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# Firm Globalization, Intangible Assets, and The Measurement of National Output and Trade

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# Firm Globalization, Intangible Assets, and The Measurement of National Output and Trade

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## Introduction

Defining the national boundaries within which income or output should be measured has long been an issue in defining concepts of income and output. For example, Kuznets (1941) suggested a variety of possible choices of boundaries for the measurement of income based on "the location and political allegiance" of owners of productive agencies (P. 53). A "strictly political" definition would include "all agencies owned by subjects of a given state," wherever their residence. A "still political", but "more realistic" one , "determined by the possibility of reaching the income…for purposes of taxation," the definition chosen by Kuznets, would include all productive agencies located within the boundaries of the state plus those located outside but owned by residents of the state, whether subjects or aliens. Other definitions might be based solely on the location of the productive agencies or the residence of the owners.

The U.S. Bureau of Economic Analysis, focusing on measures of output rather than income, announced many years later that "Effective with the 1991 comprehensive revision, BEA began featuring gross domestic product (GDP), rather than gross national product (GNP) as the primary measure of U.S. production. GDP is the market value of the goods and services *produced by labor and property located in the United States."* (U.S. Bureau of Economic Analysis, 1993, p. M-5). After emphasizing the location of the factors of production as the basis for measuring U.S. output, the BEA responded to the growth of production through foreign direct investment and the demand for measures that recognized such production as being controlled from the United States by developing a measure of U.S. international transactions that was based not on the location of the factors of production but on the location of their ownership (Landefeld, Whichard, and Lowe,1993). The measure is akin to what Kuznets described as a

"strictly political" measure, except that it excludes inputs resident outside the United States. These alternative measures of international transactions, the latest of which appears in United.States, BEA (2010) are now published annually. They imply an alternative measure of U.S. output, but as far as I know, that was never carried out.

Kuznets' idea that the boundary for a country's income might be determined by the possibility of taxing the income from production was prophetic of the main current reason for interest in distortion of output and trade measures. That is the increasing evidence that multinational firms can and do reduce their taxes by manipulating the apparent location and value of their production and the value and direction of their trade. What is usually missing from the discussion is the fact that manipulations for tax-avoidance or tax-reduction can also distort the national accounts measures on which economic policy decisions are based. Many distortions of the national accounts may be involved and this paper attempts to identify and very roughly quantify a few of them.

I suggest in this paper that the meaning and applicability of national accounts measures have been undermined by several trends in the economic environment. One is the growth of the share of services in total production and, less clearly, in total international trade (Lipsey, 2008, pp. 30-44). Another is the rise in the share of production and trade carried on by multinational firms, and particularly in the share of world trade that takes place within parts of multinational firms, partly as a result of the fragmentation of production within firms. A third is the growth in importance of intangible assets in the production and the creation of the market value of both goods and services.

The increase in the importance of services raises the share in the total economy of sectors for which the measurement of output, input, and prices is most difficult, although much progress has been made (see, for example, Bosworth and Triplett, (2007). The increased share of multinational firms in production and particularly in trade raises the share of transactions that take place not at arm's length but among parties controlled by the same owners, for which the reported prices and other aspects of the transaction are not easily compared with those for transactions subject to competitive forces . If production is fragmented among subsidiaries of a firm, and trade takes place in unfinished products or

incomplete services, prices and quantities are difficult to measure for tax or statistical authorities. Finally, if productive assets are intangible, such as intellectual assets, designs, patents, or skills of various sorts, the location of the assets is difficult to define and therefore subject to manipulation by the owners to minimize taxes. If the assets are financial, their nominal location tells nothing about the location from which they are controlled.

Statistical agencies and academic scholars have always had to deal with changes in institutions, ways of organizing economic activity, and methods of production. I suggest here that some of these changes have blurred our measures of the geographical location of production and in doing so have also eroded measures of trade among countries. Furthermore, recent revisions of guidelines for measures of production and trade have moved in the direction of making these measures less useful guides to the how and where of economic input and output.

The Size and Direction of Trade

Data collection on trade in goods and services serves many different purposes. One is to produce a set of trade data that follow the rules set down by the International Monetary Fund in its Balance of Payments Manuals. These rules aim to produce data relevant to a country's international financial position, comparable across countries. Another very different purpose is to produce trade data that reveal the impact of trade on a country's factors of production and a country's consumers.

The technique of collecting data on trade in goods has a much longer history than most collection of trade in services and is mostly performed under rules that emphasize the physical crossing of a border by the goods. Countries are to use "…crossing the border rather than change of ownership as the basic principle for compilation of trade statistics…" (United Nations, 2004, p. 5). The measurement of trade in goods for the Balance of Payments has a different objective, which is the measurement of changes in ownership of goods between residents of a country and non-residents, whether or not the goods cross an international border. Since the majority of changes in ownership take place in connection with a border crossing, the two measures are usually close and the balance of payments measures are generally derived, with some adjustments, from the data on physical movements of goods. However, I suggest later that the

apparent simplicity of the translation from physical movements of goods to the movement of the values incorporated in the goods is deceptive.

In contrast to trade in goods, trade in services does not have two alternative measurements. It exists only in the balance of payments universe. As is observed in OECD (2001), "Unlike trade in goods, trade in services involves no package crossing the customs frontier with accompanying documentation showing an internationally recognized commodity code, a description of the contents, information on quantity, origin, and destination, an invoice, and an administrative system based on customs duty collection, which facilitates data compilation." The difference is more than the degree of documentation. Trade in services often involves no passage of a service across an international border, but rather a crossing of a border by the purchaser of a service in order to consume the service in the country where it is produced. Many trades in services are geographically domestic transactions made international solely by a difference in the country of residence between the buyer and the seller of the service. The definition of country of residence is a balance of payments concept more than a trade concept, and the definition of residence plays a crucial part in defining what trade in services is.

An aspect of country of residence that creates what I think is a particularly serious distortion of the measurement of trade in services is the treatment of what are referred to as "Special purpose entities." These are subsidiaries of multinational firms, especially firms based in countries with high rates of corporate profits taxes, formed to hold some of the corporation's assets in low-tax jurisdictions, or tax havens, as a way of reducing home country tax bills. The IMF has struggled with the question of how far to recognize these subsidiaries, which often employ little or no labor and possess little or no physical capital, as residents of the countries in which they are incorporated, and therefore as exporters and importers of goods and especially services that may never enter or leave the host country. The Fifth edition of the Balance of Payments Manual (BPM) (Par. 73) defined a resident company as "…a resident unit of a country (economic territory) when the enterprise is engaged in a significant amount of production of goods and/or services there or when the enterprise owns land or buildings located there. The enterprise must maintain at least one productive establishment in the country.." (p. 22). That seems

to me to be a modest requirement, although it was probably frequently ignored. The activity criterion reappears in the new BPM as a "general principle" that "…an enterprise is resident in an economic territory when the enterprise is engaged in a significant amount of production of goods or services from a location in the territory" (Par. 4.131, p. 72). However, in what I consider a retrogression from the measurement of economic reality, the new BPM states (Par.4.21) that "…a corporation is always resident in its economy of incorporation…" (p. 53), and (Par. 4.135, pp. 73-74) that "…incorporation and registration represents a substantial degree of connection to the economy, associated with jurisdiction over the enterprise's existence and operations. In contrast, other connections such as ownership, location of assets, or location of managers or administration may be less clear-cut."

The consequence of this abolition of the production requirement, or of ignoring it when it was nominally in effect, has been to make it easy for firms to decide, in response to differences in tax rates, where to report the location of their production. Desai, Foley, and Hines (2003, p. 68) referred to this flexibility as "…the ability of multinational firms to adjust the reported location of their taxable profits." (p. 47). Some examples of the ambiguity of the location of production of certain services reported as imports by the United States, but not as exports or production by the supposed producers were given in Lipsey (2008). They included such services as insurance or reinsurance services reported as imported to the United States from Bermuda, but not as exports by Bermuda, presumably because that country did not consider them as having been produced there.

These measurement problems are most serious in service industries, where the movement of services is often not visible. The difficulty of tracing the extent to which exports draw on factors of production resident in the United States or the extent to which imports reduce the demands on such productive factors extends to trade in goods. The reason is that much of the value of goods, as well as services, is the output of intangible assets. As one newspaper story put it, "international tax planning 101," which involves the shift of "…patents on drugs, ownership of corporate logos, techniques for manufacturing processes, and other intellectual assets…" to low-tax jurisdictions overseas, suggested that most of the transferred assets were "intellectual assets where most of the profit was made, because "When

you buy a pair of sneakers for $250", it's the swoosh symbol, not the rubber, you pay for" ("Key Company Assets Moving Overseas," New York Times, Nov. 22, 2002).

The example of the iPod, sold by the Apple Corporation, illustrates the problem of defining the location even of goods production in a world in which intangible assets are an important input into production. The example of the iPod, sold by the Apple Corporation, illustrates the problem. The actual physical production of the instrument is mainly outsourced to several Asian countries, which probably supply the unskilled labor input into its production. However, most of the value of the final product may be the input from intellectual property, the patents, technology, and marketing skill that made the creation of the iPod possible. Where has that value been added? If the ownership of the technology has remained in the United States, the reported value of the imports would not include the value of the technology. The effect of the imports on the demand for U.S. factors of production would appear to be mainly a reduction in the domestic demand for unskilled labor. If the ownership of the technology has been moved to an affiliate in a tax haven, charges for that technology may be included in the import price: the value of the imports would include that of the technology. The imports would appear to be mainly imports of technology and their effect on U.S. factors of production would be expected to be to be a reduction in the U.S. demand for technological labor and other technological inputs. In fact, the technology had been produced and continually updated in the United States and was only nominally transferred to a foreign location, and the import demand would be demand for U.S. technological input.

One way in which trade in services that appears to cross national borders, but really does not, reveals itself is when reported imports of the service are not matched by any country's exports, as in the example of U.S. imports of insurance services from Bermuda, which far exceed exports of insurance services reported by Bermuda. Detailed bilateral service trade data are not available for many of the source countries reported by the United States, but a crude way of searching for such cases is to compare the total exports of services reported to the IMF by each country with the U.S. imports of services from that country reported by the Bureau of Economic Analysis. That is done on a summary basis in Table 1.

Table 1

Comparison of Imports of Services from a Country Reported by the United States (BEA) with Country Exports of Services to the World Reported to the International Monetary Fund

Unit: $ Billion

| Country | Imports of Services into US (BEA) A | Exports to World (IMF) B | A/B (%) |
|---|---|---|---|
| World | 364 | 3278 | 11.1 |
| Canada | 24 | 68 | 35.9 |
| Europe | 161 | 2081 | 7.7 |
| South & Central America | 37 | 102 | 36.3 |
| Other Western Hemisphere | 32 | 15 | 207.0 |
| Bermuda | 17 | 2 | 1081.7 |
| Other | 15[a] | 14[b] | 107.6 |
| Africa | 6 | 64 | 9.5 |
| Middle East | 8 | 78 | 10.2 |
| Asia & Pacific | 91 | 869 | 10.5 |

[a] Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).
[b] All in note a except Cuba, French Islands (Caribbean), Netherlands Antilles, Trinidad and Tobago, and United Kingdom Islands.

Source: U.S. Service Imports: U.S. Bureau of Economic Analysis (2009)

Country Service Exports to World: International Monetary Fund

Taiwan exports: Web site of the Central Bank of the Republic of China (Taiwan):

http://www.cbc.gov.tw/mp2.html.

On average, the United States reports imports from the countries of the world of a little more than 10 percent of world reported total exports of services to all destinations. The ratios are higher for some countries with close trade ties to the United States, such as Canada and Mexico, but for two supposed sources of almost 10 percent of U.S. service imports, Bermuda and "Other Western Hemisphere except Bermuda", the BEA estimate for U.S. imports of services is larger than the countries' own reports of service exports to the world. Considering the sizes of these supposed sources of service imports and their resources of human capital, I would suggest that the reported U.S. imports of services from them are almost entirely what might be called "phantom imports," services that are actually produced in the United States but attributed by the producing firms to their affiliates in the Caribbean.

For a few broad individual classes of service trade, a similar comparison can be made between BEA import data and IMF data on exports to the world. For Travel, the reported U.S. imports are over 80 percent of Bermuda's exports to the world, but Bermuda's share of world exports is small. For Transportation, the BEA measure of U.S. imports is 30 times Bermuda's reported exports to the world and 2&1/2 times reported world exports by "Other Western Hemisphere" countries, suggesting that about 4 percent of reported imports were not from the reported sources. U.S. imports of technology, as represented by royalties and license fees were also attributed to Bermuda and "Other Western Hemisphere, but virtually absent from their reported exports, but again the totals of reported imports were small. Much the same could be said for Financial services. Reported U.S. imports from Argentina, Other Western Hemisphere except Bermuda, and the Philippines were all far greater than these countries' reported exports to the whole world, but the total for the three countries was still a small part of reported U.S. imports. The miscellaneous collection of "Other services" also does not appear by this standard to very large exaggerations of U.S. service imports.

A very different case is Insurance, for which the same comparison is made in Table 2. In this case, Bermuda and "Other Western Hemisphere" are joined by Switzerland, for which reported imports by the United States were 30 percent larger than Switzerland's exports to the world. In this case, the

Table 2

Comparison of Imports of Insurance Services from a Country Reported by the United States (BEA) with Country Exports of Insurance Services to the World Reported to the International Monetary Fund

Unit: $ Million

| Country | Imports of Services into US (BEA) A | Exports to World (IMF) B | A/B (%) |
|---|---|---|---|
| World | 42,939 | 70,425 | 61.0 |
| Canada | 770 | 4,179 | 18.4 |
| Europe | 22,443 | 51,377 | 43.7 |
| South & Central America | 91 | 3,602 | 2.5 |
| Other Western Hemisphere | 19,223 | 154 | 12,459.0 |
| Bermuda | 14,763 | 76 | 19,445.5 |
| Other | 4,460[a] | 78[b] | 5,691.0 |
| Africa | 21 | 843 | 2.5 |
| Middle East | 8 | 1,476 | 0.5 |
| Asia & Pacific | 363 | 8,793 | 4.1 |

[a] Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).
[b] All in note a except Bahamas, Cuba, French Islands (Caribbean), Haiti, Netherlands Antilles, Trinidad Tobago, and United Kingdom Islands (Atlantic).

Source: U.S. Service Imports: U.S. Bureau of Economic Analysis (2009)

Country Service Exports to World: International Monetary Fund

Taiwan exports: Web site of the Central Bank of the Republic of China (Taiwan):

http://www.cbc.gov.tw/mp2.html.

reported U.S. imports from the two western hemisphere sources, more than 200 times the reported exports to the world, amounted to about 45 percent of total reported imports. Together with the part of reported imports from Switzerland that exceeded total Swiss exports, the "phantom" imports of insurance services were at least half of total reported insurance service imports and about 7 percent of total reported U.S. imports of all services

This is a conservative estimate of the "phantom" imports into the United States, the part of reported U.S. imports of services that was produced with virtually no input of labor or physical capital in the supposed countries of origin. It is conservative because reported U.S. imports of services were compared with countries' reported exports to the world and because export data were available only for broad categories of service trade.

How do U.S. affiliates in Bermuda and "Other Western Hemisphere," and some others, especially those that employ virtually no workers and hold no fixed capital, produce goods or services for export to the United States and for other purposes? Table 3 provides some hint of the method for affiliates in Bermuda, Other Western Hemisphere countries, and several other countries that operate in some sense as tax havens.

The balance sheets of U.S. affiliates in "Other Western Hemisphere" contained "Current assets other than cash items, current receivables, and inventories" that were far greater relative to their labor input, as measured by employee compensation, than the average around the world, of 3.7. The ratio was 154 in Bermuda and 49 in Other Western Hemisphere except Bermuda, two sources of reported U.S. imports of services that were far beyond the countries' reported exports of services to the world. Two other countries often cited as tax havens in one way or another, Ireland and Luxembourg, also held extremely high ratios of "other current assets to employee compensation, 16 and 52. The same locations, particularly Luxembourg, were outliers with respect to ratios to employment and sales.

Table 3

Nonbank Foreign Affiliates of U.S. Parents

Current Assets other than Cash Items, Current Receivables, and Inventories of U.S. Affiliates ($million) Relative to Employment, Employee Compensation ($million) and Sales ($million), 2004

| | Relative to | | |
|---|---|---|---|
| | Employment | Employee Compensation | Sales |
| **All countries** | 140,503 | 3.74 | 0.37 |
| **Canada** | 54,174 | 1.36 | 0.13 |
| **Europe** | 206,254 | 3.91 | 0.45 |
| Ireland | 873,372 | 16.32 | 0.56 |
| Luxembourg | 3,548,443 | 56.74 | 2.74 |
| **South America** | 26,674 | 1.42 | 0.13 |
| **Central America** | 9,302 | 0.70 | 0.07 |
| **Other West. Hemi.** | 1,707,829 | 69.48 | 1.35 |
| Bermuda | 8,748,308 | 154.10 | 1.12 |
| Other [a] | 1,049,367 | 48.65 | 1.61 |
| **Africa** | 22,669 | 1.06 | 0.08 |
| **Middle East** | 44,135 | 1.17 | 0.08 |
| **Asia and Pacific** | 127,594 | 4.33 | 0.35 |

For notes, see Table 2.

Source: U.S. Direct Investment Abroad 2004 Final Benchmark Data

Table 4 shows the same information for "Noncurrent Assets other than property, plant, and equipment and equity investment in other foreign affiliates". The worldwide ratio to employee compensation was about 5, but the ratio for Bermuda was almost 300, for the rest of "Other Western Hemisphere was over 100. For Luxembourg, it was over 80, and for Ireland it was almost 20, not such an outlier, but high enough to suggest some allocation of assets not for production. With respect to ratios to the number of employees, the same ordering of countries was visible. Again, with respect to ratios to sales, Luxembourg was the most distant outlier. Much the same story is visible in Table 5, in which only property, plant and equipment holdings are excluded from the noncurrent asset totals. The underlying assumption of the calculation is that noncurrent assets other than property, plant, and equipment in amounts far above world averages relative to relative to labor input are not producing output in the host countries of these affiliates.

Table 4

Nonbank Foreign Affiliates of U.S. Parents

"Noncurrent Assets other than Property, Plant, and Equipment, and Equity Investment in Other Foreign Affiliates" of U.S. Affiliates Relative to Employment, Employee Compensation and Sales, 2004

| | Relative to | | |
|---|---|---|---|
| | Employment | Employee Compensation | Sales |
| **All countries** | 193,527 | 5.15 | 0.51 |
| **Canada** | 142,603 | 3.57 | 0.35 |
| **Europe** | 252,005 | 4.78 | 0.54 |
| Ireland | 971,935 | 18.16 | 0.62 |
| Luxembourg | 5,118,115 | 81.84 | 3.95 |
| **South America** | 63,336 | 3.36 | 0.30 |
| **Central America** | 26,970 | 2.03 | 0.19 |
| **Other West. Hemi.** | 3,445,934 | 140.20 | 2.72 |
| Bermuda | 16,264,000 | 286.49 | 2.08 |
| Other [a] | 2,247,122 | 104.19 | 3.44 |
| **Africa** | 100,207 | 4.67 | 0.35 |
| **Middle East** | 126,148 | 3.34 | 0.24 |
| **Asia and Pacific** | 143,316 | 4.87 | 0.39 |

For notes, see Table 2, and for the source, Table 3.

Table 5

Nonbank Foreign Affiliates of U.S. Parents

"Noncurrent Assets Except Property, Plant and Equipment" of U.S. Affiliates Relative to Employment, Employee Compensation and Sales, 2004

| | Relative to | | |
|---|---|---|---|
| | Employment | Employee Compensation | Sales |
| **All countries** | 403,896 | 10.74 | 1.06 |
| **Canada** | 244,214 | 6.11 | 0.59 |
| **Europe** | 612,274 | 11.62 | 1.32 |
| Ireland | 1,651,703 | 30.87 | 1.06 |
| Luxembourg | 37,601,721 | 601.23 | 29.03 |
| **South America** | 90,806 | 4.82 | 0.43 |
| **Central America** | 47,245 | 3.55 | 0.33 |
| **Other West. Hemi.** | 7,514,092 | 305.71 | 5.94 |
| Bermuda | 47,084,308 | 829.40 | 6.03 |
| Other [a] | 3,813,281 | 176.80 | 5.84 |
| **Africa** | 155,058 | 7.23 | 0.54 |
| **Middle East** | 215,885 | 5.71 | 0.41 |
| **Asia and Pacific** | 189,312 | 6.43 | 0.52 |

For notes, see Table 2, and for the source, Table 3.

The likely income- transferring function of these large noncurrent assets is suggested by Table 6, which shows that holdings in other affiliates are a major component. They are a particularly large part of the assets of U.S. affiliates in Luxembourg, a favorite location for U.S. affiliates that are holding companies, but they are also important in assets of affiliates in Bermuda and "Other Western Hemisphere." The effect may be on the apparent geographical location of U.S.-owned production, but not necessarily on the level, unless the holding companies own some productive assets within the United States.

Table 6

Nonbank Foreign Affiliates of U.S. Parents

"Equity Investment in Other Foreign Affiliates" of U.S. Affiliates Relative to Employment, Employee Compensation and Sales, 2004

| | Relative to | | |
|---|---|---|---|
| | Employment | Employee Compensation | Sales |
| **All countries** | 210,368 | 5.59 | 0.55 |
| **Canada** | 101,611 | 2.54 | 0.25 |
| **Europe** | 360,268 | 6.84 | 0.78 |
| Ireland | 679,768 | 12.70 | 0.44 |
| Luxembourg | 32,483,689 | 519.40 | 25.08 |
| **South America** | 27,469 | 1.46 | 0.13 |
| **Central America** | 20,275 | 1.52 | 0.14 |
| **Other West. Hemi.** | 4,068,158 | 165.51 | 3.22 |
| Bermuda | 30,820,462 | 542.91 | 3.95 |
| Other [a] | 1,566,144 | 72.61 | 2.40 |
| **Africa** | 54,850 | 2.56 | 0.19 |
| **Middle East** | 89,737 | 2.37 | 0.17 |
| **Asia and Pacific** | 45,996 | 1.56 | 0.13 |

For notes, see Table 2, and for the source, Table 3.

While I concentrated here on distortions of the location of production in service industries, the issues of measurement associated with the growth in importance of intangible assets extend to all types of output. An earlier paper (Mutti and Grubert, 2006) described the possibilities for a firm to increase the share of income that it appears to earn outside the United States by "…exploiting intangible assets that it develops in the United States" through a "…relocation or migration of intangible assets abroad (p. 2). This relocation is a fiction, in the sense that the use of intangible assets has no definable location. They can be used simultaneously in many locations, and one of the advantages of multinational firms is that they can exploit their intangible assets in many locations. With the increasing fragmentation of production, much of it taking place within firms, it becomes more and more difficult to judge what part of a country's imports, for example, are the product of the country's own resources, and what part of exports are from the resources of the destination countries. The problem has probably grown in importance as the composition of trade has shifted toward more sophisticated products containing more intangible inputs. The problem of measurement would still exist even if there were no taxation of corporate income and no incentive to distort the reported location of production, but the existence of taxes and the gains from distorting the location of production probably make corporate tax returns as poor a basis for determining the location of production as they were eventually determined to be for the estimation of capital consumption.

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