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Measuring misalignment: The location of US multinationals' economic activity versus the location of their profits

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Summary

A major international effort – the OECD Base Erosion and Profit Shifting (BEPS) initiative – aims to reduce the extent of misalignment between the profits of multinational groups, and the location of their real economic activity. Recent research using balance sheet data has shown major misalignments, with a number of small jurisdictions capturing a tax base disproportionate to their economic activity, but has also revealed the limitations of available balance sheet data for lower-income countries. This paper uses survey data on the international operations of US-headquartered multinational groups to expand the research to a broader group of host countries (albeit for only one home economy), and confirms major misalignments of profit. A small number of 'profit-haven' jurisdictions are seen to have captured a disproportionate share of total profits, resulting in serious disadvantages for most G20 countries, regardless of income level.

Keywords: multinational tax avoidance; corporate tax reform; formula apportionment; unitary taxation; base erosion; profit shifting; BEPS.

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Acknowledgements

Acronyms

BEA	Bureau of Economic Analysis
BEPS	Base Erosion and Profit Shifting
BRIC	Brazil, Russia, India and China
CCCTB	Common Consolidated Corporate Tax Base
DIE	Deutsches Institut für Entwicklungspolitik (German Development Institute)
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNI	Gross National Income
MNE	Multinational Enterprise
OECD	Organisation for Economic Co-operation and Development
USDIA	US Direct Investment Abroad

Introduction

At the behest of the G8 and G20 groups of countries, the OECD launched its Base Erosion and Profit Shifting (BEPS) initiative in 2013, with the specific aim of reforming international corporate tax rules so that they 'better align rights to tax with economic activity' (OECD 2013: 11).

The BEPS process reflects particular political pressures that arose after the 2008 financial crisis, from both public anger about perceived corporate tax avoidance, and policymaker concern over tax revenue.

In addition, there are longstanding criticisms of the international rules for corporate taxation which date back to their inception in the inter-war years (Picciotto 2013). Conceptually, the major criticism is that the 'separate accounting' approach flaunts basic economics by treating individual companies within a multinational group as if they were distinct, profit-maximising entities. Practically, the major concern is that a serious misalignment may have emerged between the locations of multinational groups' economic activity, and that of their declared profits.

The BEPS Action Plan contains fifteen commitments that together may address some major flaws in the separate accounting approach. However, it has been criticised for failing to give appropriate space to alternatives: in particular, for the dismissal of further attention to profit apportionment methods that have the explicit aim of aligning profits with activity (see e.g. Durst 2013; Picciotto 2012). Nonetheless, one of the fifteen action points may mark an important step in research into this question.

Action 11 commits the OECD to establish baseline findings for the extent of profit misalignment, in order to understand the scale of the problem and to be able to track the progress of the BEPS initiative over time (OECD 2015a). Such an effort will require the collation (and publication) of data on the global distribution of multinational groups' declared profit, and on the location of their broader economic activity.

This would be a significant step forward from the current situation of fragmented data availability – and would also make possible for the first time a full, global analysis of the potential redistribution of the tax base that would be implied by various formulary apportionment approaches. It is not yet clear, however, whether the OECD can find the necessary data to create the BEPS baseline (OECD 2015a). The public comments from both civil society and private sector respondents are (atypically) consistent on the need to collate and analyse the country-by-country reporting that will soon be required (OECD 2015b); but, at the same time, work on Action 13 has narrowed the intended provision of country-by-country reporting to an extent that such collation would be impossible.

Regardless of whether country-by-country reporting data are made available in future, there remains an important question of the current extent, and the specific nature, of profit misalignment. How big are the misalignments that the BEPS initiative seeks to address, and what are the distributional implications – that is to say, which jurisdictions are the main winners and losers in terms of tax base?

A number of empirical studies use corporate balance sheet data for OECD countries, finding support for the hypothesis that international profit shifting in response to tax differentials is statistically and economically significant. Grubert and Mutti (1991), as well as Clausing (2003), provide early evidence for the US; Huizinga and Laeven (2008), Weichenrieder

(2009) and Loretz and Mokkas (2015) present more recent evidence for European multinationals.

Similar evidence for developing countries is lacking, reflecting largely the scarcity of balance sheet data. Analysis of national-level data suggests developing countries may lose three times as much in revenue, relative to their GDP, as OECD countries (Crivelli et al. 2015). One recent study (Cobham and Loretz 2014) used the leading global balance sheet database, Orbis, to assess the misalignment between profits and location of activity, and simultaneously to consider the tax base redistribution that would be associated with apportionment according to various formulae that reflect activity more closely. The results show a clear pattern of misalignment to the benefit of a small number of profit-haven jurisdictions, and to the detriment of lower-income countries in the sample. Coverage of balance sheet data is, however, very poor for developing countries: the lower income countries in the sample are, for most findings, only from Eastern and Central Europe. Once minimum coverage criteria are imposed, most developing countries drop out entirely. In addition, the Orbis data are heavily over-weighted toward Europe compared to North America and Australasia (OECD 2015a).

For that reason we present here a complementary approach. Where Cobham and Loretz (2014) provide results for globally-headquartered multinational groups but with limited host country coverage, the present study uses survey data with much broader host country coverage but for multinational groups from just a single country of headquarters: the United States. The choice of the US is due to the relative ease of data access, but also because of its importance for the global economy – including developing countries.

The paper is structured as follows. Section 1 presents the dataset and outlines the construction of variables. Effective average tax rates are derived and presented, showing both a powerful global trend downwards, but also persistent and substantial cross-country variation.

Section 2 sets out the broad issue: what is the distribution of profit globally, to what extent is it misaligned with measures of economic activity, and has there been a substantial change over time? We construct measures of misalignment, of which the preferred measure shows that misalignment with economic activity of the profits of US-headquartered multinational groups amounts to more than 20 per cent of the total, and – with the exception of the 2008 financial crisis – has grown strongly over time, from a position of very little misalignment as recently as the mid-1990s.

In Section 3 we present analysis of the country patterns of misalignment. We find that tax base losses due to misalignment with fixed factors of economic activity are not closely associated with per capita income levels (contrary to the suggestion from results for a sample of relatively higher-income countries in Cobham and Loretz (2014)). Instead, a small group of high-income jurisdictions have captured increasingly disproportionate shares of profit, while almost all other countries in the sample have lost out – including the majority of G20 members, both high- and lower-income countries.

1 Data

The data used come from the annual survey of (all) US multinational groups carried out since 1983 by the Bureau of Economic Analysis (BEA). This section presents the dataset, and outlines the main variables used in the analysis.

1.1 The dataset

Generally, the US Direct Investment Abroad survey (USDIA) includes ownership by a US investor of at least 10 per cent of a foreign business. Financial and operating data for US multinational companies cover the activities of foreign affiliates and, for some information and years, also their US parent companies.

The survey-based data cover the period between 1983 and 2012, with some changes in variable definition and in other information collected. Most importantly, data up to 2008 include all non-bank US parents and majority-owned foreign affiliates, whereas data for 2009 and forward include all US parents and majority-owned foreign affiliates.

Despite these inconsistencies, it is possible to create the longest possible time series from 1983 to 2012 (while recognising the possibility of an artificial breakpoint due to the introduction of banks). Data on US parents, however, are only available for 1994, 1999, and from 2004 to 2012. In order to examine the complete global pattern, therefore, these are the years of data used in our final sample.

Although the data are gathered through surveys from individual firms, the publicly-available data are aggregated to country- and/or industry-level. We use the country-level aggregation to explore the pattern of tax at this level. The use of country-level data can lead to biases, for example from effective consolidation of underlying profits and losses,[1] which unfortunately we cannot control for or even estimate the magnitude of. Access to firm-level data (currently only provided for approved researchers who are US citizens) could allow future research to assess the implications of these partial aggregations.

The data have been used previously for research. For example, Blonigen et al. (2014) use the confidential, firm-level data to estimate the impact of bilateral tax treaties on investment behaviour of US multinational firms, allowing for differential effects of treaties across sectors that use homogeneous versus differentiated inputs with varying intensity; while Stewart (2014) and Clausing (2012) use the aggregated data to compare the effective corporate rates, and shares of total foreign income and employment, respectively. Furthermore, Keightley and Stupak (2015) used the BEA as one of their data sources to document the large problem of base erosion and profit shifting in the United States and elsewhere.

The data are provided not as a single dataset but in a range of tables, which again differ a little over time.[2] Some information is available only in some periods or years (often the benchmark surveys that take place every five years; the last one was 2009).[3] While merging the data across tables, variables, countries and years, some information is inevitably lost. For example, since selected data are available for around 200 countries and country groups, but income statement data are available only for less than 100 of these, after merging we

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[1] The use of country-level data results in consolidation of underlying profits and losses across companies in a given country. This overall sum hides the underlying heterogeneity. In general, the consolidation of loss-making companies will depress total reported profit, biasing the average effective tax rate upwards, but with the current data we are unable to control for this or even estimate its likely magnitude. Future work by researchers with access to the company-level data should pursue this question.

[2] In the cases of sales and net income, for which we have two separate tables as sources, the information is identical in the two sources - with the exception of some tens of cases for each year between 1983 and 1988. The differences are generally small, and we opt to use the information for net income from income statement tables, because the foreign income tax variable is obtained from the same source; while for sales we take from selected data tables where the other factors of economic activity such as assets are also drawn.

[3] For example, data on various types of assets by countries are available only in the most recent period since 2009, and value added-related measures only since 1997; data on US parents (necessary for a full picture of profit alignment) are also more limited than that for foreign affiliates. Also, for some years (such as 1998), there is an addenda with information for additional variables or countries (such as in 1993 in table TAB30, the addenda includes data on taxes other than income and payroll taxes). We make no or only limited use of the information available only for particular years or countries, but this often very detailed information provides opportunities for further research.

continue working with the latter's less detailed country disaggregation. Finally, where there are negative values of some variables in some years, we input zeros for these observations.[4]

1.2 Measures of profit and economic activity

The BEA data provide us with two main indicators of profits: net income and 'profit-type return', which is available together with other value-added measures since 1997. The BEA methodology describes the latter in the following way.

> Profit-type return is an economic accounting measure of profits from current production. Unlike net income, it is gross of U.S. income taxes, excluding capital gains and losses and income from equity investments, and reflects certain other adjustments needed to convert profits from a financial accounting basis to an economic accounting basis.
> (BEA 2014)

We also construct a third profit measure, gross profit, which adds foreign income taxes to the net income measure. This is our preferred measure, since we are interested in the distribution of declared (taxable) profits.

A further alternative would be to use the gross profit measure, but to follow the construction of profit-type return in excluding income from equity investments – since these are typically returns on investments in other jurisdictions. This approach is of interest to understand the derivation of profitability for US multinational enterprises (MNEs) operating in particular jurisdictions (such as the Netherlands), where much profit is derived from equity investments elsewhere.

As Lipsey (2010) noted, however, in an important assessment of the weaknesses of existing foreign direct investment (FDI) data for understanding the real patterns of global economic activity: 'That definition leads to an understatement of the degree of distortion by excluding income from equity investments, one of the mechanisms for transferring income' (Lipsey 2010: S104).

As such, we do not feel the picture shown by profit-type return is more accurate for the current purpose: ultimately, the income *has* been shifted to, for example, the Netherlands, and so we prefer the gross profit measure which captures this.[5] Future work might usefully explore this point further.

The profit measures, as well as other financial variables, are expressed in US dollars. We use the data from the BEA, reported in current, or nominal, prices. For each year the data are thus in the value of the dollar for that particular year and, for simplicity, we are neglecting inflation as well as exchange rate changes and using the BEA data as they are.

Economic activity is generally thought of as comprising some or all of the following: employment (indicated by employee numbers and/or costs); assets (tangible and/or

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[4]   These observations represent, of the final sample, 7% of observations for net income and for profit-type return; and 3% of observations for foreign income tax. In practice the global results do not differ greatly if we retain the negative values.

[5]   The gross profit measure includes income from equity investments, with the associated drawback that some of the income from equity investments might be counted more than once if there are more layers of ownership in one country, as is common when a company is structured as a holding company. Unfortunately the BEA data do not enable us to allow for this double-counting; the alternative series which excludes equity investment income will substantially understate profit shifting. Again, future research with company-level data might shed some light on the potential magnitude of this issue. A particular concern is around jurisdictions with greater holding company activity, such as the Netherlands, where the profit shifting role may be relatively overstated if equity income is included.

intangible); and sales. The BEA survey captures each of these, to a more or less ideal extent.

For employment, the data straightforwardly include compensation costs (wages) and number of employees.

Recognising that intangible assets are commonly used to facilitate profit shifting, we are reluctant to use the BEA's 'total assets' series, since any misalignment here is likely to understate substantially that with respect to tangible assets. Future work with company-level data may shed further light on this point. The dataset contains information for net property, plant, and equipment. In the absence of a superior alternative, we consider this as tangible assets and call it so henceforth. This is similar to the approach of Government Accountability Office (2008), who refer to this series as 'physical assets'. Data for the US are available only in benchmark years (every five years between 1994 and 2009). In order to address this, we extrapolate the trend for periods in between the benchmark years, and in addition from the period 2004-2009 up to 2012.[6]

There are a number of sales indicators in the data, with varying detail and coverage in terms of years, countries, and types of sales. While future work may explore further the potential to focus on ultimate location and to exclude related-party transactions, we use here the most basic measure: sales of foreign affiliates, without limitation in terms of destinations or sales to affiliated firms. The inclusion here of related-party transactions is likely to bias downwards the eventual estimates of profit shifting, since some of these transactions will be artificially priced for that purpose.[7]

 Again, future work might usefully explore variations here.

1.3 Average effective tax rates and summary statistics

We construct average effective tax rates at the national level, as the ratio of foreign income tax to gross profit. Figure 1 shows the evolution of average effective tax rates for the United States, and for the average of all the other countries (weighted by gross profits). There is a clear downward trend for both, interrupted only briefly by the global financial crisis.

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[6] NB. We use the Stata command *ipolate*. As with any other extrapolation, this rests on assumptions of stability in the trend. Here these may be relatively close to the reality, since the trend of tangible assets is quite consistently growing for both United States (when we have data), as well as for the sum of tangible assets by all affiliates in foreign countries.

[7] Consider, for example, an intra-group transaction chain in which coffee beans are exported from Kenya to the UK, where this is booked as an underpriced sale to a Swiss entity, and an overpriced resale to the UK retail arm. Including intra-group sales will capture the depressed sales value in Kenya, and the inflated one for Switzerland. Excluding them completely, however, would see (final) sales recorded only in the UK, which in this example would be accurate for Switzerland but would further artificially deflate the apparent profit shifting out of Kenya (if sales is used as a measure of economic activity).

Figure 1 Average effective tax rates, US and all other countries
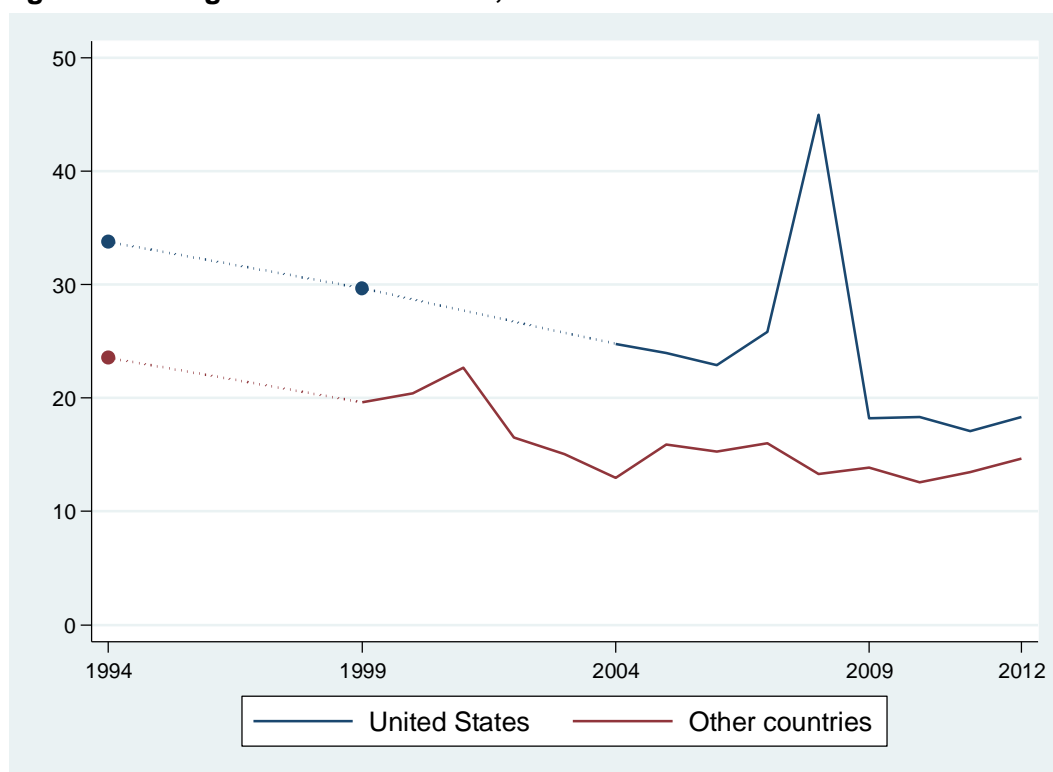
Source: Authors on the basis of the BEA data.

Table 1 presents summary statistics showing the proportion of profits and of each measure of economic activity. In addition to individual indicators of economic activity, we include two combination measures drawn from formulary apportionment measures developed for use with unitary taxation. Unitary taxation is the main alternative to the separate accounting model promoted by the OECD. The latter model seeks to tax each affiliate as if they were separate (profit-maximising) entities, and so faces the technical challenge of seeking to recreate prices for intra-group transactions as if they occurred at arm's length.

The unitary approach starts instead from the view that profits are maximised at the unit of the multinational group, so takes this as the tax base. The technical challenge is then to allocate this base between the various taxing jurisdictions in which the group has operations. While individual US states apply a range of formulae, Canadian provinces have one agreed formula, and the European Commission has developed another for the potential application of unitary taxation among its member states.

The formula used to allocate taxable profit between Canadian provinces is an equally-weighted split between sales and wages. The European Commission (2011) proposes a formula for the Common Consolidated Corporate Tax Base (CCCTB), which is weighted one-third tangible assets, one-third sales, and one-third split equally between compensation costs and (number of) employees. In these ways, the two formulae provide broad measures of economic activity, appropriate for examining BEPS-type profit misalignment. For comparison, we include here a version of the CCCTB formula with all assets (i.e. including intangibles) – labelled CCCTBa, as opposed to CCCTBtg, which includes only tangible assets.

Table 1 also includes the average effective tax rates for individual countries in 2012. Tax rates exhibit a substantial cross-country variation. For example, within Europe in 2012, we observe countries such as Spain and Italy with rates as high as 50 per cent, alongside Luxembourg and the Netherlands with rates of around 1 per cent.

Table 1 Summary statistics, 2012

	Share (%) of net income	Share (%) of foreign income tax	Share (%) of gross profit	Share (%) of profit-type return	Share (%) of tangible assets	Share (%) of assets	Share (%) of sales	Share (%) of employees	Share (%) of wages	Share (%) of CCCTBtg	Share (%) of CCCTBa	Average effective tax rate
Rest of the world	6.7	11.9	7.9	4.4	3	3.6	1.3	1.2	0.5	1.7	1.9	23.5
Argentina	0.1	0.6	0.2	0.3	0.4	0.1	0.3	0.4	0.2	0.3	0.2	42.1
Australia	1	1.3	1	1.2	1.9	1.1	1.1	0.9	1.2	1.3	1.1	19.6
Austria	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	8.6
Barbados	0.1	0	0.1	0.1	0	0.1	0	0	0	0	0	4.9
Belgium	0.5	0.3	0.5	0.5	0.4	0.8	0.8	0.4	0.5	0.5	0.7	11.3
Bermuda	3.9	0	3.3	0.8	0.2	1.9	0.3	0	0	0.2	0.7	0
Brazil	0.5	1	0.6	0.7	1	0.5	1.2	1.7	1	1.2	1	25.9
Canada	3	2.4	2.9	2.9	4.7	2.4	3.9	3.2	2.7	3.9	3.1	12.8
Chile	0.1	0.4	0.2	0.3	0.4	0.1	0.2	0.4	0.2	0.3	0.2	35
China	0.9	1.1	0.9	1.3	1	0.5	1.4	3.8	0.8	1.6	1.4	17.5
Colombia	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	29.8
Costa Rica	0	0	0	0.1	0	0.1	0.1	0.1	0	0.1	0.1	7.5
Czech Republic	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	17.8
Denmark	0.1	0.7	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	50.6
Dominican Republic	0	0	0	0	0	0	0	0.1	0	0	0	33.2
Ecuador	0	0	0	0	0	0	0	0	0	0	0	32.8
Egypt	0.1	0.5	0.2	0.4	0.2	0	0.1	0.1	0	0.1	0.1	42.6
Finland	0			0	0	0	0.1	0.1	0.1	0.1	0.1	
France	0.4	0.9	0.5	0.4	0.6	0.7	1.2	1.3	1.5	1.1	1.1	26.5
Germany	0.6	1.2	0.7	0.9	1.3	1.3	2	1.8	2.2	1.7	1.8	27.6
Greece	0	0	0	0	0	0	0	0	0	0	0	34.9
Honduras	0	0	0	0	0	0	0	0.1	0	0	0	18.8
Hong Kong	0.6	0.3	0.6	0.5	0.2	0.6	0.7	0.3	0.3	0.4	0.5	8.8
Hungary	0.1	0.1	0.1	0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	13.9
India	0.2	0.5	0.3	0.4	0.3	0.2	0.4	2.4	0.6	0.7	0.7	31.7
Indonesia	0.5	1.2	0.6	0.8	0.5	0.1	0.2	0.3	0.1	0.3	0.2	33
Ireland	5.8	0.8	5	5	1.3	2.2	1.9	0.3	0.3	1.2	1.5	2.4
Israel	0.2	0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.1	7.5
Italy	0.1	0.6	0.2	0.3	0.3	0.3	0.7	0.6	0.6	0.5	0.5	48.8
Japan	0.6	2	0.8	1.5	0.6	1.9	1.5	0.9	1.4	1.1	1.5	36.4
Korea, Republic of	0.2	0.3	0.2	0.4	0.2	0.3	0.4	0.4	0.3	0.3	0.3	18.3
Luxembourg	4.6	0.3	3.9	0.3	0	3.2	0.2	0	0.1	0.1	1.1	1.1
Malaysia	0.3	0.4	0.3	0.5	0.3	0.1	0.3	0.4	0.1	0.3	0.2	19.9
Mexico	0.8	1.4	0.9	1.2	1.1	0.7	1.3	3.1	0.7	1.4	1.3	24.1
Netherlands	8.2	1	7.1	1.1	0.5	3.6	1.4	0.6	0.7	0.8	1.9	2.3
New Zealand	0	0	0	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	12.4
Nigeria				1.2	0.6	0.2	0.2	0	0	0.3	0.1	
Norway	1	3.3	1.4	1.3	0.8	0.3	0.3	0.1	0.2	0.4	0.3	38

Table 1 Summary statistics, 2012 (continued)

Panama	0	0	0	0	0	0	0.1	0.1	0	0	0	45.5
Peru	0.1	0.5	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	39.6
Philippines	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.6	0.1	0.2	0.2	18.6
Poland	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.4	0.2	0.3	0.2	21.3
Portugal	0.3			0	0	0.1	0.1	0.1	0.1	0.1	0.1	
Russia	0.2	0.3	0.2	0.4	0.3	0.1	0.3	0.4	0.2	0.3	0.2	17.7
Saudi Arabia	0.1			0.2	0.1	0	0.1	0	0	0.1	0	
Singapore	2	0.5	1.7	1.7	0.7	1	2.4	0.5	0.5	1.2	1.3	4.2
South Africa	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.2	0.2	25.3
Spain	0	0.3	0.1	0	0.3	0.3	0.4	0.5	0.4	0.4	0.4	59.2
Sweden	0.2	0	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	1.4
Switzerland	2.7	0.7	2.4	1.7	0.3	1.3	1.7	0.3	0.5	0.8	1.1	4.4
Taiwan	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.2	17.9
Thailand	0.2	0.5	0.3	0.5	0.3	0.1	0.4	0.5	0.1	0.3	0.3	28.2
Turkey	0			0	0	0	0.1	0.1	0.1	0.1	0.1	
United Arab Emirates	0.1			0.8	0.1	0.1	0.2	0.1	0.1	0.1	0.1	
United Kingdom	3.1	2.6	3	2.6	2.7	8.9	3.9	3.5	3.7	3.4	5.5	13.4
United States	48.4	58.7	50	60.7	71.4	59.8	64.7	65.6	76.2	69	65.1	18.3
Venezuela	0.2	0.3	0.2	0.3	0.1	0.1	0.1	0.2	0.1	0.1	0.1	22.7
Total (USD millions, thousands of employees)	2059986	380860	2440846	1397359	4483430	53725972	16884396	35226	2322307			

Source: Authors on the basis of the BEA data. Note: series 'CCCTBa' shows the correlation of profits with a CCCTB formula using total assets; whereas 'CCCTBtg' replaces this with tangible assets, per the Commission's (2011) proposal.

Throughout the paper, we limit our findings to individual countries where data are available at the country level, and to one residual group that contains the rest of the world. Unfortunately the data availability is skewed against lower-income and African countries. When we employ the World Bank's classification according to regions and income groups, valid as of July 2015,[8] there are no low-income countries, six lower-middle income countries (Egypt, Honduras, India, Indonesia, Nigeria and Philippines) and only Egypt, South Africa and Nigeria (with limited data) from Africa with data for 2012 to be included in the presented results. While the data in theory have global coverage, the limited range of US FDI in smaller and lower per capita income economies is likely to give rise to greater data suppression here. The resulting limited availability of data for some groups of countries leads us to present the results for individual countries only, rather than by groups.

The sample covers activity generating gross profits of around $2.44 trillion, or 3.3 per cent of the recorded world GDP in 2012 of $74 trillion (World Bank's *World Development Indicators*).

It is already clear that profit is not well aligned with many measures of activity – for example, China's share of employees is nearly four times its share of gross profit; Italy's share of sales

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[8]   Each year the World Bank revises analytical classification of the world's economies based on estimates of gross national income (GNI) per capita for the previous year. As of 1 July 2015, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of $1,045 or less in 2014; middle-income economies are those with a GNI per capita of more than $1,045 but less than $12,736; high-income economies are those with a GNI per capita of $12,736 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of $4,125.

is three times its share of gross profit; Luxembourg's share of gross profit is nearly eighty times its share of employment costs. This misalignment is the focus of this paper.

1.4 Exclusion of 'mining' affiliates

Data on foreign income taxes do not distinguish between standard income taxes, and payments that reflect natural resource rents. As such, these rents have the potential to skew the analysis – artificially suggesting that resource-rich countries receive a share of (gross) profit that is disproportionate to their actual economic activity. For this reason, we explored taking advantage of the country-by-industry disaggregation to eliminate from national averages the data relating to affiliates operating in the BEA's 'mining' category, which covers oil and gas extraction, coal mining, metal ore mining, non-metallic mineral mining and quarrying, as well as support activities for mining.

The sub-category of oil and gas extraction is responsible for most of the mining category in 2012 in terms of affiliates' net income and sales. There are data available at this level of detail for years 1994, 1999, and 2004-2012.[9] The mining category is available between 1999 and 2012, but not for 1994. In 1994 the petroleum category is available, but does not include mining (which stands as a separate category for parents, with no data for affiliates). Since the petroleum industry is responsible for a large share of the mining category, and no better alternative is available, we were required to treat the petroleum category in 1994 in the analysis below identically to the mining category since 1999.

Overall we differentiated between eight industries, namely mining; manufacturing; wholesale trade; retail trade; information; finance and insurance; professional, scientific, and technical services; and other industries. In 1994 the data did not distinguish the two industries of retail trade and information, and so we worked with only six industries.

An important complication here relates to data suppression. Since the reported data are suppressed when it might be possible to identify an individual multinational group, there are inevitably more suppressions when dealing with country-industry data than with country aggregates alone. As a result, the mining category is sometimes suppressed when national-level data are available. Where possible, we generated national aggregates, net of mining. Where mining data are suppressed, we created the broadest possible national aggregate which excludes mining, by eliminating the total of all suppressed industries (i.e. mining plus other suppressed industries).[10]

For each country and year observation, we eliminated the value for the suppressed industries across all variables for consistency, although this results in a small number of additional observations where estimates are not possible.[11] For countries where data are suppressed, and only reported in (e.g. regional) aggregates, this additional industry suppression is not possible, and so the 'residual' reported in the results below does including mining – and so for the reasons above may show an artificially high level of positive profit misalignment.

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[9]   From 2000 to 2003, data are absent for US income taxes paid by parent companies, and therefore it is not possible to include these years in the analysis.

[10]   Again, we input zeros where negative values of some variables were implied by this elimination of suppressed values (this is the case for four observations only).

[11]   Specifically, 9 observations in the case of net income, of which 5 relate to Nigeria; 45 observations for foreign income taxes, with the most frequently unavailable countries being Nigeria, Saudi Arabia and United Arab Emirates; 6 observations for assets (half of these for Barbados); 8 observations for sales (half of these for Egypt and Nigeria); 3 observations for employees (2 of these for Barbados); and 2 observations for wages (Barbados and United Arab Emirates).

Table 2 shows the proportion of the full sample that would be retained after performing the necessary exclusions, across the main variables. Across the sample years, this results in excluding around 20 per cent of the total, by profit; less in terms of variables reflecting activity. In 2012, the remaining sample relates to $2.013 trillion of gross profit, 82 per cent of the recorded total of $2.440 trillion.

Table 2 Sample coverage (% of full sample, 2012) after mining sector exclusion

	Net income (%, $US m)	Foreign income tax (%, $US m)	Gross profit (%, $US m)	Total assets (%, $US m)	Sales (%, $US m)	Employees (%, thousands)	Wages (%, $US m)
1994	93	92	92	91	89	97	95
1999	92	92	92	95	93	93	94
2004	85	87	85	93	95	95	97
2005	79	87	80	91	93	94	95
2006	80	86	81	89	92	92	95
2007	76	87	78	90	91	92	95
2008	71	79	73	88	89	91	92
2009	79	89	81	91	96	95	97
2010	78	87	80	91	96	96	96
2011	82	86	83	90	96	94	96
2012	81	89	82	91	96	96	97
Totals after exclusion	1667439	338810	2013160	49136152	16223026	33850	2253733
Memo: Full sample totals	2059986	380860	2440846	53725972	16884396	35226	2322307

Source: Authors on the basis of the BEA data.

As the shares of tax relative to gross profit demonstrate, including mining – rather than performing this exclusion process - can result in substantial distortion, in particular in creating a possibly artificial appearance of profit shifting into major resource-rich economies, since the resource rents in question tend to be large in relation to the standard corporate income tax seen elsewhere.

On the other side of the scales, however, we weigh the very large loss of data; the fact that our exclusions necessarily include industries beyond mining, in an inconsistent way across countries, making direct comparison problematic; and the additional issue that our residual category includes mining, and so cannot be compared equivalently to the country-specific results. Finally, genuine profit shifting does occur in the resource sector – anecdotally, it may be the most widely abusive sector – so the overall argument for excluding this sector from a study of profit misalignment, *even if it could be done perfectly,* is unsatisfactory at best.

On balance, the full sample is preferred and this forms the basis for the remainder of the paper.[12]

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[12]   We are grateful to Kim Clausing for valuable discussion on this point.

2 Economic activity and global misalignment

Broadly, misalignment can be conceived of in two main ways: either the relative intensity of the distortion, or in terms of the absolute scale of what is misaligned.

The simplest way to capture the intensity of distortion depends upon the knowledge that perfect alignment of profits with economic activity would give rise to a perfect correlation (that is, of 1) between the series. A correlation of -1 would, equivalently, imply perfect misalignment (e.g. all the activity in one jurisdiction, and all the taxable profit in another).

As such, we can show misalignment simply as the correlation of factors of economic activity with gross profit across countries, and over time. Figure 2 shows just this. As well as the correlations relating to profit misalignment with each individual factor of economic activity, we include two multiple-factor measures discussed above (the Canadian and CCCTB).

Figure 2 Profit misalignment as relative intensity of distortion
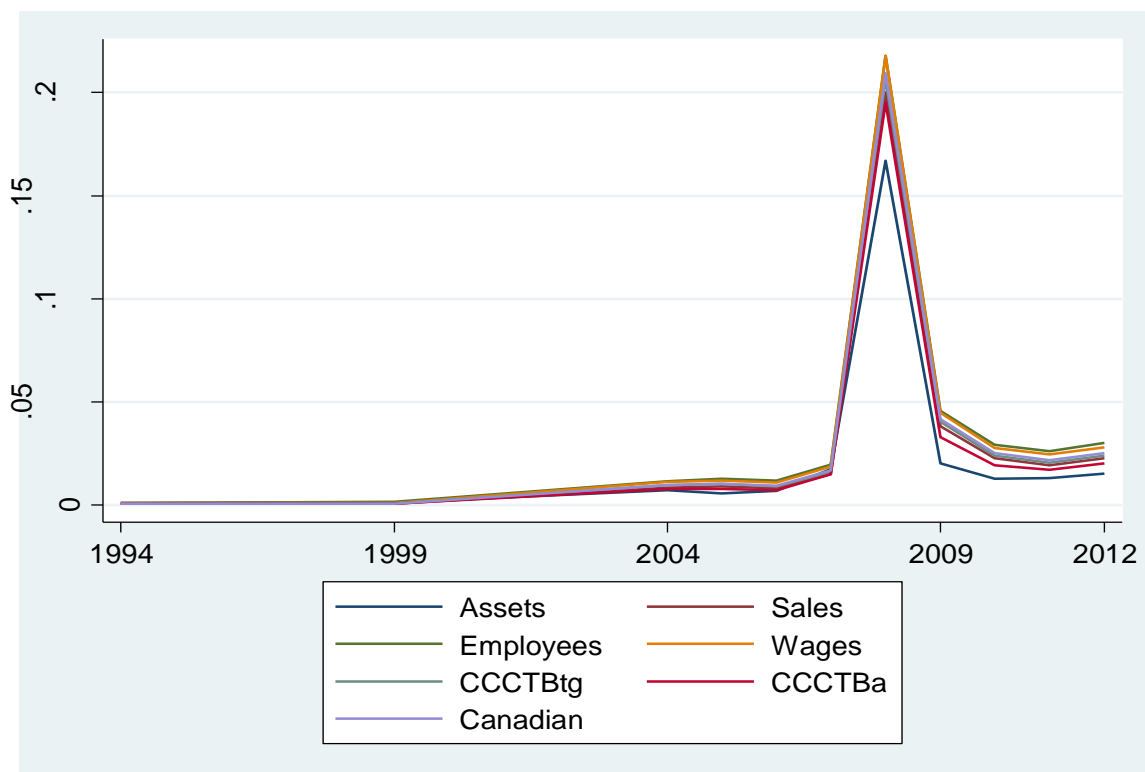
Source: Authors on the basis of the BEA data.

Note: series 'CCCTBa' shows the correlation of profits with a CCCTB formula using total assets; whereas 'CCCTBtg' replaces this with tangible assets, per the Commission's (2011) proposal, and is used in the rest of the paper.

Figure 2 shows global profit misalignment of US MNEs over time, in terms of correlations between profit and activity measures. Since a value of 1 implies perfect correlation, we define misalignment as (1 minus correlation). Misalignment as recently as the mid-1990s is near zero – suggesting that it is only in the last two decades that BEPS has become a significant problem. The extent of deviation from perfect correlation appears small, on any measure, even if the post-crisis level and trend are above those of the pre-crisis period.

Co-movement across all the measures implies that misalignment has developed in much the same way in relation to any of the common indicators of economic activity. In addition, the

relative ranking of misalignment among the various measures of economic activity is broadly consistent – although closer inspection reveals that misalignment with respect to sales has become a more important feature over time.

The financial crisis caused a spike in misalignment centred on 2008, although this presumably reflects the impact of widespread losses rather than a particular growth in BEPS activity. (Again, future research using company-level data should explore the precise impact on country-level results of individual company losses.) Aside from this spike, there is a common pattern since the mid-1990s of a growing trend towards misalignment. The post-crisis rebound has returned misalignment levels to roughly their pre-crisis level by 2012; more recent data will be needed to explore whether or not the trend of growing misalignment has since been reversed by greater public pressure and tax authority scrutiny.

The second type of misalignment measure reflects the scale of the distortion: in effect, how much taxable profit is in the 'wrong' place. The picture here shows that the relatively small reductions in correlation seen in Figure 2 are actually associated with large absolute misalignments (e.g. the correlation changed by about 0.2 in 2008, but this is associated with the near-doubling of the misalignment as estimated below).

This can be calculated as the sum of either the (positive) 'excess' profits recorded in jurisdictions where there is not concomitant economic activity; or equivalently the sum of the (negative) 'absent' profits from jurisdictions with activity.

The following formula shows how we estimate the profit for a jurisdiction – if the result is negative, we call it excess profit (since alignment would require its removal); if the result is positive, we call it missing profits.

$$
\begin{aligned}
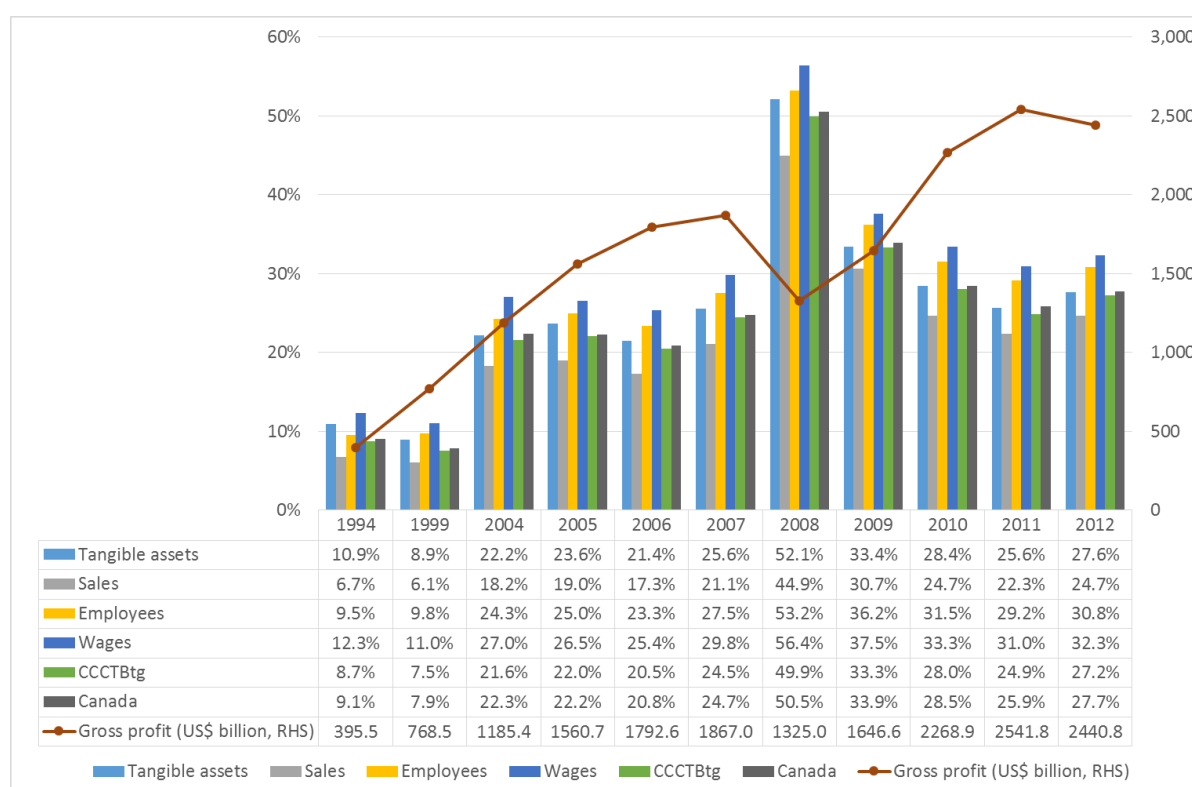\textit{Estimated profit} \\
= \textit{Share of economic activity} * \textit{Total global gross profit} \\
- \textit{Actual gross profit}
\end{aligned}
$$

Figure 3 shows the sum of excess profits by various measures of economic activity – that is, the total value of US MNEs' additional taxable profits that would need to be declared instead in the jurisdictions that appear to lose out, in order to be aligned with their economic activity (which would lead to the correlation discussed above to be 1).

Misalignment by this measure grows over the period from roughly 5-10 per cent of total gross profit in the 1990s, to around 15-25 per cent in the 2000s pre-crisis, through an artificial maximum of around 50 per cent during the sharp profit fall in 2008, and broadly in the range of 25-30 per cent since 2009. In other words, the crisis, and measures taken in the immediate years after it, does not appear to have reversed the sharp growth in misalignment since the 1990s.

As with the correlation-based misalignment measures, the ranking is broadly consistent over time: the greatest misalignment among the most fixed components of activity (wages and employees, followed by tangible assets); the least misalignment among the components with the most easily manipulable location – sales. (Tangible assets become less powerfully misaligned than employees over the sample period.) The roughly midway extent of misalignment by tangible assets, compared to other activity measures, is responsible for the consistently close values of the CCCTB and Canadian measures, despite their different formulae.

Figure 3 The extent of profit misalignment (% of gross profits)

	1994	1999	2004	2005	2006	2007	2008	2009	2010	2011	2012
Tangible assets	10.9%	8.9%	22.2%	23.6%	21.4%	25.6%	52.1%	33.4%	28.4%	25.6%	27.6%
Sales	6.7%	6.1%	18.2%	19.0%	17.3%	21.1%	44.9%	30.7%	24.7%	22.3%	24.7%
Employees	9.5%	9.8%	24.3%	25.0%	23.3%	27.5%	53.2%	36.2%	31.5%	29.2%	30.8%
Wages	12.3%	11.0%	27.0%	26.5%	25.4%	29.8%	56.4%	37.5%	33.3%	31.0%	32.3%
CCCTBtg	8.7%	7.5%	21.6%	22.0%	20.5%	24.5%	49.9%	33.3%	28.0%	24.9%	27.2%
Canada	9.1%	7.9%	22.3%	22.2%	20.8%	24.7%	50.5%	33.9%	28.5%	25.9%	27.7%
Gross profit (US$ billion, RHS)	395.5	768.5	1185.4	1560.7	1792.6	1867.0	1325.0	1646.6	2268.9	2541.8	2440.8

Source: Authors on the basis of the BEA data.

3 International distributional implications

Of particular interest is the extent to which there are systematic distributional implications from misalignment. Does it result in overall lower tax payments by US MNEs? Which jurisdictions lose out? Which jurisdictions 'win', and by how much? Among countries that lose out, are the effects broadly comparable at different levels of per capita income?

3.1 Tax payments and misalignment

We follow the second approach to misalignment from Section 2, since this allows us to assess the distributional implications of misalignment at national level. Full alignment with economic activity requires that gross profit shares (the proportion of all US MNE gross profit) in a given jurisdiction match the share of US MNE economic activity. We calculate the ratio of these shares and multiply it by actual gross profit in 2012 to arrive at potential gross profit implied by the misalignment, which could be higher (or lower) than the actual gross profit. From this we subtract the actual gross profit to arrive at the additional gross profit (positive or negative) that would be declared, in the presence of full alignment.

$$
\begin{aligned}
Additional\ gross\ profit \\
= \frac{Share\ of\ economic\ activity}{Share\ of\ gross\ profit} * Actual\ gross\ profit - Actual\ gross\ profit \\
= Actual\ gross\ profit \left(\frac{Share\ of\ economic\ activity}{Share\ of\ gross\ profit} - 1 \right)
\end{aligned}
$$

Potential additional tax payments are calculated as the product of this additional gross profit and the average effective tax rate of the country in question. The latter is the ratio of actual tax payments to actual gross profit.

$$Additional\ tax\ payments = Additional\ gross\ profit * \frac{Actual\ tax\ payments}{Actual\ gross\ profit}$$

$$= Actual\ tax\ payments \left(\frac{Share\ of\ economic\ activity}{Share\ of\ gross\ profit} - 1 \right)$$

Since the country-level data aggregate both profitable and loss-making operations, note that the average tax rate calculated need not equate precisely to the average rate paid by profitable businesses only (which would likely in reality have lower effective tax rates than those reported here because of the higher tax base due to the absence of the consolidation of losses of other companies – so that while the rates calculated and used here are below statutory rates in most cases, for weak economies such as that of Spain in 2012 the reverse holds). In addition, this is a static analysis only, which cannot take account of behavioural changes were full alignment to occur – for example, in making more intense both the lobbying for lower tax rates, and the degree of competition for the location of investments or real economic activity. It is also important to note that real economic activity is likely to be substantially less elastic to changes in taxation than financial factors (Saez et al. 2012). Overall, these estimates should be treated as indicative rather than precise.

Additional gross profits and additional tax payments are then calculated for the six definitions of economic activity. Those countries that exhibit lower shares of economic activity than of gross profit, we label as 'excess-profit' countries; those with higher shares of economic activity than of gross profit, as 'missing-profit' countries.

Table 3 shows additional gross profits (the 'excess profit' measure), rising in absolute terms from around $25 bn-$50 bn in 1994, to around $600 bn-$800 bn in 2012, all expressed in current dollars.[13] The broader measures of the CCCTB and Canadian formula provide a core estimate of misaligned profit, rising from $35 bn in 1994 to $670 bn in 2012.

Table 3 also shows average effective tax rates of the two groups of countries, which are substantially lower for excess-profit countries. Note however that the difference in rates is lower post-crisis (6-8 percentage points, compared to 11-14 in the pre-crisis 2000s), while misalignment remains broadly stable after 2009.

A possible interpretation of these patterns is that the sharp rise in misalignment after the 1990s disciplined jurisdictions with high effective tax rates, driving down the differential. If such a response were intended to reduce the extent of misalignment (i.e. if 'high tax' countries chose to cut rates in order to grow the base), it has been almost completely ineffectual – at least in aggregate.

The immediate impact of the crisis in 2008 is notably different too. In missing-profit jurisdictions, a higher proportion of losses among affiliates covered is presumed to result in artificial increase of the *national* average effective rate; while in excess-profit jurisdictions, no such effect on the rate is noted.

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[13]   Note that adjusting for inflation would reveal a flatter, real terms trend over time.

Table 3 Additional gross profits, US$ m

	Excess profit, US$ m								Excess profit	Missing profit
	Tangible assets	Assets	Sales	Em-ployees	Wages	CCCTBtg	CCCTBa	Canada	Average tax rate	Average tax rate
1994	-42985	-33204	-26657	-37564	-48496	-34564	-31046	-35792	0.23	0.33
1999	-68187	-48977	-46516	-75032	-84596	-57944	-50087	-60339	0.18	0.29
2004	-262862	-189187	-216095	-287553	-320635	-255823	-226811	-264771	0.11	0.25
2005	-368345	-234593	-296021	-389837	-413684	-344078	-294958	-346553	0.11	0.24
2006	-383870	-242332	-309946	-418556	-455081	-367334	-315502	-373624	0.12	0.23
2007	-477370	-336532	-393963	-513618	-556056	-457235	-403267	-461661	0.11	0.25
2008	-690200	-544686	-595311	-705200	-747502	-660961	-611852	-668908	0.12	0.41
2009	-550349	-370018	-504802	-595767	-618240	-548290	-464671	-558388	0.11	0.19
2010	-645302	-456286	-559705	-714955	-756646	-636101	-558179	-645850	0.1	0.18
2011	-651489	-455850	-567095	-741386	-786824	-631768	-569084	-657281	0.11	0.17
2012	-673528	-460091	-602293	-752913	-788369	-663815	-585539	-676674	0.11	0.19

Source: Authors on the basis of the BEA data.

The two panels of Table 4 show estimates of, respectively, the difference in tax payments for excess-profit and for missing-profit countries, were gross profits to be fully aligned with one of the six measures of economic activity.

The estimate of excess tax revenue received in 2012 ranges from $25 bn to nearly $80 bn; the estimate of missing tax revenue is of course higher, ranging from around $80 bn to $160 bn. The difference between the two ranges – i.e. roughly $50 bn to $80 bn – is the implied revenue gain of US multinationals and their shareholders, at the expense primarily of missing-profit jurisdictions worldwide. The revenue gains of excess-profit jurisdictions can be thought of as providing an estimate of the cost of bribing them into cooperative behaviour. Note also that the different economic activity measures provide quite different implied revenue gains for missing-profit jurisdictions – including the CCCTB and Canadian formulae – because while the scale of misalignment is similar for the latter two options, the distributional implications are quite different (and differences in tax rates lead to this showing large differences in implied revenue effects.

Table 4 Additional tax payments

a. Excess profit

	Tangible assets	Assets	Sales	Employees	Wages	CCCTBtg	CCCTBa	Canada	Average tax rate
1994	-8054	-8023	-5180	-7457	-10062	-6370	-6198	-7063	0.23
1999	-8468	-9059	-5688	-9993	-11774	-6404	-6239	-7526	0.18
2004	-17450	-24674	-18289	-25963	-31614	-20280	-21716	-24007	0.11
2005	-27286	-28922	-25657	-34413	-38564	-27181	-26933	-30571	0.11
2006	-30094	-33953	-30390	-39335	-47234	-31920	-32888	-37329	0.12
2007	-33260	-44473	-36652	-43696	-54233	-37431	-39809	-43464	0.11
2008	-71040	-76265	-69462	-76159	-87236	-72062	-73724	-78012	0.12
2009	-41973	-41715	-46542	-51827	-58493	-46436	-42746	-51812	0.11
2010	-43148	-46392	-49265	-58041	-66821	-50406	-48922	-56767	0.1
2011	-52048	-59245	-58662	-69601	-80378	-57777	-59406	-66864	0.11
2012	-51294	-59885	-60956	-68436	-78383	-59130	-60661	-67451	0.11

b. Missing profit

	Tangible assets	Assets	Sales	Employees	Wages	CCCTBtg	CCCTBa	Canada	Average tax rate
1994	14381	10390	9306	12590	16399	11767	10275	12296	0.33
1999	22519	14079	15194	25414	26237	19237	16062	19510	0.29
2004	65780	46007	55006	72001	79650	64309	56745	66383	0.25
2005	86458	59824	68977	87926	98085	80184	70513	81991	0.24
2006	85360	57278	70856	95193	104552	82694	73015	86221	0.23
2007	121592	102547	102808	129567	147193	118732	111024	123021	0.25
2008	311909	267771	272780	305309	342349	300834	286043	307227	0.41
2009	102307	63249	94387	124877	120333	104978	88353	106654	0.19
2010	116876	81956	106731	137699	146425	120681	106476	125302	0.18
2011	108992	82237	102675	143399	141978	113996	104308	119671	0.17
2012	126297	84048	119670	161215	158732	132558	117141	136982	0.19

Source: Authors on the basis of the BEA data.

The losses for missing-profit jurisdictions have not, in the aggregate, risen to the extent that misalignment has increased – because the fall in average effective tax rates means that the implied loss per dollar of gross profit shifted out has also fallen.

A simple comparison suggests that total losses are not inconsistent with the spot estimate by IMF researchers Crivelli et al. (2015), that base erosion and profit shifting by all multinationals (not only those headquartered in the US) might result in a worldwide 2012 loss of around $600 bn. The IMF *Coordinated Direct Investment Survey* records the US as the source, in 2012, of around 16 per cent of the outward FDI stock (roughly $4.4 trillion out of a global total of $27.8 trillion). Extrapolating crudely upwards on the assumption that non-US multinationals display the same propensity to shift profits, alignment with the CCCTB measure of economic activity would imply tax losses due to missing profits of roughly $650 bn.

3.2 Static revenue impact: the winners and losers

We turn, finally, to consider results at the level of individual countries. For simplicity we present results for a single measure of economic activity only at this stage, and we choose the CCCTB formula basis as the broadest combination of types of economic activity. Annex 1 contains the full results for 2012, so alternative bases can be compared.

Table 5 shows the relative scale of the major excess-profit and missing-profit jurisdictions. In the former, panel (a) shows that more than a fifth of excess profit cannot be disaggregated from the residual 'Rest of the World' category – jurisdictions which are not fully and individually accounted in the 2012 BEA data. Of the remainder, just four jurisdictions with tax rates of 2 per cent or below account for more than 90 per cent of the misaligned profit: the Netherlands, Ireland, Bermuda and Luxembourg. A further 10 per cent is due to Switzerland and Singapore, which have effective tax rates of around 4 per cent; and an additional 1 per cent of misaligned profits is due to Hong Kong, with an effective tax rate of 9 per cent. This is in line with the existing literature on international profit shifting, which indicates that the corporate tax base is sensitive to tax rate differences across countries (de Mooij and Ederveen 2008).

Table 5 Top ten excess-profit and missing-profit jurisdictions

a. Excess profit

	Additional gross profits, $ bn	Percentage of current gross profits	Additional tax payments, $ bn	Average effective tax rate	Share of global excess profits	Share of global excess profits (individual countries only)
Rest of the world	-151.2	-78%	-35.5	23%	23%	
1 Netherlands	-151.8	-88%	-3.5	2%	23%	30%
2 Ireland	-93.6	-77%	-2.2	2%	14%	18%
3 Luxembourg	-93.6	-97%	-1.0	1%	14%	18%
4 Bermuda	-76.1	-95%	0.0	0%	11%	15%
5 Switzerland	-38.5	-67%	-1.7	4%	6%	8%
6 Norway	-22.0	-67%	-8.4	38%	3%	4%
7 Singapore	-13.7	-32%	-0.6	4%	2%	3%
8 Indonesia	-7.3	-51%	-2.4	33%	1%	1%
9 Hong Kong	-3.9	-28%	-0.3	9%	1%	1%
10 Denmark	-2.8	-50%	-1.4	51%	0%	1%
Memo: All other individual countries	-9.3	-31%	-2.1	20%	1%	2%

Memo refers to Venezuela, Egypt, Barbados, Israel, Malaysia, Peru and Sweden. Memo values are sums except for percentage of gross profits and tax rate, which are unweighted averages.

Source: Authors on the basis of the BEA data.

b. Missing profit

	Missing gross profits, $ bn	Percentage of current gross profits	Missing tax payments, $ bn	Average effective tax rate	Share of global missing profits	Share of global missing profits (ex. US)
United States	463.0	38%	84.8	18%	71%	
Germany	25.8	154%	7.1	28%	4%	14%
Canada	23.5	33%	3.0	13%	4%	13%
China	15.0	65%	2.6	17%	2%	8%
Brazil	14.3	98%	3.7	26%	2%	8%
France	13.9	110%	3.7	27%	2%	7%
Mexico	13.7	64%	3.3	24%	2%	7%
India	11.4	184%	3.6	32%	2%	6%
United Kingdom	9.2	12%	1.2	13%	1%	5%
Italy	8.6	187%	4.2	49%	1%	5%
Spain	8.2	496%	4.9	59%	1%	4%
Memo: All other individual countries	41.5	103%	10.4	24%	6%	22%

Memo refers to Australia, Japan, Poland, Chile, Argentina, South Africa, Philippines, Korea Rep., Belgium, Russia, Czech Rep., New Zealand, Hungary, Panama, Thailand, Greece, Honduras, Taiwan, Costa Rica, Austria, Ecuador, Dominican Rep. and Colombia. Memo values are sums except for percentage of gross profits and tax rate, which are unweighted averages.¨
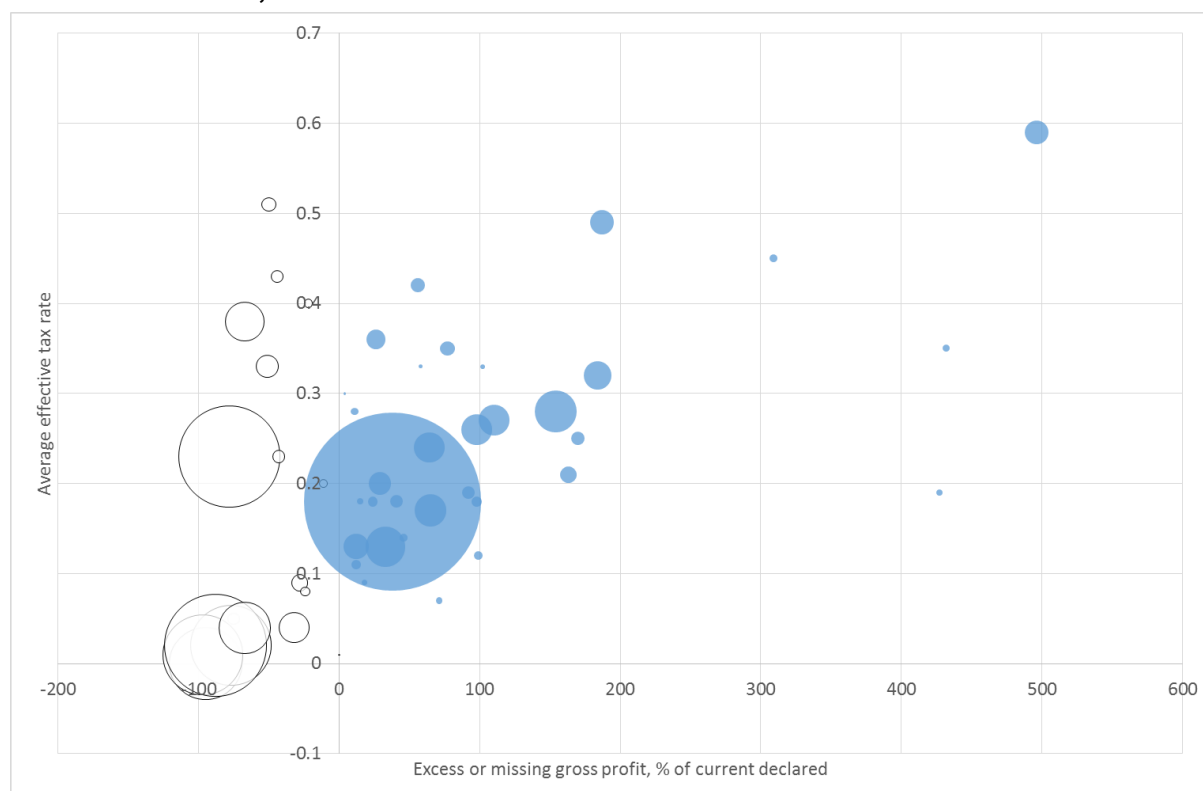
Source: Authors on the basis of the BEA data.

The other countries identified in the top ten are not recognised in the same category: Norway, Indonesia and Denmark each exhibit effective tax rates over 30 per cent. For the first two, it is possible that natural resource activity may play a part in inflating the apparent share of gross profit. In the case of Norway, which accounts for the major share, the year 2012 in particular is clearly anomalous with a major jump in gross profits. Further investigation is needed in this and the remaining cases, ideally with company-level data.

In panel (b), three features stand out. First, as expected for US-headquartered MNEs, the US is the biggest loser by far, accounting for more than 70 per cent of the total gross profit that is misaligned away from the location of the real economic activity that gave rise to it. Second, the range of major economies is broadly represented – from the BRICs to leading OECD countries. Third, the missing profit is in some extreme cases greater than that which remains – by a smaller margin in the cases of India and Germany, for example, and by a factor of four in the case of Spain and some smaller economies.

Finally, Figure 4 shows missing and excess profit against the average effective tax rate, where bubble size indicates the total value of gross profit misaligned in each case. Excess profits are shown as negative and missing profits as positive – that is, these are the directions of adjustment were alignment to be imposed on the current position. The dominance of a small number of excess-profit jurisdictions (those with tax rates near zero, and excess profit near -100 per cent, i.e. most of their declared profit) is confirmed. The US is the largest loser in dollar terms, but many countries are missing higher shares of reported profit.

Figure 4 Intensity of profit misalignment (% of current declared gross profits), and effective tax rates, 2012

Source: Authors on the basis of the BEA data.

Negative bubbles (indicated in white) show excess-profit jurisdictions where misalignment results in artificially high profits. Positive bubbles (in blue) show missing-profit jurisdictions where misalignment artificially reduces declared profits. Bubble size reflects dollar value of misaligned profit.

Annex II provides some data on total tax revenue and on major areas of public expenditure, to support comparisons of the relative importance of the tax revenue potentially at stake due to profit misalignment of US MNEs alone.

4 Conclusions

This first analysis of global misalignment patterns in the profits of US multinational groups is largely descriptive, but sheds new light on the picture. Three main findings stand out. First, in contrast to some previous literature, it appears that countries at all income levels are losing out to profit shifting, compared to the taxable profits they could expect, given the current pattern of economic activity and a scenario in which the OECD BEPS aim of aligning profits with economic activity were actually to be achieved. There is great variation among countries, however, both in terms of the absolute value of losses and their proportional importance.

Second, the majority of missing profit from jurisdictions where real activity takes place ends up in just a few jurisdictions with near-zero effective tax rates – the Netherlands, Ireland, Bermuda and Luxembourg are the most important by far, and with Singapore and Switzerland account for almost the entirety of profit shifting that can be allocated to individual jurisdictions.

Third, the issue is of first-order importance in terms of the world economy. The preferred spot estimate for shifted profit in 2012 uses the European Commission's proposed formula for economic activity, and amounts to $660 bn, 27 per cent of US multinationals' gross profit or approximately 0.9 per cent of world GDP. Depending on the relative scale of profit shifting among non-US multinationals, it is feasible that the issue reaches the accounting materiality threshold of 5 per cent in respect of global economic accounts.

In addition, the level of profit shifting by US multinationals has been broadly stable from 2010 to 2012 (post-crisis), and at a level notably higher than that which prevailed pre-crisis in the early 2000s (which was itself sharply higher than that of the 1990s). This is despite a substantial narrowing of the effective tax rate differential between missing-profit and excess-profit jurisdictions, although tax rates do appear to be closely correlated with the resulting misalignments of declared gross profit.

There are important caveats. Most obviously, the analysis relies on the public BEA data, which are aggregated at the national level and subject to many and varying suppressions. Further investigation of many specific points is needed by researchers with access to the full company-level data, and also on the general question of how aggregation of losses and profits within each country affects the findings. Additional work with balance sheet data may shed further light on the representativeness, or otherwise, of US MNEs for global FDI, which at this stage remains unclear. Finally, the limitations of a static analysis are clear, and the behavioural responses to full alignment are likely to be substantial.

Future research with the current data should explore in more detail the changing patterns over time (for example, the emergence of greater misalignment with respect to sales than to assets; the industry-specific patterns, including around mining; the roles of specific individual jurisdictions; and falling average effective tax rates).

This analysis also exposes, however, the paucity of high quality data with which to assess either the scale of base erosion and profit shifting, or the progress of the OECD BEPS initiative designed to curtail these corporate tax abuses. It has already been announced that the imposition of country-by-country reporting on multinationals will not be accompanied by a process to collate and analyse the data required – even at the aggregate level. Instead, BEPS Action 11 contains vague language on the possibility to consider some data aggregated and provided by individual governments. If unchanged, this represents a major

missed opportunity to make good use of valuable data where the compliance costs have already been accepted.

In addition to preventing accountability for the OECD, its members, or the G20 and G8 groups of countries that provided the mandate, such a failure of transparency would also prevent policymakers from improving their understanding of the nature and extent of profit misalignment, and most likely also hinder effective policy progress at the national level.

The confirmation of the likely scale of misalignment here, and the extent to which most countries are losing out to a small number of jurisdictions, should focus minds on the importance of better data. Individual jurisdictions and economic blocs should seriously consider making country-by-country reporting public. At the global level, there should be an urgent revisiting of the decision not to establish a repository which would allow analysis by trusted researchers, and the publication of aggregate data annually.

Annexes

Annex I Detailed results, 2012 (additional gross profits; additional tax payments)

Annex II Scale comparisons: Relative importance of implied revenue changes

Annexes are available online at: <http://taxjustice.net/scaleBEPS>

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