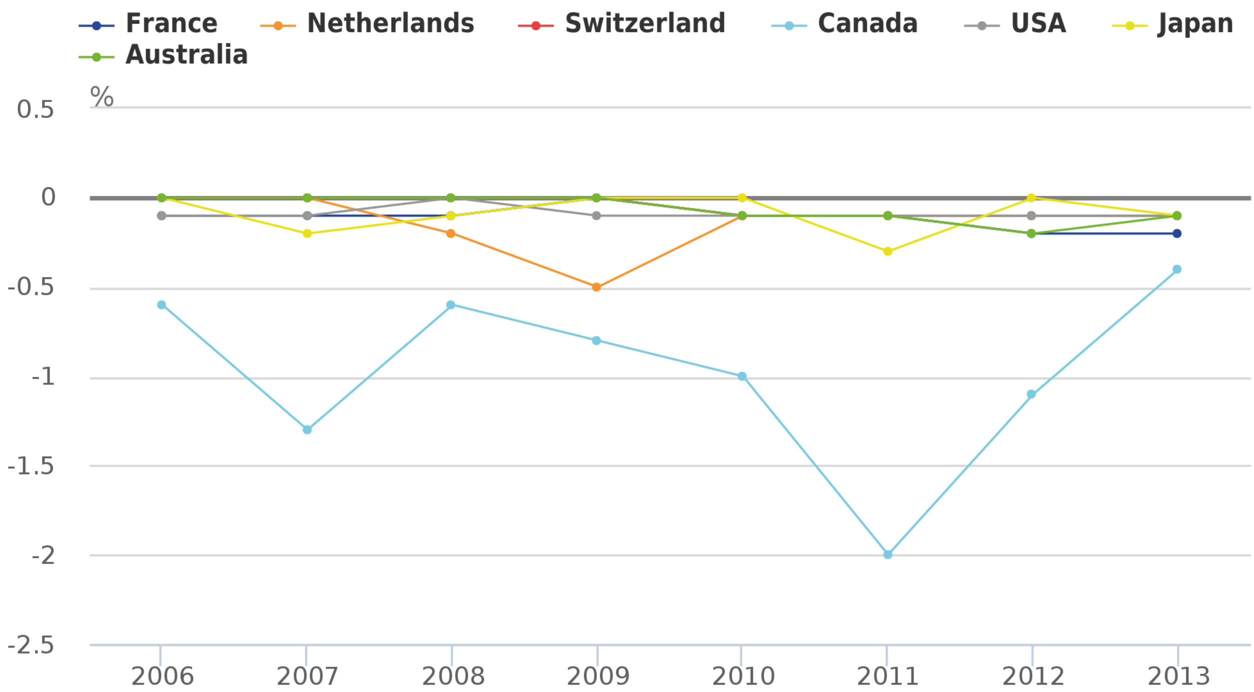
Figure 5: Total foreign companies' share of UK branches' net profits, 2006 to 2013



Source: Office for National Statistics

Similar to total positions, Canada is once again the country most affected by the removal of the Chancellor's Initiative data. Between 2006 and 2013, total earnings for Canada are revised downwards by 1% on average, maintaining an average of £1.1 billion over the period. All other countries covered by the Chancellor's Initiative extract have a downward revision of 0.1% or less (Figure 6).

Figure 6: Revision to total net earnings from foreign direct investment in the UK due to removal of Chancellor's Initiative data by country, 2006 to 2013



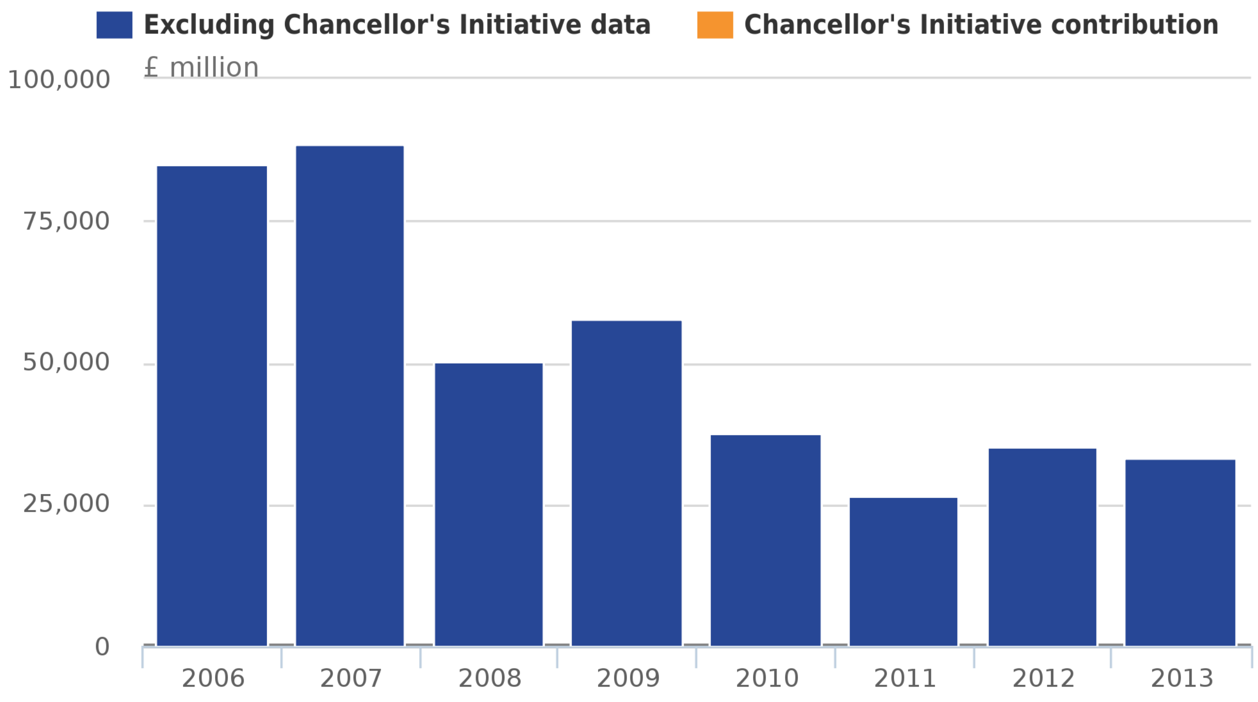
Source: Office for National Statistics

Once again, industry estimates for 2013 have been used to illustrate the impact of removing the Chancellor's Initiative data, due to the shorter time series presented at this level of aggregation. Total inward FDI earnings in the "other services" industry is revised downwards by 3% from £896 million to £868 million. Canada has the most notable revision to total earnings in this industry, with a 288% downward revision from £3 million to a £6 million loss. All other countries affected by the removal of this data have downward revisions of less than 6%.

4.3.3. Impact on total flows by component, geography and industry

Removing the Chancellor's Initiative data has minimal impact at an aggregate level, with average downward revisions of 0.1% between 2006 and 2013 (Figure 7).

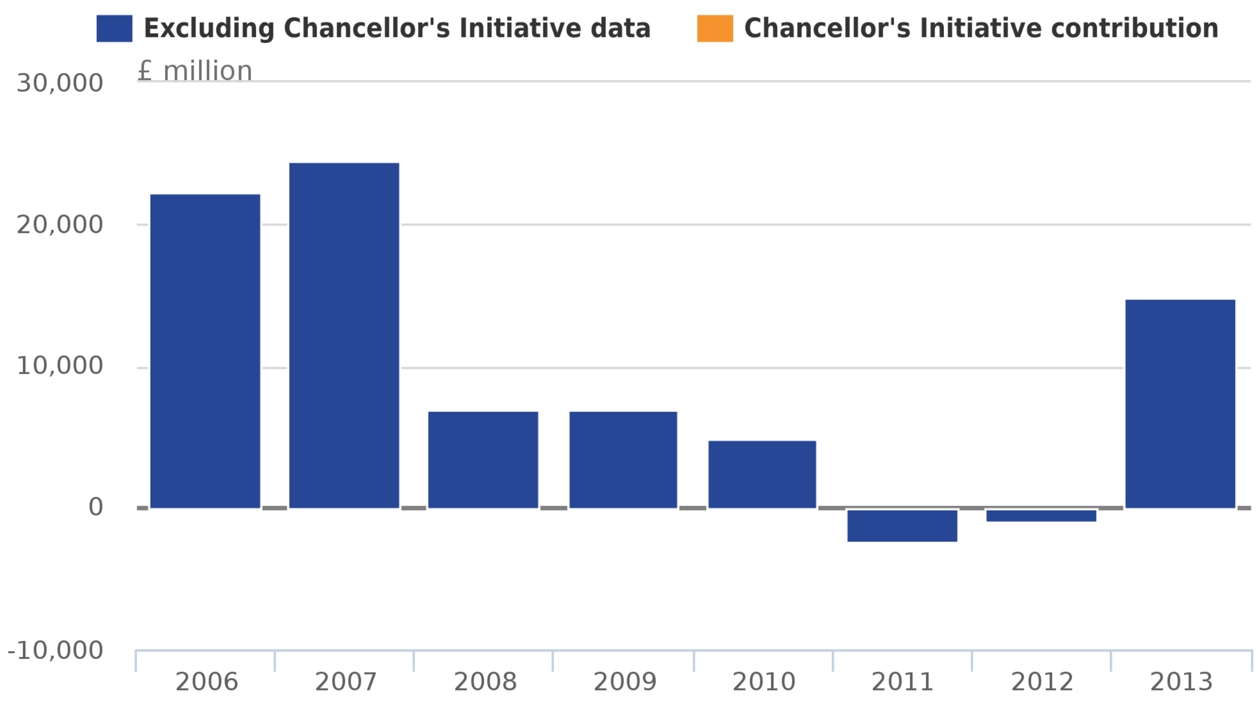
Figure 7: Total net foreign direct investment flows in the UK, 2006 to 2013



Source: Office for National Statistics

As previously mentioned, the Chancellor’s Initiative data extract in branch opening and closing balance are equal to one another, therefore their removal does not impact on the value of total flows. The only impact on total flows from removal of the Chancellor’s Initiative data is from a small downward revision to reinvested earnings, due to the changes in branch net profits. There is an average decrease of 0.8% to reinvested earnings over 2006 to 2013 (Figure 8).

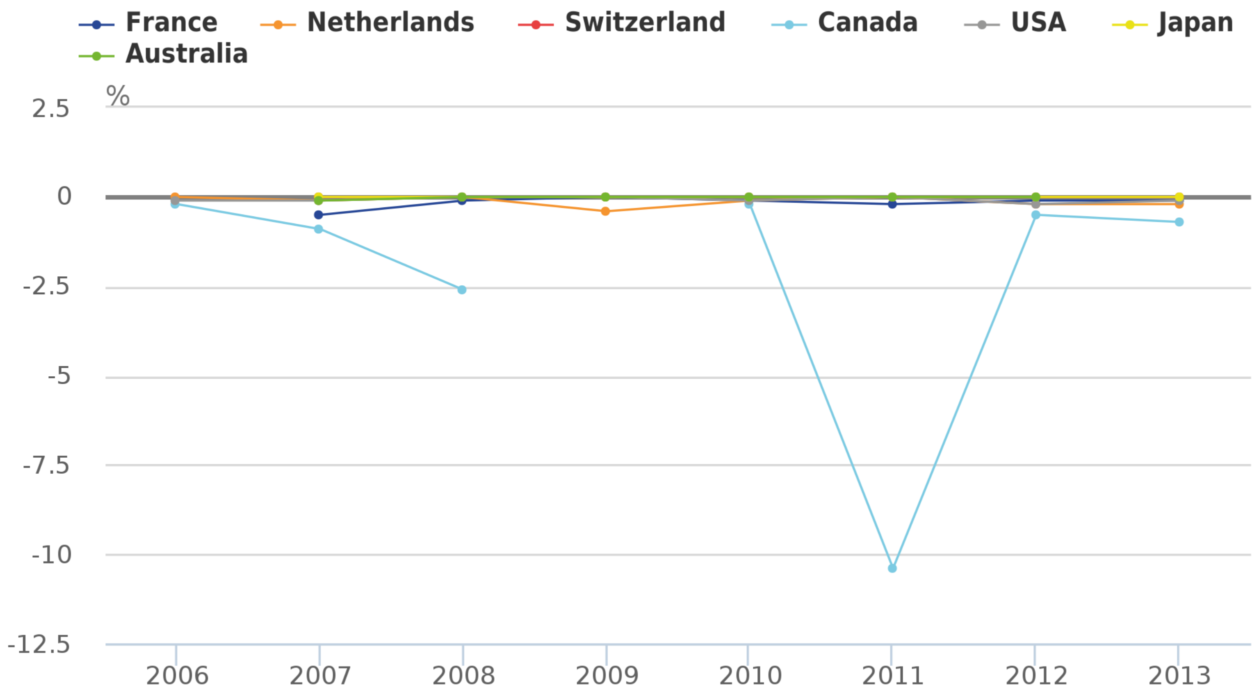
Figure 8: Total re-invested earnings, 2006 to 2013



Source: Office for National Statistics

At a country level, Canada continues to be the most affected by the removal of the Chancellor’s Initiative data, with an average decrease of 38% to total net FDI flows in the UK between 2006 and 2013. However, in 2009, total flows for Canada are revised from £3 million to a £6 million loss, having a large impact on the overall average. This period has been removed from Figure 9 and excluding this data point results in a much lower average downward revision of 2%. All other countries affected by the Chancellor’s Initiative data extract have downward revisions of less than 0.2% over the same period.

Figure 9: Revision to total net foreign direct investment flows in the UK due to removal of Chancellor's Initiative data by country, 2006 to 2013



Source: Office for National Statistics

Notes:

1. Please note that some time points have been omitted for the figure above due to disclosure control.

Within the "other services" industry, 2013 estimates of total FDI flows in the UK by industry are once again used to illustrate the impact of removing the Chancellor’s Initiative data. Total inward FDI flows in the "other services" industry have decreased by 4.4% with an initial disinvestment of £647 million revised to a larger disinvestment of £675 million. France has the most notable revision to total flows in this industry, with a 120% downward revision from an initial disinvestment of £4 million to a further disinvestment to £9 million. Canada also has a large decline in total flows in the "other services" industry of 43.0%, while all other countries affected by this data have downward revisions of less than 7%.

5 . BPM6 revisions to historical FDI estimates

The UK balance of payments (BoP) and foreign direct investment (FDI) statistics are produced in line with international standards set out in the Balance of Payments Manuals (BPM). These standards ensure that economic statistics produced globally are compiled in a consistent, comparable and reliable way.

Time series data previously published in the FDI statistical bulletin experienced a discontinuity when international standards were reviewed from Balance of Payments Manual 5 to 6; where data for periods prior to 2012 were consistent with BPM5, while those from 2012 and onwards were consistent with BPM6. The historical time series published in this year’s bulletin for periods from 2007 onwards have been revised to ensure consistency with BPM6. This article provides an overview of the main revisions as a result of this change.

5.1. BPM6 conceptual changes

International guidelines presented in the BPM are periodically reviewed to reflect economic and technological developments and to ensure user needs are met. This article covers the main changes to historical time series of FDI statistics as a result of the implementation of the sixth edition of the Balance of Payments and International Investment Position Manual (BPM6). The new BPM6 includes a series of changes to BoP statistics, including:

- measurement basis for FDI profits
- treatment of super-dividends
- special drawing rights
- employee stock options
- changes to trade in goods and trade in services (including non-monetary gold and goods sent abroad for processing)
- remote gambling

More detail on these methodological changes and their wider impact on balance of payments can be found in a separate article.

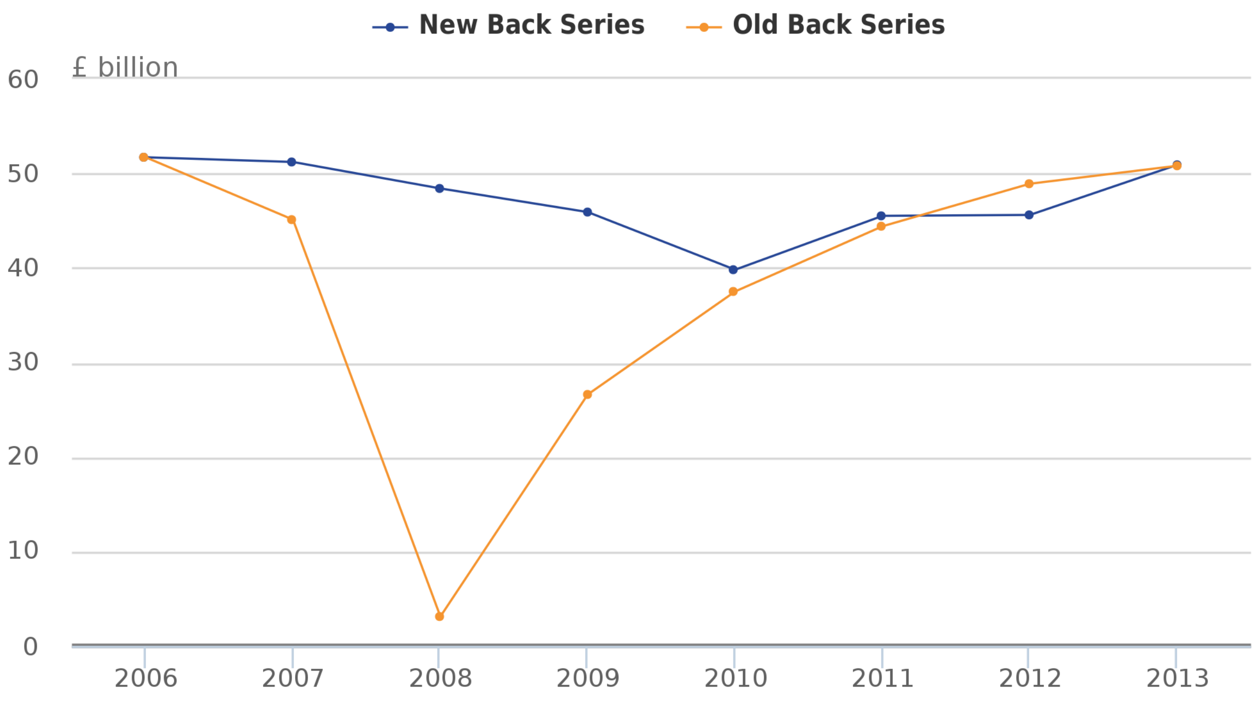
The biggest impact on FDI statistics from new BPM6 guidelines stems from the change in the measurement basis of FDI profits, particularly on the inward estimates. In line with BPM5, FDI profits for monetary financial institutions (MFIs) were previously measured on an all inclusive basis; however, in accordance with the new BPM6 guidelines, MFI profits are now measured on a current operating performance (COP) basis. COP excludes holding gains and losses, which are calculated as dealing profits less net spread earnings, plus exceptional items less provisions for bad and doubtful debts.

In addition to the BPM5 and 6 methodological changes, the FDI MA4 statistical bulletin traditionally only revises the previous year’s data from the current reference period to reflect late survey returns. As such, revisions made to historic time series were not reflected in the bulletin despite being reflected in statistics presented in balance of payments statistics and national accounts.

5.2. Impact for FDI earnings

Due to changes in how FDI profits are measured in BPM6, the largest revisions are found within inward FDI earnings data, with relatively much smaller revisions to all other headline FDI statistics. The largest revision to the back series occurs in 2008, where the previously published back series reported inward earnings of £3.1 billion in 2008, which is revised upwards to £48.2 billion. Fewer revisions occur between 2010 and 2013, with an absolute average annual revision over this period of £1.7 billion, or 3.9% (Figure 10).

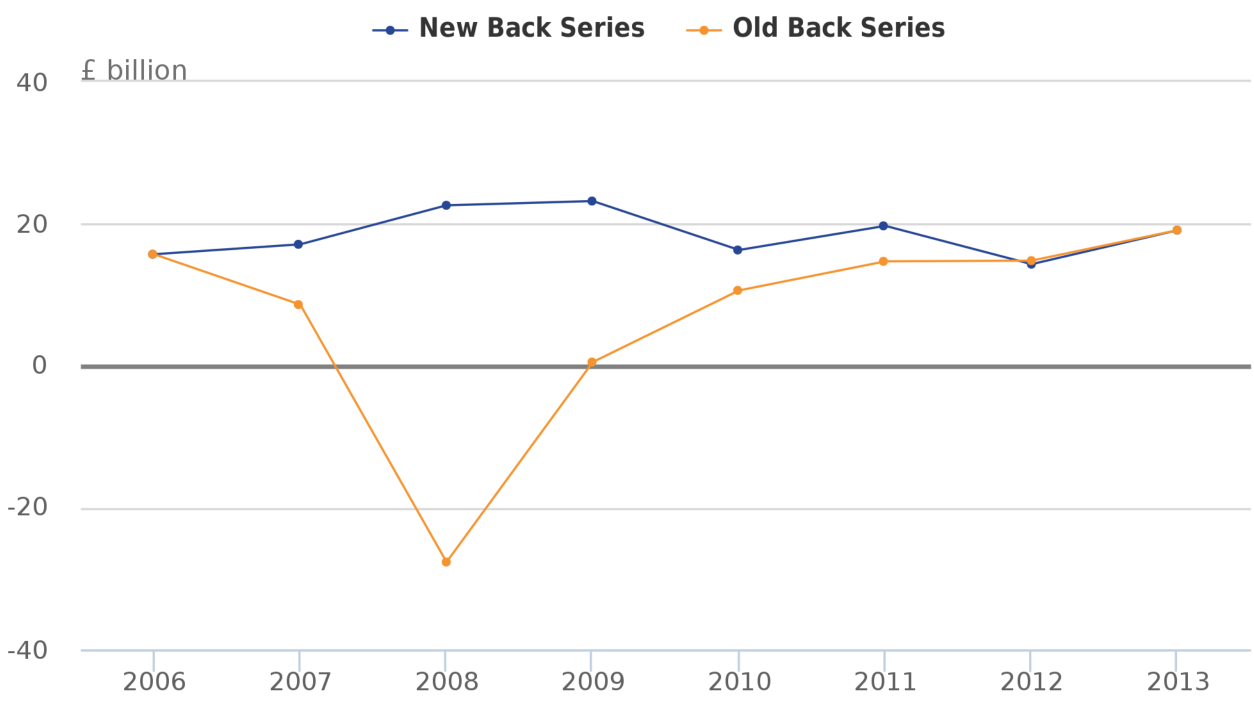
Figure 10: Annual inward foreign direct investment earnings, 2006 to 2013



Source: Office for National Statistics

The upward revision to inward earnings in 2008 is mainly caused by revisions to earnings in the financial services industry, which are revised upwards from negative £27.7 billion to positive £22.6 billion – an upwards revision of £50.3 billion. This upward revision accounts for more than the total £45.3 billion revision to total inward earnings in 2008 – with downward revisions in other industries offsetting the overall increase (Figure 11).

Figure 11: Annual inward foreign direct investment earnings from financial services, 2006 to 2013



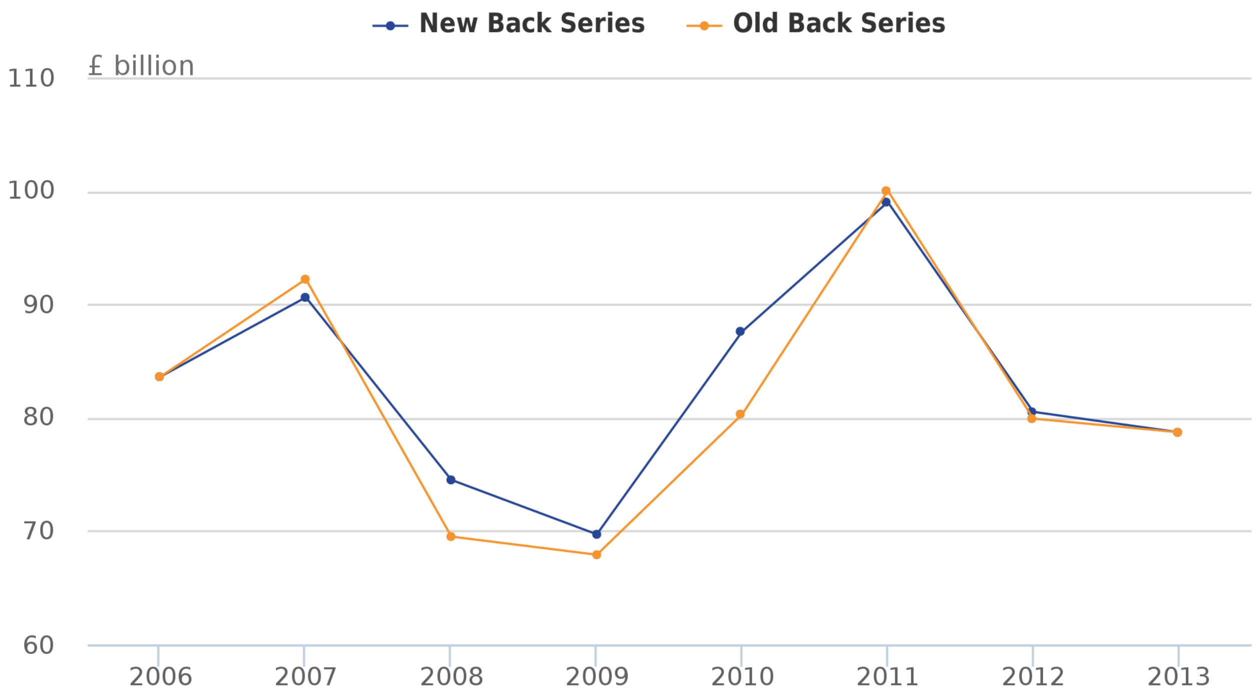
Source: Office for National Statistics

The large revisions in financial services during the financial crisis reflect large trading losses recorded by MFIs and provisions for bad debts. The effect of excluding these, in line with BPM6 guidelines, results in large upward revisions to inward FDI earnings.

While the BPM6 changes affect both directions of FDI, the impact is substantially greater on the inward side due to a contrast in the activities of foreign-owned affiliates based in the UK (inward FDI) compared with UK-owned affiliates based overseas (outward FDI). Foreign-owned affiliates operating in the UK often have large trading arms; therefore, holding gains and losses form a much greater part of their profits. In contrast, overseas affiliates of UK-owned MFIs tend to be more focused on retail banking, with a relatively smaller proportion of profits accounted for by holding gains and losses. As such, excluding holding gains and losses results in large upward revisions to inward earnings, as large trading losses during the financial crisis are excluded.

Given the differences in the nature of inward and outward companies operating in financial services, the BPM6 changes have a substantially smaller impact on the overall outward earnings estimates, with an absolute average revision of £2.5 billion between 2007 and 2013, or 3.2% (Figure 12).

Figure 12: Annual outward foreign direct investment earnings, 2006 to 2013

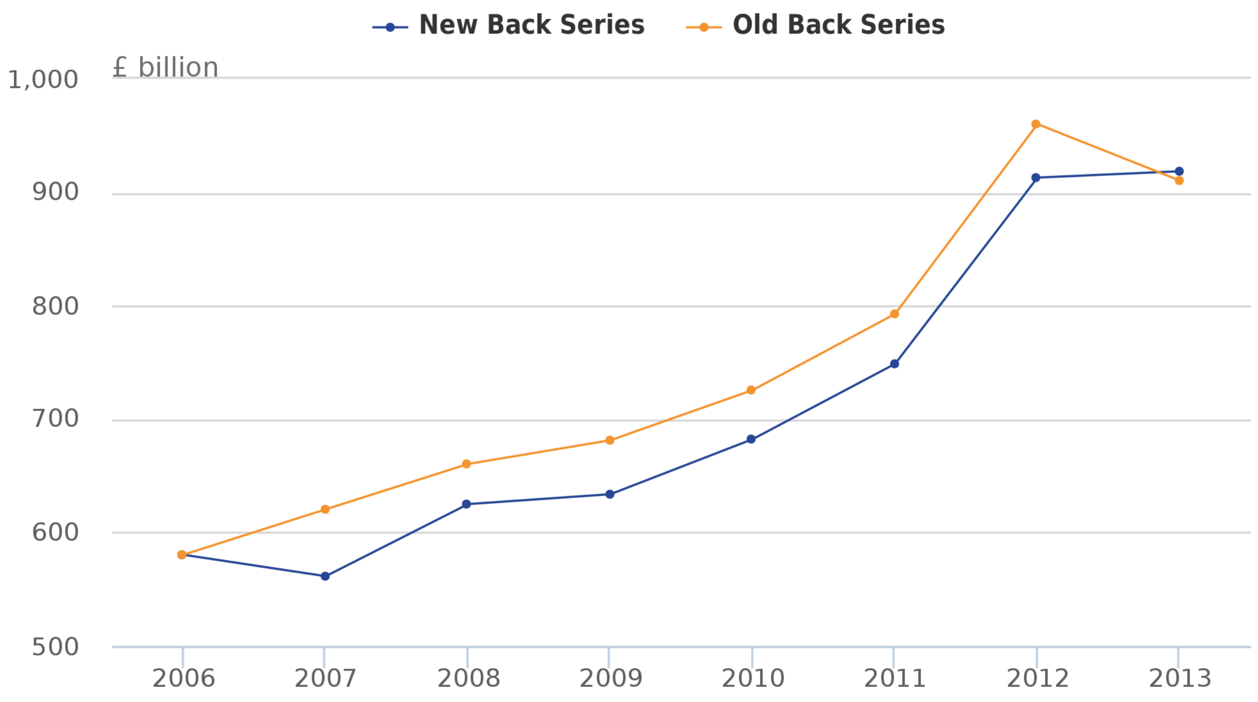


Source: Office for National Statistics

5.3. Impact for FDI positions

The revisions to FDI positions are relatively small compared with the revisions seen in inwards earnings, with an absolute average revision to inward positions between 2007 and 2013 of £40.7 billion, or 5.6% (Figure 13). These revisions are broad-based geographically and in terms of industry.

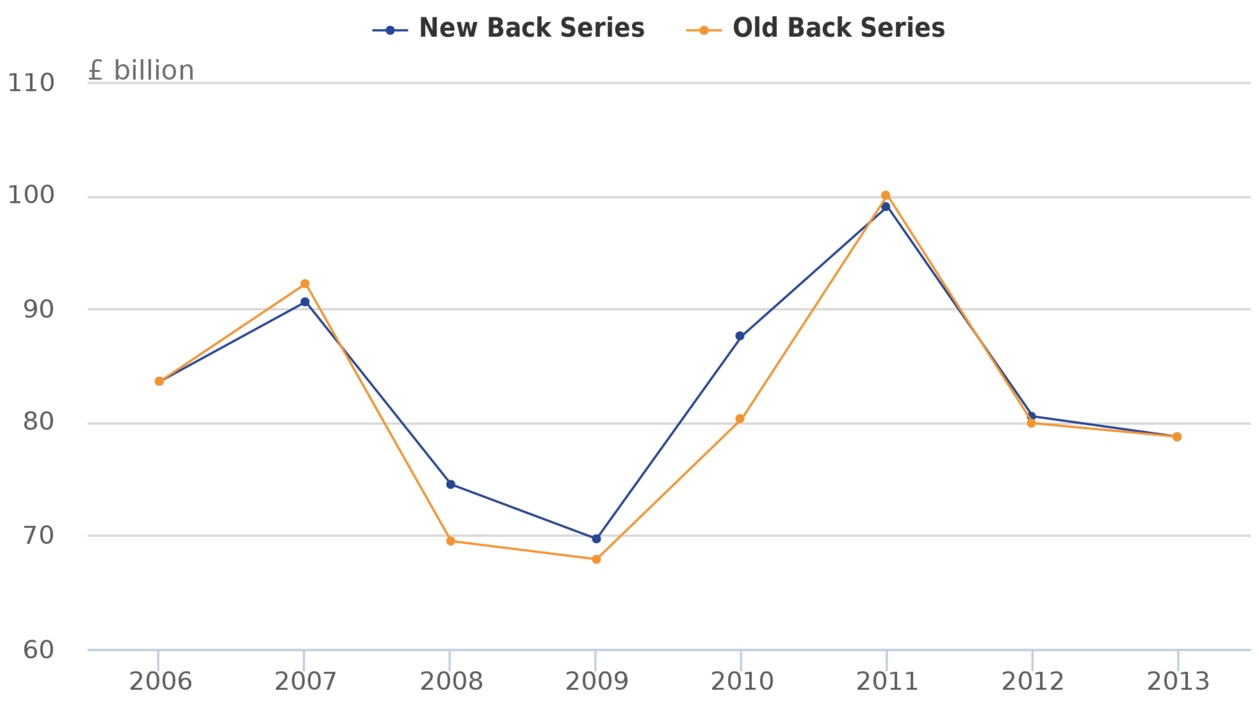
Figure 13: Annual inward foreign direct investment positions, 2006 to 2013



Source: Office for National Statistics

Similarly to inward FDI positions, revisions to outward FDI positions are also relatively small, with absolute average annual revision of £34.0 billion between 2007 and 2013, or 3.3% (Figure 14). These revisions are broad-based geographically and in terms of industry.

Figure 14: Annual outward foreign direct investment positions, 2006 to 2013

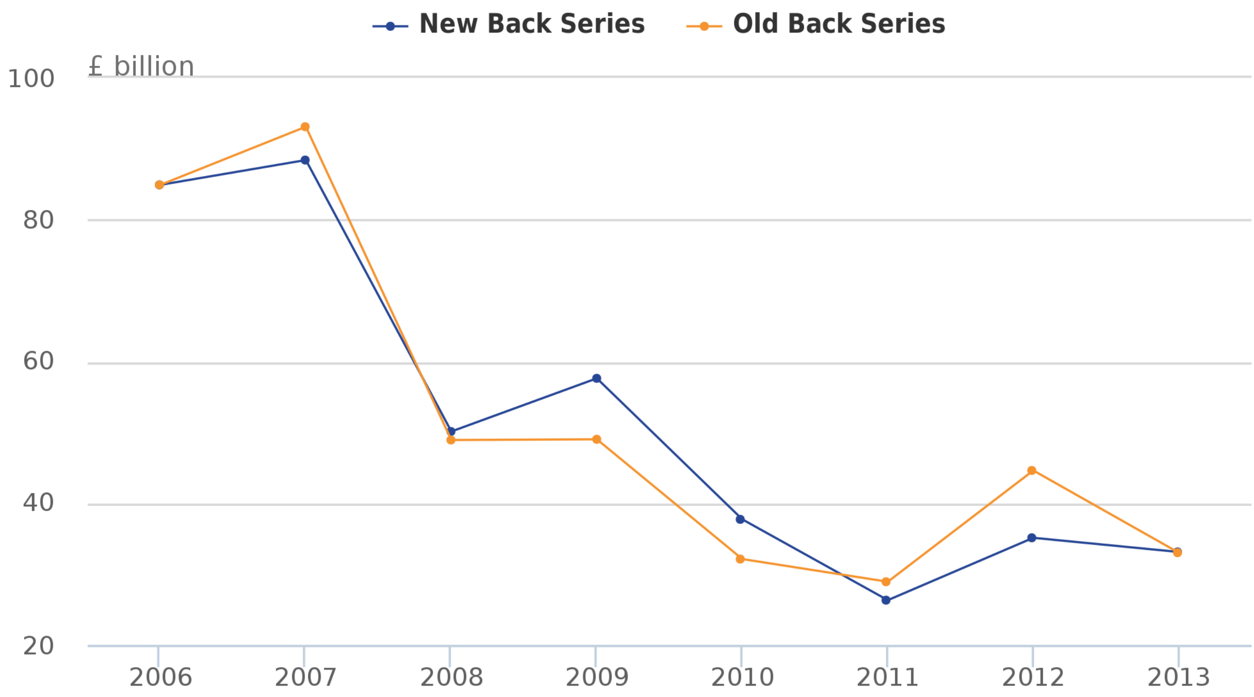


Source: Office for National Statistics

5.4. Impact for FDI flows

The revisions to FDI flows are relatively small compared with the upwards revisions seen in inwards earnings, with absolute average annual revisions of £4.6 billion between 2007 and 2013, or 10.4% (Figure 15). These revisions are broad based geographically. On an industry basis, the largest revisions occur in financial services, due to the upward revisions to earnings and the subsequent impact on the reinvested earnings. These revisions are less pronounced on an aggregate level, as downward revisions to flows in a number of other industries offset the increase.

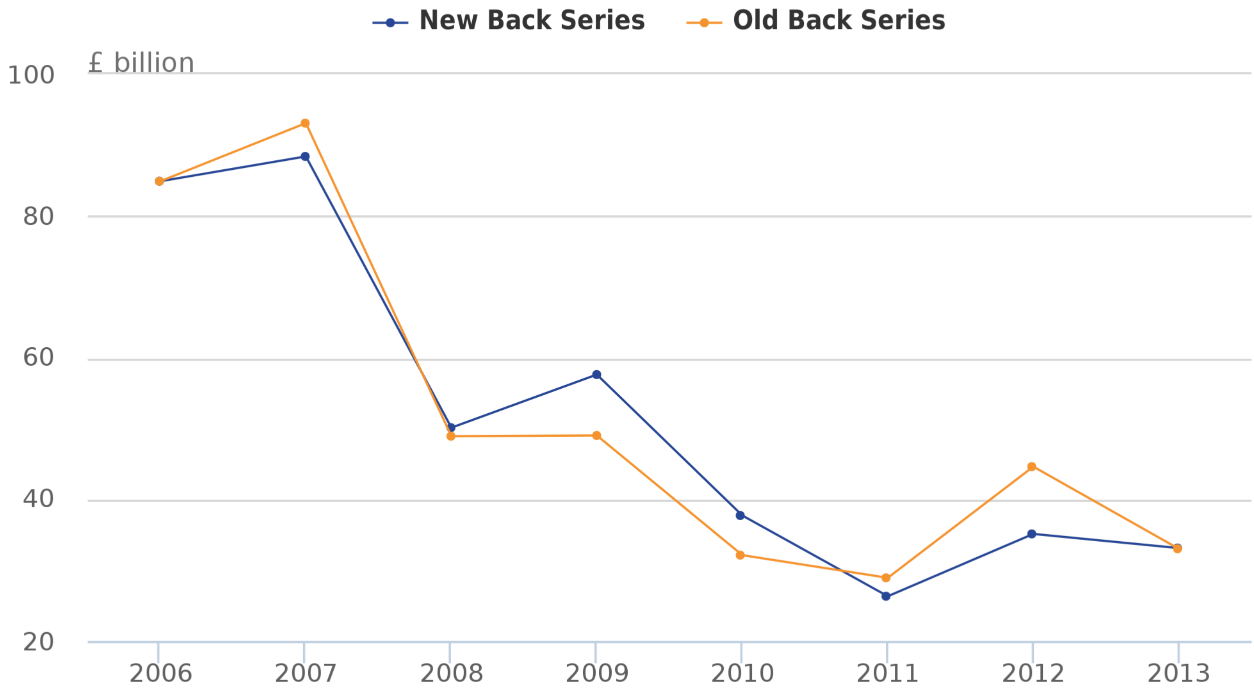
Figure 15: Annual inward foreign direct investment flows, 2006 to 2013



Source: Office for National Statistics

Revisions to outward FDI flows in absolute terms average £6.7 billion a year between 2007 and 2013, or 17.7% (Figure 16). These revisions are broad based geographically. While there were some revisions to financial services, these were notably smaller compared with inward FDI.

Figure 16: Annual outward foreign direct investment flows, 2006 to 2013



Source: Office for National Statistics