

# Implications and Challenges Associated With Developing a New System of Extended International Accounts

*Discussion paper*

Steven Landefeld

UNSD consultant

International Conference on the  
Measurement of International Trade and Economic Globalization  
Aguascalientes, Mexico, 29 Sep – 1 Oct 2014

United Nations Friends of the Chair Meeting on the  
Measurement of International Trade and Economic Globalization,  
Aguascalientes, Mexico, 2 Oct 2014

## Abstract

This paper discusses the implications and challenges of moving to a new system of extended international accounts. The most important implication of such an integrated system will be significant improvements in the relevance and accuracy of the economic-financial statistics used by public and private decision-makers. It is also likely to improve the accuracy, efficiency and international comparability of the existing system of economic statistics through the reconciliation of such data as bilateral and global trade balances, export and import prices, assets and liabilities, as well as through data exchanges, use of administrative and other “big data,” and common business registers, data collection instruments, classification systems, and accounting systems. Such a system also comes with significant challenges including resolving measurement problems posed by globalization and managing the increase in statistical agency cost and respondent burden of the expanded data collections necessary to provide the new data required by integrated world supply and use and financial statistics. Statistical agencies will have to work with businesses and government, to better harmonize official, government, business and financial accounting systems in the measurement of global value-added and financial transactions and assure the protection of the confidentiality of that data. It will also be important to develop a broad outreach program that addresses concerns from trade sensitive sectors about the impact of such an accounting system on trade and investment policy. Finally, a coordination framework needs to be developed that prioritizes the elements in the implementation plan for a new international system of accounts and that effectively allocates the workload across countries and international organizations.

## Table of Contents

Implications and Challenges Associated With Developing a New System of International Accounts .....	3
A. Introduction .....	3
B. Overview of the Effect of Globalization on the Measurement of Trade .....	3
C. Architecture of an extended System of International Accounts .....	6
D. Policy questions: Encouraging trade, growth, and competitiveness through more relevant and accurate data .....	7
i. The iPhone case.....	7
ii. Trade and Investment Policy .....	10
iii. Unfair trade practices cases, IP protection, subsidies, and guaranteed loans.....	10
iv. Tax Policy .....	10
v. Financial and regulatory policy.....	11
vi. Macro Policy .....	11
vii. Environmental and Energy Policy.....	12
viii. Critical materials, food safety, and national security.....	13
viii. Business and financial decisions.....	13
E. Improving the accuracy and efficiency of the existing system of economic statistics .....	13
i. Addressing difficult measurement problems raised by globalization.....	15
ii. Increases in costs and respondent burden .....	16
iii. Harmonizing official, government, business and financial accounting systems .....	17
iv. Expanding outreach programs .....	18
F. Developing a Work Program for a New System of International Accounts.....	18
i. Concepts and Scope .....	19
ii. Methods .....	20
iii. Organizing for implementation .....	21
G. Questions for Discussion.....	23
H. References .....	24

# Implications and Challenges Associated With Developing a New System of Extended International Accounts

## A. Introduction

1. This discussion paper is prepared for the International Conference on the Measurement of Trade and Economic Globalization (29 September to 1 October 2014, Aguascalientes, Mexico) and serves as input to the subsequent meeting of the Friends of the Chair group on 2 October 2014. The paper is trying to bring together a multitude of measurement issues in the area of trade and globalization under the umbrella of a new integrated System of International Accounts (SIA).

2. In particular, this paper addresses the major issues identified in Decision 44/106 by the Statistical Commission at its forty fourth session held in 2013. The paper addresses the Statistical Commission's recognition of the need for the creation of an overarching measurement framework for international trade and production that addresses the measurement challenges associated with trade, financial, environmental, and social integration around the globe. Per the charge from the commission special attention is devoted to integration, data gaps, best practices, conceptual development, resources, coordination, data collection and sharing, and the protection of confidentiality. Specific challenges to be addressed include the measurement of value-added, income, and employment from global production chains, intra-firm trade, foreign ownership and control, manufacturing services, and transfers of intellectual property.

3. This discussion paper reviews these and related issues as well as options for implementation. Hopefully, the paper and the associated discussion of issues and priorities at the Aguascalientes meeting will provide useful input to the Friends of the Chair meeting that follows the Conference.

## B. Overview of the Effect of Globalization on the Measurement of Trade <sup>1</sup>

4. Existing International Statistics have not kept up with globalization. While in many ways they remain invaluable, in other ways they have been unable to provide public and private decision makers the data they need to navigate today's integrated world economy. A new integrated System of International Accounts (SIA), that extends the existing System of National Accounts (SNA), the Balance of Payments Manual (BOP), and incorporates a number of new accounting concepts and measures, including the use of global supply and use tables and

---

<sup>1</sup> For a comprehensive review of the topics covered in this discussion paper, see Ronald Jansen et al (2014); Ahmed and Ribarsky (2014), Robert Heath (2013), UNECE (2011), the Friends of the Chair Concept Note (2014) prepared for this Conference.

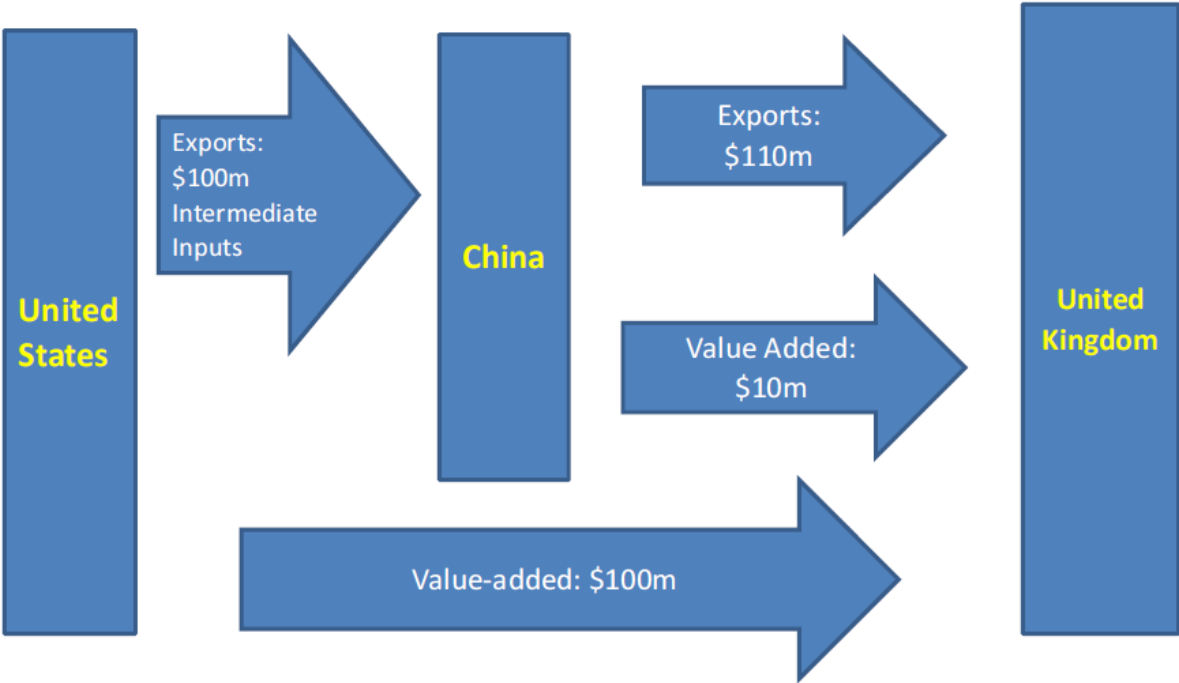
integrated real and financial accounts, can more fully capture real and financial international transactions.

5. Firms have long sought to maximize production efficiency and minimize their global tax burden by organizing their business across national boundaries around the world, but advances in technology and communication and reductions in shipping costs have accelerated the pace of global production. This globalization has helped increase international trade, global growth, and productivity, but has caused significant problems for the measurement of economic activity.

6. One of the most basic challenges of this increasing globalization is that it has led to an increasing volume of double counting in the real and financial sector. In the real sector, traditional trade measures count gross flows of goods and services as exports and imports each time they cross international borders. This results in a misleading picture of the economic contribution of countries to trade flows. These flows no longer reflect the value-added of the exporting country in the production of the goods or services.

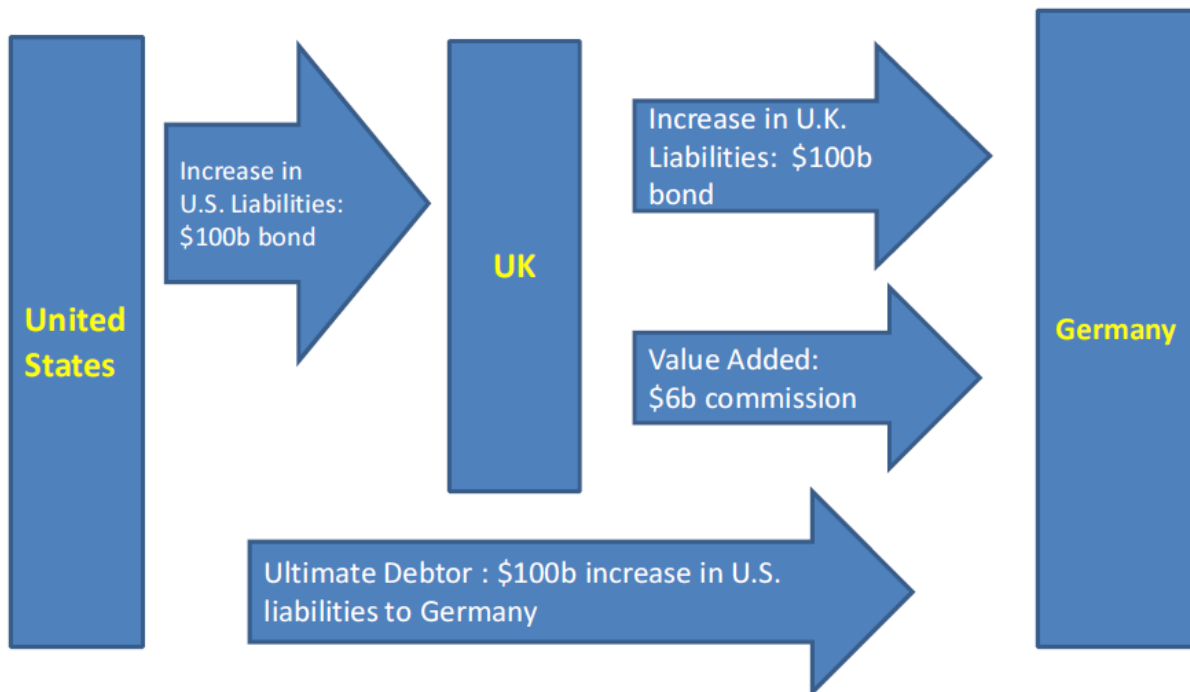
7. Similarly, in the financial sector, the increasing complexity and global nature of financial transactions has resulted in a system where official statistics provide a misleading picture of the ultimate cross-country financial risk. A leading example is the absence of clear information during the unfolding financial crisis and recession regarding the extent of European exposure to the U.S. financial crisis through holdings of subprime mortgage-backed securities.

**FIGURE 1: Gross vs. Value-Added Trade Flows**



8. The measurement problem can best be illustrated by two simple examples of trade and financial transactions. First, a trade example. If a United States IT firm exports \$100 million worth of goods and services in the form of intermediate inputs and design, technology, and financial services to China, which adds \$10 million in value added and exports \$110 million worth of goods to the United Kingdom, this will add \$110 million to Britain's trade deficit with China. It will have no impact on the bilateral trade balance with the United States and the UK, even though the United States firm accounts for \$100 million of the \$110 million in value added behind the exports to Britain. If trade flows were computed on a value-added basis, the UK deficit with China would only rise by \$10 million, while that with the United States would increase by \$100 million. Note that the overall trade deficit for this series of transactions is unaffected by the switch to value-added recording, but Britain now has a much better understanding of the source of its trade imbalance; the United States a better sense of the source of the final demand for its products.

**Figure 2 BOP Financial Flows vs. Ultimate Creditor/Debtor**



9. The second example for international finance is similar. If a United States multinational bank bundles together \$100 billion in subprime mortgages into a \$100 billion bond; sells that bond to its UK affiliate; which in turn sells that bond to a German firm for \$106 billion, it will show up as \$100 billion increase in US liabilities to the UK and no increase in U.S. liabilities to Germany and a \$106 billion increase in UK liabilities to Germany (and German-owned UK assets). Because financial transactions are often recorded against the immediate counterparty, the official statistics will show no increase in German exposure to any problems in U.S. financial

markets.<sup>2</sup> If, however, international assets and liabilities were recorded on the basis of the ultimate debtor or creditor for each transaction countries would have a much improved basis assessing their financial risk and policies.

10. These measurement problems posed by global production chains are exacerbated by other related issues raised by globalization, including:

- The use of transfer prices that differ from market prices and thereby distort official statistics and the underlying pattern of economic activity across countries presented by those statistics.
- The use of special purposes entities formed by firms for financing and tax purposes that also obscures the underlying pattern of economic activity.
- Increasing trade in services, which requires the expansion and or development of often complex, burdensome, and costly survey collection systems for affiliated and unaffiliated firms.
- The limitations of any one nation's statistical system, which is based on domestic survey or administrative data, to capture the value of international transactions that take place across a number of countries as part of today's complex global production chains.
- Increasing international trade through the internet that is hard to capture by existing national data collection systems
- Increasing trade and investment in intellectual property, which is hard to measure and is particularly subject to distortion through the use of transfer pricing and special purpose entities to lower taxes.

### **C. Architecture of an extended System of International Accounts**

11. So what might a new extended system of international accounts look like? The core would be existing sets of national and international accounts that were up-to-date and fully harmonized with the System of National Accounts and the Balance of Payments and International Investment manual. These core accounts would include a complete set of accounts including balance sheets and supply and use tables. These accounts would then be integrated and made internally and externally consistent, especially with the accounts of major trade and investment partners, through bilateral reconciliation and other methods outlined in the UN Guidelines for Integrated Economic Statistics, the IMF Balance of Payments Manual, and other international guidelines and manuals. Relying mainly on indirect estimation techniques and firm micro-data, these core accounts would be used to develop integrated global supply and use tables and integrated real and financial accounts. These accounts in turn would be used to develop official Global Supply and Use Tables and related trade in value added, income and employment statistics and Integrated International Real and Financial Accounts that employ ultimate beneficial owner (creditor/debtor) estimates.

---

<sup>2</sup> Benchmarking of International Investment Position's for portfolio investments normally addresses the bilateral biases in the flow data used for quarterly and annual Balance of Payment Accounts; although the reallocations can be very large. Also, benchmarking does not resolve geographic biases related to the use of Special Purpose Entities organized in lower tax jurisdictions.

12. Initially, such a set of extended international accounts should probably be developed using methodologies that improve the accuracy and consistency of the core data and indirect estimation techniques to develop the extended flow and balance sheet. Such an approach would have the benefit of improving the core data while minimizing the incremental cost -- in terms of respondent burden and statistical agency budgets-- while conceptual and collaborative work can proceed. In the interim, statistical agencies, business respondents, and data users can work to develop a long-term data collection system to collect the source data needed for extended supply chain and financial accounts.

**D. Policy questions: Encouraging trade, growth, and competitiveness through more relevant and accurate data**

13. A new international extended accounting system that addresses the measurement challenges would be extremely important in better targeting public policy and informing public perceptions regarding international trade and investment. By drilling down beneath gross/counterparty trade and investment flows it is possible to provide a more accurate, and relevant picture of the underlying pattern of economic activity across countries. A fuller picture of the critical international dependencies and benefits that arise from global production and trade will provide an improved basis for public understanding the dynamics of global trade and investment and for public policy.

i. *The iPhone case*

14. One of the ways in which existing trade statistics misdirect public policy and public opinions is their failure to capture the domestic value added that is derived from imports. A much cited example comes from the popular iPhone. Apple, the company that makes such products as the iPad and the iPhone, has been the subject of much public and political criticism in the United States for its "offshoring" of the production of its products to China, adding to the already large trade deficit with China, and its avoidance of state, local, and federal taxes through its overseas activities.

**iPhone Study**

Value of inputs from U.S. shipped to China (included in U.S. exports)	\$10.75
Value of inputs shipped to China from other countries	\$161.71
Manufacturing costs to China	\$6.50
Wholesale value of iPhone shipped to U.S. (included in U.S. imports)	\$179
Retail value of iPhone sold in U.S. stores (included in PCE)	\$499

15. This public image of Apple, and a similar perception of many multinational U.S. companies, has flamed protectionist sentiment and focused too much energy and public debate on “Benedict Arnold” corporations and "lost" US jobs, thereby diverting attention from more fundamental structural reforms, such as overhaul of the tax system, and investments in training and human capital.

16. Despite these public perceptions, as it turns out, most of the value-added in the iPhone comes from the United States. According to a 2011 case study (Kraemer, Linden, and Kramer, 2011) only \$6.50 out of the \$499 retail value of an iPhone makes its way back to China for the assembly and manufacture of inputs from the United States and other countries (Table 1). Most of the money derived from the sale of the iPhone made in China ends up going to the United States. The total \$499 retail price of the iPhone made in China breaks down as follows: 2% (\$10.75) for the value of U.S. inputs shipped to China, which are included in U.S. exports; 32% (\$161.71) for the value of inputs shipped to China from other countries; 1% (\$6.50) of the manufacturing costs of assembling the iPhone in China; 36% (\$179) for the wholesale value of the iPhone shipped to the United States (included in U.S. imports); and 64% (\$320) going to United States in the form of difference between the retail and wholesale imported price of the iPhone. The bottom line is that roughly two thirds of the value of the iPhone made in China goes to the United for research, design, engineering, financing, transportation, advertising, and retailing, logistical and their inputs, and Apple profits.

17. In another example discussed in a recent OECD paper cites research showing that 50 and 80 percent of the value added of shoes "manufactured in Asia" comes from the European Union. Ironically, as the authors note, in 2006, the EU antidumping rights on shoes imported from China and Vietnam.

18. Now admittedly case studies are hard to generalize and regarded with some scepticism by the public and partisans on the other side of public policy debates, but work by the OECD, WTO and UNCTAD using global supply and use tables and micro-data on global production chains also underline how different the distribution of economic activity and trade looks when measured on a value-added basis.

19. For example, according to the OECD estimates, China's bilateral trade with the United States was one-third smaller on a value-added basis than on the official measure based on gross flows. This is, in part, due to the fact that one third of the content of China's exports comes from foreign inputs. While much smaller than the extreme iPhone case study where 96 percent of the export value of the Chinese iPhone is from imported inputs, China's assembly and processing of electronic components and products have contributed to the rise in the foreign content of Chinese exports from an estimated 12 percent in 1995 to 33 percent in 2009. According to the OECD estimates, there is quite a range in the foreign content of countries exports. At the upper end, with foreign content of roughly 40 percent or more, are Luxembourg, Singapore, Slovakia, Ireland, and Taiwan. At the other-- with foreign content of roughly 10 percent or less -- are such countries as the United States, Brazil, Russia, and Saudi Arabia.



20. Another area where better information would help is data on the importance of global trade to domestic non-export industries through their contribution to exports, especially services. Domestic industries, and their representatives, have tend to take protectionist positions on trade and investment issues, yet as globalization has increased an increasing share of their output is ultimately sold as intermediate inputs for export industries. In addition to their dependence on exporters as a market for their products, lower cost intermediate imported inputs help domestic producers remain competitive and benefit consumers in creating levelling playing field in price settings.

21. Services are the prime example of the contribution of domestic production to exports. Since most services cannot be directly exported, they account for less than one fourth of global trade. Yet, the OECD estimates that services account for over half of total value-added exports for the United States, the United Kingdom, France, Germany and Italy. In addition to these design, R&D, logistical, legal and other services that are inputs into exports there are the significant domestic transportation, wholesaling, advertising, and financing services involved in selling final goods and services imports. Based on the U.S. input-output tables, the average trade and transportation margin on goods suggests that services could account for a large percentage of the final retail value of imported goods, even if significantly less than the 64% from the iPhone example, but still substantial.

22. Use of such value-added measures rather than gross measures does not change countries overall trade balances but does change bilateral balances providing an improved basis for public understanding and policy. Generally, it will lower bilateral trade deficits with countries that are near the end of the value-added chain processing and assembling final goods and services, and with neighboring countries that are the conduit for trade. Bilateral balances will rise with countries further up the supply chain that provide inputs to countries involved in final assembly and processing and on net there should be no change in overall balances. Value-added counting, by eliminating double-counting of trade, will also lower total exports and imports without affecting overall trade balances. For example , if a U.S. multinational exports services and parts to its overseas affiliate for processing and then buys the final product back from the affiliate for sale in the United States, only the manufacturing value-added and other foreign content should be counted as value-added trade, the rest is really the sale of domestic product back to U.S. residents.

23. So what are the implications of a new system of international accounts that drills down below the existing balance of payments and national accounts data? The broadest implication would be an increase in public and policy makers understanding of how irrevocably connected to, and dependent on, their economy is to global supply chains. From agriculture and advertising to design and retail services, economies are directly or indirectly dependent on global supply chains and markets. Protectionist policies designed to "help" domestic industries are more likely to do harm than good, by lowering efficiency, raising prices, lowering employment, and retarding innovation, investment, and growth.

24. The following is a top down look at how more nuanced data on the value-added contributions to trade and investment would improve public and private decisions.

ii. *Trade and Investment Policy*

25. As illustrated by the EU example of trade sanctions against footwear made in Asia -- where as much as 80% of the valued-added from Asian made footwear is estimated to originate in the EU -- suggests how trade policy based on bilateral gross trade flows can mislead economic policy and how better data on value-added contributions could result in better targeted policy.

26. Another example is legislation that has been proposed by the U.S. Administration and introduced into the U.S. Congress almost every year that would curtail U.S. multinationals from the type of offshoring epitomized by Apple. Such a policy may appear to make sense when looking at the mounting gross trade deficit with China, or the U.S. bilateral deficit in electronic components, but makes little sense if the iPhone example, is anywhere close to being correct (with most of the value-added from the Chinese –made iPhone accruing to the United States).

iii. *Unfair trade practices cases, IP protection, subsidies, and guaranteed loans*

27. These are other examples of policies that are guided by gross trade flows, which may grossly misstate the impact of trade on an economy. There are significant costs associated with these types of actions in terms of direct costs to government and taxpayers, higher costs to importers, and higher prices of imported goods for consumers. Such significant costs can only be justified if there is a significant economic harm being imposed and as illustrated by the examples and the various estimates of value-added trade, gross trade flows may well be an inadequate guide, especially for specific industries and products, of these costs.

iv. *Tax Policy*

28. Considerable attention is devoted to concerns over corporate inversions, use of special purpose entities, transfer pricing, and sale of intellectual property. All of which can be used to lower domestic taxes by redirecting income to lower tax foreign jurisdictions. The growing share of foreign direct investment through lower tax countries, falling effective tax rates on corporate income, and high-profile restructurings of multinational high-tech corporations of their intellectual property to significantly lower their effective tax rates have justifiably resulted in proposed changes in tax codes to curtail such tax avoidance behavior. However, as the value-added data suggest, there are very large value-added benefits to parent-company countries that should be taken account in designing international tax policy.

29. In cases like the Chinese-made iPhone sold in the United States and Vietnamese-made shoes sold in Europe, most of the final sales value for these products is in the form of domestic services and profits that can be taxed. Changes in tax law that ignored these benefits might not only reduce (rather than raise) net domestic tax receipts, but lower domestic production and

employment. Drill-down data on domestic value-added derived from globally produced imports would provide the basis for more complete analysis of net revenue losses from alternative tax treatments of foreign source income.

30. More complete analysis of the impact of alternative tax policies would also be provided by integrated financial accounts that allow tax analysts to look behind the existing --mainly counterparty data -- to examine the ultimate ownership of assets and liabilities. Such a drill-down would help in the analysis of the true impact of taxes on international direct and portfolio investment flows. Such analysis, would also be aided by the use of formulary accounting, that reallocates reported income and financial flows reported by for Special Purpose financial entities to reflect the underlying pattern of production using the pattern of real economic activity as indicated by such geographic data as MNC's sales, compensation, and property plant and equipment (Rassier, 2014).

31. Further, to the extent that access to lower cost inputs keeps domestic firms competitive and open for business, they also raise tax revenue relative to the alternative off production moving completely offshore.

v. *Financial and regulatory policy*

32. One of the main conclusions that came out of the review of the financial crisis was that financial regulators did not have a clear and integrated picture of the distribution and size of the problem. As described above, a significant share of financial transactions are recorded against the counterparties to transaction rather than the ultimate creditor or debtor, with a disproportionate share being recorded against countries where there are major financial markets such as London. As a result, early on in the financial crisis, Europe officials were unaware of their exposure to the fallout from the sub-prime mortgage crisis in the United States.

33. One of the key recommendations for measurement that came out of the G-20 and other analyses of the financial crisis was for more comprehensive financial data that could provide regulators a more integrated picture of systemic risk in the global financial system. Integrated and up to date financial accounts based on ultimate creditors and debtors would enable global regulators to better assess the relative levels and transmission of risk and the management of that risk.

vi. *Macro Policy*

34. The data lessons learned from the financial crisis are not only important for financial oversight and regulation, but for macroeconomic policy. Until the financial crisis macro-economists focused much of their research and policy on the real sector. The financial and housing crisis, the Greek and other countries debt problems, and the Great recession refocused attention on the role of debt, asset values, and global interdependencies on national and global business cycles. After the financial crisis, macro-prudential and other policies focusing on globally coordinated macroeconomic policies received much attention.

35. Integrated trade and financial data that are part of a new international accounting system that help policy makers drill down and "look through" the existing balance of payments and national accounts data will be powerful tools to guide macro policy makers as they move forward in adopting the lessons learned from the great recession.

36. Beyond better integrated global financial and real data, one of the most important measurement challenges posed by globalization that is important for macro-policy are biases in import prices. These biases can have a significant distorting impact on measures of inflation and growth used as targets by monetary authorities and by fiscal authorities for budget projections used in evaluating alternative budget proposals and policies.

37. There is a body of research (Houseman and Ryder, 2010) which suggests that domestic survey data fail to capture price reductions when domestic producers switch to from domestic to imported inputs. This bias, in turn, understates inflation, understates real imports, and overstates real GDP and productivity growth, especially in the manufacturing sector. The estimated bias on real GDP and inflation for the United States are on the order of 0.2 percent. The potential bias for manufacturing is on the order of 1.5 percent manufacturing, with the largest estimated bias is in computers, 11 percent. If correct, such biases could be significantly distorting trend growth in key monetary and fiscal policy targets and projections. Successful implementation of a new extended system of national accounts that addressed these measurement problems (see below) would improve some of the most important economic data guiding macroeconomic policy.

vii. *Environmental and Energy Policy*

38. Environmentally Extended Global Supply and Use Tables can be extremely helpful in correctly identifying the location of production (by type) embodied in traded goods and services and their contribution to global pollution. Based on this information on the global pollution dependencies -- by location, product, and type of pollution -- international bodies and countries can work together to design the most effective and equitable means of reducing regional and global pollution.

39. In this respect, the use of natural resources is of great importance. In their report on the Resources Futures<sup>3</sup>, Chatham House states that the world is undergoing a period of intensified resource stress, driven in part by the scale and speed of demand growth from emerging economies and a decade of tight commodity markets. Poorly designed and short-sighted policies are also making things worse, not better. Whether or not resources are actually running out, the outlook is one of supply disruptions, volatile prices, accelerated environmental degradation and rising political tensions over resource access.

---

<sup>3</sup> See

[http://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Energy,%20Environment%20and%20Development/1212r\\_resourcesfutures.pdf](http://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Energy,%20Environment%20and%20Development/1212r_resourcesfutures.pdf)

viii. *Critical materials, food safety, and national security*

40. With the rise in terrorism and fears of tainted food and drug supplies there has been increasing interest in assessing the origin of imported goods, especially rare earth minerals used for defense, energy and food purposes. However at this point, the list of materials is relatively short and assessments of the sources and availability of critical materials, and needed mitigation, has mainly been a case study approach to tracing supplies of specific products, similar to what is being done for aggregates in the OECD and other value-added estimates. Over time, as policies related to critical materials, energy, and food and drug safety expand to focus more on broader commercial implications and from national security to economic security, there is likely to be an interest in broader industry based, estimates of value-added supply chains.

viii. *Business and financial decisions*

41. Although business and financial decisions are largely guided by detailed product and firm-specific data on sales, costs, profits, and risk, business decisions are also based on macroeconomic and industry-level data. Official aggregate and industry level data provide important benchmarking, trend, and macroeconomic data that factor into business and financial decisions.

42. A new international accounting system that allowed business and investors to drill down below the existing trade and financial data would provide a much improved for assessing trends in supplies, costs, sales, prices, and profits. Further, to the extent the new system provided more accurate and more relevant data, it would provide a double bang-for-the-buck for business.

**E. Improving the accuracy and efficiency of the existing system of economic statistics**

43. Given the resource constraints confronting official statistical agencies, it will be important to invest in efforts that both improve the existing core statistics and improve the basis for the extended system of international accounts. Such an effort will incorporate a wide range of techniques for harmonizing and better integrating existing data, new IT systems, and use of administrative and other big data. Many of these techniques are described in more detail in the UN Guidelines for Integrated Economic Statistics and in recent UN, OECD, and IMF research on extended international accounts.

44. Such efforts should probably begin with work to harmonize existing sets of national and balance of payments accounts and the balance sheet, supply and use, and other accounts that support them. The first step for most countries is to the adoption of concepts and definition from

the 2008 SNA and BPM6 in areas that are quantitatively significant<sup>4</sup> and where deviations from international standards can result in significant bilateral asymmetries in national accounts. Resources are scarce and countries are unlikely to spend significant resources on measurement issues of limited importance to their own economy. However, resolution of larger inconsistencies can result in large benefits for Global Supply and Use Tables and International Real and Financial Accounts based on these core accounts.

45. Next in importance is empirical work, including the reconciliation of such data as bilateral and global trade balances, export and import prices, and assets and liabilities. Such reconciliations can significantly improve the accuracy of bilateral and international data, at a significantly lower cost than expansions of existing data collection systems, with no increase in respondent burden.

46. A key element in successful reconciliations is the use of data exchanges. Such data exchanges and reconciliations can identify double-counting of transactions, gaps in coverage, misclassification of industry and product classifications for key firms, and persistent misunderstandings and misreporting by respondents. These data exchanges are most effective at the micro-data level, but bilateral reconciliation of tailored sub aggregates can help identify the types of problems cited above, many of which can then be resolved without the exchange of micro data.

47. Other empirical work with the potential for improving the core data used for extended national accounts may lie in the use of administrative and other “big data” to supplement and improve existing international data. One can imagine, for example, using a wholesale trade variant of MIT's retail Billion Price's project (Rigobon and Cavallo, 2014) to research and “fix” possible biases in import prices cited above.

48. Other powerful data tools for improving the core national and balance of payments accounts include common business registers, which pay special attention to multinational companies; common data collection instruments for large firms; common classification systems; and common accounting systems that attempt to reconcile the financial accounting standards like GAAP, FARs, and statistical accounting standards for the 2008 SNA for multinational corporations. Indeed, given differences in accounting and statistical systems across countries, harmonization of the ISIC, NAICs, Trade and other classification systems should be accorded high priority.

49. Further efficiencies and improvements in the international source can be made by the integration of IT and data processing systems within and across countries. Over time increased use of SDMX and other common data transfer protocols and API and other common data programming systems will result in greater consistency in IT and data processing systems.

---

<sup>4</sup> For instance, the implementation of the BPM6 services component “manufacturing services on input owned by others”

i. *Addressing difficult measurement problems raised by globalization*

50. In addition to better harmonizing and reconciling existing core accounts across countries, a new extended system of international accounts will require resolution of a number of the most important of the measurement problems raised by Globalization. An overview of these problems taken from UN 2011 is cited in Table 1.

51. Many of these problems can be resolved by the new data and estimates required to construct Global Supply and Use Tables and International Real and Financial Accounts. These include those problems associated with multinational enterprises, the increasing size and complexity of FDI, the use of special purpose offshore entities for financing and tax purposes, factory-less goods producers, and the increasing size and complexity of financial transactions, especially those in the shadow banking sector. Initially these may be addressed by indirect estimates, but ultimately will require expanded data collections, mainly for MNC's, that provide the necessary information on global supply chains.

**Table 1 Globalization factors and the most affected main national accounts items**

Global phenomenon	National accounts items most affected
<b>Arrangements within MNEs, including transfer pricing</b>	Allocation of Gross value added (GVA)/GDP across countries; international trade in goods and services; investment income and financial flows
<b>FDI relationships</b>	Investment income and financial flows; i.i.p.
<b>Special purpose entities (SPEs)</b>	GDP in relation to GNI, International trade in services; investment income and financial flows; i.i.p.
<b>Goods sent abroad for processing</b>	GVA/GDP; international trade in goods and services
<b>Merchanting</b>	International trade in goods (and possibly services)
<b>IPPs</b>	GVA/GDP; capital formation; international trade in assets and related services
<b>Quasi-transit trade</b>	GVA/GDP; international trade in goods
<b>International labour movement and remittances</b>	GDP; GNI; gross national disposable income; international transfers
<b>Ownership of property abroad</b>	International trade in services; investment income and financial flows; i.i.p.
<b>Internet trading</b>	International trade in goods and services; household consumption
<b>Limitations of national data collections</b>	Imports, import prices, GDP/GVA, and Productivity

*Source: UNECE, Eurostat, and OECD, The Implications of Globalization on National Accounts, United Nations, 2011*

52. Other problems will require expansions of direct survey data collections of unaffiliated firms or expanded use of big data used by business. For example, because services trade cannot be captured in large part through customs or other administrative sources, resolving

measurement problems associated with the increase in the size and complexity of trade in services, including overseas assembly and other processing of good, can only be resolved by direct surveys. The compilers guide<sup>5</sup> for trade in services statistics gives further background on those compilation issues. Other problems that require expanded direct surveys include the increase in international merchanting of goods produced and sold in other countries; increasing trade and transfer of intellectual property; international trading via the internet by business and households; and increasing international travel.

53. Some, such as increasing labor movement will probably require use and exchange of aggregated administrative data. Others such as transfer prices will be very difficult to resolve and may only be resolved via formulary and data matching research.

ii. *Increases in costs and respondent burden*

54. Another implication of this program of work is that the new data required for an extended system of international accounts is likely to significantly increase respondent burden with an attendant reduction in overall and item response rates, which will lead to an overall reduction in accuracy, both for the new and existing statistics. It is also likely to increase costs to statistical agencies already experiencing shortages in resources.

55. While undoubtedly statistical systems are constantly being updated with new collections and data replacing older lower priority programs, but so many countries have already prioritized their programs, that it is unlikely that there are lower priority programs that can easily be cut to make way for the data required for a new extended system of international accounts. And cuts to the existing core statistics would be counterproductive because the existing accounts are the foundation for the new system.

56. Effectively managing these increases in respondent burden and costs through increases in efficiency (for instance, to further implementation of integrated economic statistics with centralizing of corporate services) and by convincing politicians, policymakers, and data users of the value of investments in these new statistics will be critical. As noted above, it will be extremely important to exploit synergies that improve existing and new data through improvements in existing trade and financial data through bilateral reconciliations; improved I-O estimates of imported intermediate inputs through micro-data research; linking of domestic micro-data; implementing the lessons from the UN guidelines for integration volume; going from small to big with proof of concept techniques; and reliance on indirect estimates until data collection, resource and other issues can be resolved.

57. Explaining the value of these new international data is important, not only to justify incremental resources, but to convince respondents of the value of reporting such data and to convince sceptics in traders-sensitive sectors of the value of such data. U.S. statistical agency work on collecting supply chain information for factory-less goods producers (FGP's) illustrate

---

<sup>5</sup> See <http://unstats.un.org/unsd/tradeserv/msits/CGmsits2010.htm>



the respondent and public concern problems in collecting such data. Recently, the scheduled switch to the use of FGP classification in 2017 was postponed due to difficulty in collecting supply chain data from firms in test questions on existing surveys and due to strong concerns from trade sensitive sectors. These sectors were concerned that such estimates would through "statistical sleight of hand" reduce the trade deficit with key "competitors" like China and reduce recorded exports and imports thereby reducing public concern over lost jobs and trade in their industries. Although this reaction may be unique to the United State, it is quite likely that individuals from trade sensitive sectors, ranging from EU farmers to Asian fisheries, may react similarly.

iii. *Harmonizing official, government, business and financial accounting systems*

58. One way in which statistical agencies can manage costs, reduce respondent burden and improve accuracy is through the harmonization of accounting systems. Equally important will be the development of harmonized electronic data collection instruments that are consistent with business records and terminology and the development of protocols for protecting the confidentiality of both public and private data.

59. Unless businesses collect and maintain records on supply chains and other variables of interest, it will not be possible to collect accurate data at a reasonable cost. Although, statistical agencies should work to make their voices heard by national and international financial accounting standards boards, and intellectual property and other trade groups interested in measurement, shorter-term success is more likely to come through joint development of business of official data collection instruments that can allow for data to be easily pulled from existing business records. Often these records will not be completely consistent with economic accounting definitions, but they can provide baseline data that can be adjusted by statistical agencies to the appropriate definitions and coverage. Jointly developed and common collection instruments will also reduce respondent burden and costs.

60. The development of harmonized data collection systems will be aided by access to firm level micro-data (big data) so that statistical agency officials can develop their sub-aggregates and estimates that will be useful in developing consistent geographic data on value-added and other international transactions.

61. Official statisticians have generally focused their attention on protecting the security of the individual and firm level data they collect and keeping whatever they collect remains safely within their official firewalls. They do this through legal protections, regulations, IT data security, disclosure analysis and other techniques. However, as the use of private "big data" by official statisticians proceeds, it will be critical to extend existing protections and develop parallel protocols to assure that whatever data and proprietary estimates that officials access stays behind the companies own firewalls.

62. Today's businesses are data driven and protection of their data (pricing, markets, cost structures, licensing arrangements, sources of supply, etc) and proprietary methodologies are key

to their competitiveness and success. Access to such data by competitors is a real threat. In addition, access to such raw firm level data by regulators and tax authorities may be a particular problem for official statisticians who are part of "government." Development of iron-clad data protocols, voluntary, or with civil and criminal penalties, would help alleviate those business concerns and promote access and collaboration.

63. Similarly, development of data protocols for statistical access to governmental regulatory, tax, and other administrative data would help allay other government and public concerns about such access. Given mounting public concerns and sensitivity about government data access, such protocols will be increasingly important.

*iv. Expanding outreach programs*

64. As noted above, based on recent U.S. experience, it is likely that there will be resistance by trade-sensitive industries to an extended system of international supply and use tables and accounts that lower bilateral trade deficits with major trading partners and that lower overall levels of exports and imports by eliminating double-counting. Labor unions may also be concerned because trade in value-added estimates, correctly record the value-added gains by designers, engineers, managers, financiers, advertisers, and shareholders that offset the value-added losses of manufacturing workers.

65. An expanded outreach program will be required to address these concerns from trade-sensitive sectors about the impact of such accounting on trade and investment policy. Among the points that might be made are data quality management related: 1) the existing trade and investment measures are not being replaced and will remain the primary measures of trade on a monthly, quarterly and annual basis; 2) indeed, work to develop these new accounts will improve the accuracy of the bilateral balances by capturing addressing asymmetries and missing transactions; 3) the new trade in value-added and financial accounts will take years to develop and are likely to be annual-only supplementary accounts that drill down accounts that provide additional information on the secondary distribution of income from bilateral trade; and 4) such new information can actually better target trade complaints, such as those relating to dumping, intellectual property, and health.

66. An expanded outreach program will therefore need to provide separate targeted messages for economic policy makers in executive and legislative branches, central banks, international organizations; decision-makers and analysts in the business community; and affected labor and industry representatives.

## **F. Developing a Work Program for a New System of International Accounts**

67. If existing efforts to expand data on trade and finance to better measure dependencies and risk across countries are to develop into a new extended system of international accounts, it will require a work plan that outlines and prioritizes the necessary steps to develop the new system. It

will also need to identify leadership and supporting roles for international organizations and countries addressing the various conceptual, measurement and data quality issues that will be included in the plan.

i. *Concepts and Scope*

68. The first task will be completing work on developing the overall framework. At this point this would be one of the highest priorities. Such a framework would clearly include consolidated global supply and use, and international real and financial accounts, but significant work remains on identifying the scope of those and additional supplementary accounts. Are additional detailed breakdowns required for compensation and employment (and labor quality)? Should we further clarify the concept of degree of economic ownership and control in global production by business functions of firms in the fragmentation of tasks in the global value chain taking into account the transfer of intellectual property products? What are the trade by enterprise characteristics based on GVC analysis and profiling that can be used for the improved homogeneity of the industry classification for the global supply and use tables? What are the appropriate statistical methods to address the asymmetries in trade consistent with the national supply and use tables? Should the national supply and use tables be generated for enterprises rather than establishments as unit of production to better reflect the strategic management considerations of multi-national enterprises in the production in the GVC? Should the accounts adopt a strict arms-length market valuation concept, or try and address problems associated with intra-firm transfer process and the recording of economic activity using formulary analysis based on micro-data matching and bilateral data exchanges, using proxy-pricing? How far should expanded international financial accounts go in looking through transactions to measure consolidated counter-party risk, or ultimate beneficial owners; would this only be done for systemically important countries? What are the main aggregates, statistics and indicators that are determined by the global supply and use tables and international real and financial accounts, including trade in value added, income, jobs, and natural resources?

69. While considering a comprehensive list of the components and research issues for an extended set of international accounts would be useful, a plan that calls for focusing on a set of global supply and use tables and consolidated financial accounts would be a sensible first objective. Paying attention to the necessary linkages and building blocks for a complete framework will of course be important, including the extension to environmentally extended global supply and use tables with the interest in the natural resources and emission embedded trade statistics.

70. The development of the conceptual framework for the global supply and use tables and its environmental extension should be led by the UN, Eurostat, OECD, WTO and other interested parties at the international level. Further, because financial and monetary policy and statistical interests are intricately intertwined, and separately financed, it may also be best to leave the bulk of the task of developing new extended international financial accounts to the IMF, G-20, central banks and finance ministries charged with addressing the measurement gaps in cross-border risk

revealed by the financial crisis. The UN, EUROSTAT, OECD, the World Bank and national statistical offices will play an important role in coordinating to assure that the global supply and use tables and extended international financial accounts are consistent and integrated with the existing macro accounts like the 2008 SNA, BPM6, SEEA 2012, etc.

## ii. *Methods*

71. Because of the costs, unresolved data access and collection issues, and industry concerns associated with direct value-added data collection, at this point in time, efforts may be best focused on: 1) reconciling and improving existing international trade and finance measures included in national accounts and balance of payments; 2) expanding, reconciling, and refining existing multilateral and country-level indirect estimates of trade in value added; and 3) beginning long-term work with respondents on harmonizing business and international accounting, developing common data collection methods, more efficient IT data processing and collection systems, outreach for funding, and outreach to affected industrial groups in global value chains.

72. To support and improve trade in value added estimates will require according priority to data sharing and data integration, especially in areas where the reach of national statistics is limited and with key trade and investment partners where discrepancies can affect national product and industry measures and global export and import totals and their balances.

73. This data sharing work will be dependent on multi-lateral and country level efforts to improve and tailor the industry and product classification of national supply and use tables for globalisation analysis. Another high priority area is developing more nuanced sub-aggregates that would provide new coefficients for better estimating input-output relationships used to estimate global supply chains. Estimates based on work within statistical agency using in-house micro data might include data that is broken out by firm size and export intensity, by identifying exporters by business functions like those that process and assemble goods under contract separately from other exporters, or breakdown by stage of production<sup>6</sup>. Separate data on the coefficients for non-exporting domestic enterprises would also help refine the existing value-added estimates.

74. Extensions of the basic trade in value-added estimates would be helped by further breakdowns of these different types of enterprises by employment and job skills. Such estimates would be filling a yawning gap in debates about the effect of offshoring.

75. Another key area is to begin work on collecting and analyzing survey and administrative data on value-added chains with an eye to the use of such data as extrapolators, bias adjustments, and other indirect methods for estimating trade in value-added, services, and transfer prices.

---

<sup>6</sup> See the discussion paper of Stacey Frederick on refining ISIC classification with the Value Chain reference Model and the work of OECD on extended SUTs

76. As noted above, most of the work associated with developing integrated financial accounts should probably remain with the IMF, G-20, central banks and finance ministries charged with addressing the measurement gaps in cross-border risk revealed by the financial crisis. That said, national accountants need to play an important role in harmonizing such data and helping, where possible, to assure these extended international financial accounts can become an effective tool in an extended and integrated set of macroeconomic international accounts. Such accounts will help policymakers: a) "look through" the data to accurately measure counter-party (cross-country) risk; b) increase the transparency of complex instruments included in the aggregate data; c) measure the distribution of risk across debtors and creditors; and c) measure ultimate beneficial owners. National accountants will also have to work to develop a coordination framework for compiling a comprehensive set of extended international accounts.

### *iii. Organizing for implementation*

77. The first task is putting together the members of the working group that will be charged with developing the work plan and developing the priorities for that plan. An effective allocation of the workload across countries and international organizations will need to be mindful of members incentives and relative strengths. Overall coordination is probably best left to the International Organizations who have both the incentive and experience in coordinating the development of harmonized global accounting systems. The United Nations Statistical Division together with Eurostat, OECD and WTO are perhaps best placed to coordinate and harmonize the broad contours of the global supply and use tables of an extended system of international accounts. Excellent work of the various academic initiatives such as WIOD, CREEA and Eora and the work of the OECD on TiVA should provide a sufficient foundation for an international partnership for formulating the global supply and use table framework, while the IMF, ECB and BIS are best suited to continue its work on extended financial accounts. Eurostat should support those efforts within the European context, while the World Bank's role (and the role of the other multi-lateral development banks) will be foremost to support the corresponding implementation efforts in developing countries.

78. Country participation will be the backbone for this effort. Individual countries have the expertise, access to the data, relations with respondents, and understanding of business and policy needs to lead in the development and priorities for the implementation plan. Given their importance in global supply chains, especially the role of their multi-national companies, major developed economies will need to play a key role in bilateral data exchanges, reconciliation, and other research to improve the core statistics and extend and refine the trade in value added and financial accounts. Some major developed economies may be unable by law to participate in micro data exchanges but should be able to participate in reconciliation and research work through reconciliation of bilateral sub-aggregates, use of publicly available data, and bilateral micro data research (conducted in such a fashion that only the domestic statistical agency researcher can access the domestic micro-data and the other country researcher can only see

aggregate coefficients and results). Further development of new techniques in this domain is necessary.

79. Smaller countries, on the other hand, may be even more dependent on, and vulnerable to disruptions in, global supply and financial chains. Examples include, respectively, Ireland and Iceland. These nations therefore will need to play a key role in determining the design of such accounts and the necessary information to be derived from the accounts.

80. Finally, as suggested throughout this discussion paper, the implementation plan should include a heavy dose of management steps to produce the most relevant and accurate data in the most cost effective way while protecting the confidentiality of respondents. The plan should probably proceed incrementally using proof of concept techniques and contingency plans to assure at least partial success and minimization of costs at each step in the plan. It will also be important that some representative body, perhaps a working group coordinated by the UN and other International Organizations with key country membership, have final authority to make decisions and hear objections to assure steady progress on the implementation plan.

## **G. Questions for Discussion**

1. What should the scope for a new extended system of international accounts?
2. What priority should be accorded to a new extended system of international accounts relative to other needed efforts to maintain and update the existing sets of economic accounts?
3. Given respondent burden and resource constraints, what is the best way to proceed in developing an extended set of international accounts? Through direct survey estimates or indirect estimates using expanded supply and use tables? Are indirect estimates good enough for most policy uses?
4. Is it realistic to think that efforts to develop expanded international accounts can be integrated with efforts to improve the existing Trade, Balance of Payments, and National Accounts?
5. What is the best strategy for rolling out, and garnering support for, an extended system of international accounts?

## H. References

Ronald Jansen, et. al. "Measuring International Trade and Economic Globalization," IARIW 33rd General Conference, 2014

Nahim Ahmad and Jennifer Ribarsky, "Trade in Value Added, Jobs, and Investment," IARIW 33rd General Conference, 2014

Dylan Rassier, "Formulary Measures for the U.S. Current Account: Accounting for Transactions Attributable to Special Purpose Entities of Multinational Corporations," IARIW 33rd General Conference, 2014

Office of Management and Budget, "2017 North American Industry Classification System (NAICS) Revision," U.S. *Federal Register* Vol. 79, No. 153, pages 46558-46559, Friday, August 8, 2014.

UNSC Friends of the Chair draft Concept Paper on "Measurement of International Trade and Economic Globalization," April, 2014

Report by the Secretary General, "Measurement of International Trade and Economic Globalization," United Nations Statistical Commission, 45th session, March 2014

Robert Heath, "Why Are the G-20 Data Gaps Initiative and the SDDS Plus Relevant for Financial Stability Analysis, IMF Working Paper, January 2013

IMF, "Enhancing Surveillance: Interconnectedness and Clusters," International Monetary Fund, March 15, 2012

United Nations Economic Commission for Europe, *The Impact of Globalization on National Accounts*, United Nations, 2011

Kenneth Kraemer, Greg Linden, and Jason Dedrick, "Capturing Value in Global Networks: Apple's iPad and iPhone," working paper, July 2011

Susan Houseman and Kenneth Ryder, *Measurement Issues Arising from the Growth of Globalization*, Upjohn Institute and the U.S. National Academy for Administration, 2010.