Measuring Global Production in the National Accounts and the Balance of Payments

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Measuring Global Production in the National Accounts and the Balance of Payments

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*This paper presents some of the main findings of the UNECE Task Force on Global Production as reflected in the UNECE Guide to Measuring Global Production. Contributions from Dylan Rassier, Soli Peleg, Gerardo Durand Alcántara and Henk Nijmeijer to this paper are gratefully acknowledged. The authors only are accountable for any mistakes in this paper. Readers are invited to provide their comments to mark.dehaan@cbs.nl.

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Summary: Globalization contrasts the notion of a national economy. Breaking down globalized production chains, including those encapsulated by multinational enterprises, on a country-by-country basis is a challenging task which increasingly occupies macroeconomic statistics compilers. This paper builds on the work carried out by the UNECE Task Force on Global Production which is developing a Guide to Measuring Global Production. Among other things, the Guide presents a typology of global production arrangements with the purpose of obtaining a clear understanding of (a) the specific roles of the various entities active in global value chains, (b) the nature of transactions they are engaged in, and (c) ownership issues around assets and IPPs in particular. The Guide aims to assist statisticians in compiling macroeconomic statistics at a national level. Users of the statistics are expected to benefit from this new guidance as well, for example by being provided with high-quality information on a country's changing trade dependencies in an environment of on-going globalization.

1 Introduction

In recent years, significant steps have been taken to improve the recording of transactions in the national accounts and balance of payments for enterprises participating in global production. In particular the harmonization of the System of National Accounts, 2008 (2008 SNA) and the Balance of Payments and International Investment Position Manual, sixth edition (BPM6) is an important improvement. For example both sets of accounting standards require a recording of imports and exports of goods on a strict change of ownership basis. In addition, the UNECE Guide on the Impact of Globalization on National Accounts assists statistics compilers in a wide range of globalization issues.

The former versions of the SNA and BPM recommended the recording of commodity trade on the basis of cross border registration; the biggest advantage of this recording being its close connection to

statistical observation of international trade, often obtained from customs information. A disadvantage, however, is its disconnection from the production accounts of the companies active in global production. This becomes apparent when for example looking at arrangements in which goods are shipped abroad for processing or repair without a change of ownership taking place. Following a cross border registration of trade, the accounts assume economic ownership is handed over to the foreign processor and respective transactions are imputed between the principal and the processor. An import of goods and respective intermediate consumption has to be imputed for the raw materials or semi-processed goods entering the country of the processor and export of goods (and output) for the processed goods returned to the principal. Maintaining consistency between the international trade flows and the production accounts under cross border registration required imputations of output and intermediate consumption which is simply beyond economic reality. The recording of international trade of goods on the basis of a transfer of ownership principle recommended in 2008 SNA and BPM6 increases accounting consistency and ensures better consistency between enterprise accounts and national accounts, particularly in the context of global production.

However, setting up the economic accounts on a change of ownership basis brings to the surface measurement issues, which were previously concealed when compiling the accounts following the old guidelines. Also, additional data sources supplementing customs records must be put into place to meet these new guidelines. In 2012, the Commission of European Statisticians installed a Task Force on Global Production with the objective of developing guidance on some of the unresolved conceptual issues arising from the 2008 SNA and BPM6 in relation to global production. A second task was to develop further guidance on implementation aspects. In doing so, the Task Force studied the existing practices of countries in relation to various global production arrangements. This guidance was brought together in the 'Guide to Measuring Global Production' of which an interim draft version was sent out for country consultation at the beginning of 2014.

The main findings of the Task Force could be summarized as follows:

- Global value chains may be fragmented to such an extent that their accounting on a country-by-country basis becomes highly challenging and requires first of all a clear understanding of the kind of production activities carried in one country as against another.[1] Subsequently it requires a clear understanding of the nature of transactions between the entities active in these globalized value chains. These complexities are often amplified when examining global production arrangements inside multinational enterprises. Global production does not simply

[1] The interim version of the Guide to Measuring Global Production makes a distinction between global supply chains, global value chains and global production chains. These concepts are explained in the introductory chapter.

represent an interlinked sequence of unconditional market transactions which can be accounted for in a step-by-step approach. Instead these production webs are usually under managerial control of a leading company, i.e. the principal, and subject to conditional transactions and huge information streams in which intellectual property and information technology play a crucial role. The governance structures of global value chains are well explained by Gereffi et al. (2005).

- Global value chains inside the multinational enterprise group may be designed, at least to some extent, to benefit from differences in the tax regimes across jurisdictions. In such cases, national accountants may be confronted with the question whether business reporting reflects an economic, opposed to a legal (and tax reporting) state of affairs. The 2008 SNA explains that legal and economic ownership of products and assets will usually coincide, but if not, economic ownership should prevail. This guidance may be difficult to follow in practice, for example when the revenues from intellectual property products before taxes are reported by an affiliated 'brass plate' company in one country, and after taxation are repatriated to the parent. The latter should probably be identified as the genuine economic owner of the intellectual property product in question but does not report the returns to intellectual property products in its production account.
- Accounting for global production can be very data intensive and resource demanding. Dedicated surveys and installing 'large and complex enterprise units' are examples of the means put into place by statistical institutes to keep track of global production. However, the need for such substantive efforts is not a welcome message for those statistical institutes constrained by diminishing budgets and calls for limiting response burden.

These findings indicate that on-going economic globalization will inevitably require increasing efforts by national accountants to assign the right fragments of a global value chain to individual national economies. And while statisticians and politicians are used to thinking in terms of national economies, representatives of multinational enterprises are less inclined to do so, unless for tax reasons. So, is it a rhetorical question to ask if the national accounts have become obsolete? If they were not already established as some of the most important measures of economic performance, would there be a need to invent them?

This brings into question the policy use perspective. Just as company's statutory accounts are prepared and published to inform stakeholders on the status of their investments, the national accounts are compiled and disseminated to inform the stakeholders, e.g. government bodies, citizens and corporate representatives, on developments in the national economy. So, as long as economic policy takes a key interest in the national economy, economic statistics must support a national economy's view.

At the same time, one could argue that the need for a national economy perspective in a globalizing world is not diminished. On the contrary, as globalization leads to the reallocation (offshoring) of production activities and jobs, the consequences at the national economy level in terms of competitiveness, employment, income and government finance is expected to elevate policy attention.

Economic globalization also has an environmental dimension as it may be the polluting industries that move away first, expectedly to countries with less strong environmental regulation. It is not said this offshoring of physical transformation improves a nation's overall environmental performance, particularly when taking into consideration the indirect environmental requirements (i.e. natural resource inputs and residual outputs) of imported goods in addition to those recorded directly in the environmental accounts of producers and consumers at the national level.

The rest of this paper is organised as follows. Section 2 presents a brief overview of the work carried out by the Task Force on Global Production to improve the measurement of global production in the national accounts and the balance of payments. Section 3 follows the user's perspective by reviewing a number of analytical aspects of the national accounts and balance of payments in the context of global production and international trade. The last section of this paper summarizes the Task Force's recommendations and some of the future challenges of national accounting in the context of global production.

2 A brief overview of the Guide to Measuring Global Production

The main goals of the Guide to Measuring Global Production (in short, the Guide) is providing clarity on several unresolved conceptual issues and providing support on the measurement aspects of global production. This conceptual and practical guidance is supported by a wide range of country case studies presented throughout the Guide.

2.1 Conceptual framework

The conceptual issues discussed in the Guide start with the presentation of a typology of global production arrangements. This typology helps with identifying:

- The main entities active in the arrangements;
- The level of control exercised by the principal over suppliers;
- The nature of transactions taking place between the entities participating in the arrangement;
- Economic ownership of material inputs, output and assets, in particular the intellectual property products used in production.

The following global production arrangements are identified:

A. Goods sent for processing abroad;

B. Goods under merchanting;

C. Factoryless goods production;

D-E. Fragmenting the production of services, including or excluding intellectual property products;

F. Subcontracting the production of services;

G-H. Direct investment enterprises not directly engaged in either producing goods or producing services.

It should be noted that global value chains may be organised by combining several of the arrangements listed above. This may seriously complicate the analysis of real life cases of global production. Also, contract producers may be working simultaneously under several of the above mentioned arrangements, such as processing and factoryless goods production. Another complicating factor is that global value chains may be rearranged frequently. Keeping track of these changes in business registers, source statistics and macroeconomic statistics will be demanding.

The accounting aspects of the first two arrangements, processing and merchanting, are discussed in detail in the 2008 SNA and BPM6, particularly in the context of recording the international transactions in goods on the basis of a transfer of ownership, in contrast to a cross border registration. This point was already briefly highlighted in Section 1 of this paper with respect to goods sent for processing. Merchanting involves international trade in goods where these goods never cross the border of the country in which the merchant is resident.

An arrangement less well understood so far is factoryless goods production. Factoryless goods producers outsource all physical transformation to contract producers, often located abroad. Factoryless goods producers are often active in the production of high-tech products like semi-conductors and consumer electronics. While the factoryless goods producer does not supply any of the material inputs into the production process, this producer's main occupation is providing substantial service inputs in the form of technology, know-how, and product design. Factoryless goods producers are typically substantive investors in intellectual property products to which the provision of the above mentioned services is closely connected. In other words, the factoryless goods producer concentrates on research, innovation and marketing decisions and maintains control over the outcome of the production process, including the contractor's contributions, by providing the technical specifications that are essential for the transformation of the material inputs. Further, the factoryless goods producer controls access and delivery of the final output to consumers.

A strict interpretation of the UN (2008) International Standard Industrial Classification of All Economic Activities, ISIC Rev. 4, would mean that factoryless goods producers should be classified under trading. Paragraph 144 of ISIC Rev. 4 recommends that a principal who completely outsources the transformation process should be classified into manufacturing if and only if it owns the input materials to the production process, and therefore owns the final output. Yet, factoryless goods producers own the blueprints of production but not the material inputs.

As a consequence, the output of factoryless goods producers should reflect the net value of purchases and sales of goods, i.e. the trade margins. This will lead to a rather distorted reflection of such high-tech companies, as the supposed trade margins would usually be dominated by the value added generated by various sorts of activities besides trading, i.e. research and development (returns on investment in intellectual property), product design, supply chain management, branding and marketing.

Alternatively, the Guide recommends classifying factoryless goods producers under a special category of manufacturers. As their production functions differ fundamentally from regular vertically integrated manufactures, economic analysis with respect to international trade relationships, should benefit from separate (sub) classes under which factoryless goods producers would be represented in the supply-use tables of the national accounts. The Guide further recommends recording the output of a factoryless goods producer in accordance with its principal activity, i.e. manufacturing. Even though factoryless goods producers themselves are not engaged in material transformation, their output should reflect the full value of the product as sold to customers, and thus not a trade margin.

In the typology of global production arrangements the Global Production Guide follows a so-called 'narrow' view on factoryless goods producer, only with the purpose of defining precisely the output of the contractors under either a processing (a manufacturing service) or a factoryless goods production arrangement (a good). However, in terms of economic classifications, it is important to stress that each principal that owns intellectual property products and supplies related service inputs to a contract processor, possibly in addition to material inputs, should be classified under manufacturing. This may apply to the principals of a processing arrangement who own, in addition to material inputs, also the intellectual product products related service inputs.

In addition to manufacturing, several categories of global production arrangements listed above deal with the international provision of services. Their suggested significance caused the broadening of the scope of the Task Force research programme from global manufacturing to global production more generally. At this point in time it must also be admitted that the Task Force was not able to obtain sufficient evidence on services related global production cases, a clear exception being merchanting. In the Guide some preliminary guidance is given on merchanting, subcontracting and bundling of

services, yet it acknowledges that this guidance will require further development and refinement in the near future.

In addition to typology issues, the Guide also elaborates on the principles of economic ownership, particularly inside the multinational enterprise group and with respect to the intra-company recording of goods, services and assets. There are at least three areas where applying the principles of economic ownership in a national accounting context can be challenging. The first area, which was already touched upon, concerns the brass plate type of entities inside multinational enterprise groups to which legal ownership of intellectual property products are assigned with the purpose of cumulating related revenues in low tax jurisdictions.

A second issue concerns the intra-company transfer of goods, services and assets which should be carefully examined as these exchanges may not coincide with actual market transactions. The transfer pricing methods applied by multinational enterprises largely determine the extent to which such international transfers of goods and assets can be recorded at 'arm's length' prices. Particularly challenging is the recording of intragroup services provided by e.g. head offices and dedicated R&D units. The Guide reviews the work of 'large and complex cases units' where several statistical institutes attempt to map the international transactions of the largest and most complex multinational companies on a case-by-case basis. Further, the Guide contains a decision tree assisting national accounts and balance of payments compilers in assigning intellectual property ownership to the various entities in a global production arrangement, inside or outside the multinational enterprise group.

A third issue is about multiterritory enterprises and related companies whose operations are physically spread over more than one country. As the central focus is on data for the national economy, it is necessary to split the operations of such enterprises between economies. In the absence of separate institutional units, the operations should be prorated according to an appropriate indicator of the scale of the enterprise operations in each economic territory. This will inevitably require the recording of imputed international transactions in goods between these units. Creating notional units is done out of necessity and is an exception to the general 2008 SNA/BPM6 rule of not imputing transactions. Based on a range of country case studies, the Guide provides practical guidance on how to account for multiterritory enterprises on a country-by-country basis.

2.2 Practical guidance

Practical guidance in the Guide also deals with statistical measurement issues associated with so-called quasi-transit trade and similar phenomena. Quasi-transit trade occurs when goods enter an economy and are declared as imports for customs purposes at values that differ from those that are declared when the goods leave the same economy. Quasi-transit trade may lead to import values

obtained from customs records that differ from the actual transaction value. The Guide lists a number of data sources that can be consulted in addition to customs data to trace down the actual transaction values of quasi-transit trade flows.

Specific attention is paid in the Guide to the already mentioned large and complex enterprises units set up in recent years by several statistical institutes, for the purpose of observing and measuring global production related activities on a case-by-case basis. Based on the responses of a survey obtained from ten national statistical institutes, similarities and differences in the operation of these large and complex cases units are examined. Within these statistical institutes, the large and complex cases units play a leading role in solving the most complex accounting problems of global production. Although the organisation, tasks and the analysed data sets may vary across countries, the collection of country experiences reveal many common threads or issues, which statistical offices face. A common platform to share experience and learn from each other would be very beneficial.

The Guide pays significant attention to practical guidance on overcoming data gaps that emerge in the data collection systems of statistical offices when moving from a 'cross border' to a 'transfer of ownership' registration of the international trade in goods under a processing or merchanting arrangement. Usually, merchandise trade statistics are the main source used for the recording of imports and exports of goods in the national accounts and the balance of payments. It should be noted that, until now, merchandise trade statistics have strictly followed a cross border recording of trade in goods under International Merchandise Trade Statistics Guidelines (IMTS 2010).[2] A range of adjustments are needed to translate the observations from this source to a recording of imports and exports based on transfer of ownership under BPM6.

The following examples may illustrate the kind of adjustments that are required:

- Goods sent abroad for processing and the return flows of processed goods should be removed from exports and imports respectively in merchandise trade statistics as no change in ownership takes place. However, goods shipped after processing directly to foreign customers should be added to exports as these will remain unrecorded in merchandise trade statistics;
- Similarly, intermediate goods purchased abroad and shipped to foreign processors should be added to imports as they remain equally unnoticed in merchandise trade statistics;

[2] IMTS 2010 based measurement of international trade in goods is on a cross-border basis. This recording method diverges from BPM6. To bridge these differences, IMTS 2010 recommends customs collection to include information on changes in economic ownership.

- Goods received and returned under an inward processing arrangement should be removed from imports and exports respectively, as observed from the country's perspective in which the processor is resident;
- The goods purchased and sold under a merchanting arrangement will remain unrecorded in merchandise trade statistics which means supplementary surveys are needed to capture these international trade flows under merchanting.

The significance of these adjustments obviously depends on the level of openness of the economy under consideration. For some economies these adjustments will be substantial. Just to illustrate this point, today Hong Kong's imports and exports of goods not passing its borders are bigger than those that do (Census and Statistics Department of Hong Kong SAR, 2014).

The Guide systematically reviews all data items needed in addition to merchandise trade statistics to account for global production arrangements. The inconvenient truth is that, for this to happen, supplementary data sources must be put into place. Many statistical institutes that already adjusted their modes of observation in accordance with 2008 SNA and BPM6 guidelines did so by establishing dedicated surveys for observing imports and exports under processing or merchanting arrangements. Yet, several statistical offices commented in response to the preliminary consultation of the Guide that such an expansion of economic surveys is not a feasible option for them.

3 Implications for analysis

The international fragmentation of production influences macroeconomic statistics in several ways. Without pretending to provide a complete overview of user's concerns, globalization is expected to affect the use of macroeconomic statistics in at least the following three areas: a sound understanding of economic classifications, productivity measurement and the analyses of international trade relationships. These three areas are briefly explored below.

3.1 Economic classifications

First of all, applying the industrial classification to establishments participating in a global value chain may be less straightforward or less informative. The industry classification should particularly support the provision of information on the economic structure, and on structural changes, as for example shown in the national accounts supply-use tables. The existing classifications may not always be equipped to keep track of structural changes resulting from globalisation.

An issue already touched upon is that of factoryless goods producers. Albeit acknowledging these companies are acting as the leading firms in manufacturing oriented global value chains, their main contributions to the value chain are mainly services related. The typical activities carried out by these companies are e.g. supply chain management, R&D, product design, branding and marketing. The recommendation of the Task Force is not to classify factoryless goods producers under wholesale trade but instead as manufacturers. However, it has also been argued that factoryless goods producers should be headed under a totally new class of producers.

Aggregating in one class the regular vertically integrated firms with those leading either a processing or a factoryless type of global production arrangement will inevitably lead to a heterogeneous representation of the production accounts, as presented by the supply-use tables, as the input structures of both categories of firms will differ fundamentally. Even if the output of both types of firms is similar, the kinds of operations carried out are not similar at all. Obviously, another reason for differentiation is that factoryless producers and principals sending goods for processing abroad are interconnected to global markets and international trade, which may not necessarily be the case for the vertically integrated manufacturers. From a user's perspective, this is in itself relevant information.

This means that the principals in either a processing or factoryless goods production arrangement should preferably be classified to manufacturing as a separate and new subset of existing classifications highlighting the 'factoryless characteristics' of these firms but maintaining at the same time a link to the their main output, for example as shown at the ISIC division (2-digit) level.

For similar reasons, the contract producers under a processing or factoryless goods production arrangement should preferably be presented in separate ISIC (sub) classes as well, as the output of these producers differ from regular goods producers as well. For example, the contract producers under a processing arrangement will be providing processing services on goods owned by the principal. Under a factoryless goods production arrangement, the contract producer will be manufacturing products on the basis of the technical specifications provided by the principal. Under such conditions the contract producers will not invest as heavily in intellectual property products as regular producers headed under the same ISIC category would need to do. Similarly, their output will not include any of the corresponding returns on intellectual property investment, as these will be acquired by the factoryless goods producer when selling the goods to customers. For these reasons, and also because of their tight international relationships, contract producers and processors should preferably be classified separately from the regular manufacturers in the corresponding ISIC class.

Business functions are used in statistical surveys on international outsourcing to categorise the kind of activities transferred to affiliated or non-affiliated companies abroad (Statistics Denmark et al., 2008). In addition to the outsourcing of physical transformation, business functions which are frequently outsourced are e.g. transportation and warehousing activities, marketing and after sales services

including help desks and call centres, ICT services, administrative and management functions and R&D. Each of these functions has corresponding classes in ISIC. But these codes do not necessarily indicate the characteristics of the global value chain to which these activities are linked. Particularly for head offices or R&D units, it would from an analytical point of view be useful to add information on the main characteristic of the global value chain to which these activities are linked, for example by indicating the main characteristics of the output generated in these chains.

Similar kinds of suggested refinements in economic classifications are recommended by the OECD (2014) in the supply-use tables integrated in the trade in value added framework. Globalization leads to heterogeneity of the input-output technical coefficients, giving rise to disturbances in the modelled trade dependencies of industry branches as a whole.

More generally, one could argue that input-output coefficients are increasingly reflecting (change in) economic ownership relationships instead of physical transformation relationships in the strict Leontief sense. For economic analysis this is not necessarily problematic, unless globalisation leads to a level of heterogeneity of production functions of the companies grouped in one class that makes the coefficients on average meaningless. However, in environmental input-output analyses physical transformation represents the key object of research. For example, the environmental impacts of a manufacturing service provider are quite difficult to assess on the basis of a production account showing no material inputs and outputs. As a result, the System of Environmental-Economic Accounting, SEEA 2012, (par. 3.133 and further) recommends an alternative treatment of goods sent for processing in the physical supply and use tables as opposed to their monetary counterparts by recording the material and energy inputs and outputs as physically observed. For the international movement of goods this requires a cross border registration and not a recording on change of ownership basis.

The further development of economic classifications in connection to global production is not part of the work area of the Task Force on Global Production. The UN Expert Group on International Statistical Classifications has confirmed that discussion on the implications of the proposed alternative classification of factoryless goods producers has started, yet a final decision is still pending.

3.2 Productivity measurement

A second issue is productivity measurement. Increasing productivity is generally conceived as a key source of economic growth, particularly in the aging society characterised by declining labour participation. Productivity growth can simply be defined as the increase in output (value added) generated by a non-increasing set of inputs (labour and capital), resulting from technological improvement. In addition to micro data research, the national accounts are equally used for measuring and analysing meso and macro trends in productivity (*cf*. O'Mahony and Timmer, 2009 or Jorgenson,

and Schreyer, 2013). As one of the novelties, the 2008 SNA includes a chapter (20) on capital services, particularly with the purpose of facilitating productivity measurement.

Global production can have significant impacts on the measurement of productivity in the national accounts. One obvious distorting factor is the reallocation of revenues by multinational enterprises to low tax jurisdictions, by creating legal units such as intellectual property owning special purpose entities or affiliated entities seemingly active in merchanting type of arrangements. These legal entities do not have any economic significance other than tax cost minimisation. For that reason, productivity measurement at the level of such units is rather pointless.

Fragmentation of production also leads to challenges in the domain of price and volume measurement. Without representative price deflators, measuring the outputs in volume terms of the various global production fragments is simply impossible. However, perhaps more importantly, lacking price information equally complicates measuring contributions to value added and GDP volume growth. Advancing price measurement in these areas requires the expertise of price statisticians which is beyond the scope of the Task Force on Global Production.

The Guide suggests improving price deflators in the following areas:

- Industrial processing services;
- The output of contract producers in a FGP arrangement;
- Trade services in connection to merchanting;
- Head office services and other intra-company services;
- IPP related services, specifically R&D; and
- Inventories held abroad.

One possible outcome of productivity measurement under factoryless goods production is that R&D performed by the principal will be generating productivity gains at the level of contract producers. Or reversely, quality improvements in the output of the contractor may originate from research in product development and product design conducted by the principal. Under such an arrangement, product innovations will be codified in the blueprints of production by which the contract producer alters its manufacturing process. In case these adjustments do not lead to substantive changes in transformation costs, they should, at least in theory, be measured as an increase in output (quality improvement) of the contractor. Subsequently, the principal will be purchasing higher quality products at similar prices and will consequently benefit from increasing mark-ups, especially when consumers sufficiently appreciate these quality improvements, allowing the principal to elevate sales prices. This example shows that a reasonable understanding of productivity estimates may require a clear view on global production arrangements in which productivity measurement takes place.

3.3 Recording of international trade

The increasing significance of global production will inevitably inflate international trade flows as measured via cross border registration, as the international fragmentation of formerly vertical integrated production methods will increasingly lead to shipments of semi-manufactured goods from one country to another. As a result, these enlarged gross trade flows may less clearly explain a country's actual trade dependency in terms of generated income and employment.

Moving towards a recording of imports and exports on a strict transfer of ownership basis, as recommended in 2008 SNA and BPM6, will to some extent overcome the problem of trade inflation. Under an outward processing arrangement, the previous recording of exports of raw materials and imports of manufactured goods (following a cross border registration) must according to the 2008 SNA guidelines be replaced by recording an import of a processing service. A reverse situation applies to merchanting where the export of a merchanting service must be replaced by recording the net export (export minus import) of goods under merchanting. Both accounting treatments reflect a net, instead of gross, recording of international trade flows.

But even when following strictly a transfer of ownership principle, imports and exports of goods in the balance of payments and national accounts may show volume growth rates exceeding those of GDP or domestics expenditure. The Guide provides an overview of the work currently undertaken by the OECD and WTO on trade in value added. By tracking down the value added embodied in gross trade flows, a clearer picture can be drawn of the actual trade dependencies between countries, particularly on a bilateral country level. Trade in valued added is typically measured with the help of interlinked input-output tables on the basis of the mapping of bilateral trade flows. This reconciliation of international trade statistics in a multiregional input-ouput table is a huge endeavour, requiring substantive data adjustments.

Due to globalisation, assessing an individual country's international competiveness most likely requires a shift in focus. In former times, it was sufficient to detect industry branches operating on international markets in contrast to those that are not. Nowadays, the fragmented production chains require a more subtle review of economic activities, for example by examining the kinds of business functions in which internationally operating companies are typically active. Particularly for the leading firms in global value chains, this may also bring a shift in focus from goods to services. The work on trade in value added indicates that, particularly in the area of services, asymmetries between reported exports (from country A's perspective) and imports (from country B's perspective) can be substantial.[3] However, linking particularly the knowledge-intensive fragments to global value chains, e.g. supply

[3] http://www.oecd.org/sti/ind/statisticalqualityoftiva.htm

chain management, financing, R&D, ICT, logistics and marketing, requires high quality trade in services statistics. Advancing an economy's knowledge orientation is often considered a way to keep up with international competitiveness. Perhaps it is not so much the trade in value added, but the trade in high-skilled labour becoming increasingly the focal point of economic policy (Timmer at al., 2008).

Measuring the services flows inside global value chains encapsulated by multinational enterprise groups is particularly challenging. The transfer pricing methods applied inside the enterprise groups largely determine whether or not transfers of goods, services or assets can be recorded in statistics at 'arm's length'. Transfer pricing has been used by global corporations as an approach to tax planning and profit optimization which distorts the information collected from these companies. In addition, for many services as managerial or R&D services provided by e.g. head offices and dedicated R&D units, cost redistribution mechanisms are not always put into place. R&D is often regarded as 'corporate property' and assigning R&D ownership to either a head office or the affiliated companies using the R&D in their production activities is not straightforward. In this regard, the IPP decision tree presented in the Guide provides guidance to statistics compilers that sometimes depends on pragmatic solutions, which may not always be satisfactory from an analytical viewpoint.

The 2008 SNA research agenda (par. A4.12) suggests that consolidation of the accounts of enterprise groups would overcome the problem of shared costs and benefits of ancillary production and R&D. However, consolidation may not lead to a satisfactory solution for the analysis of individual country performance in the cases where these enterprises have affiliated companies in a wide range of countries, as a breakdown of the accounts, and cost redistributions, on a country-by-country basis is still required.

The Guide advises to explicitly address the reporting of intra-group services in international trade in services surveys, depending of course on the significance of multinational enterprise groups in these statistics. Examining the intragroup provision of services on a case-by-case basis, as facilitated by the so-called large and complex cases units inside national statistical institutes is also a promising way to proceed. In addition, statistical institutes should work closely together to eliminate asymmetries in statistics where they occur. A related initiative currently under development in the EU is the Euro Group Register covering the biggest European multinational enterprises.

4 Conclusions and recommendations

So, does globalization herald the end of national accounting? And if so, what would be the alternatives for replacement, as users still require a macro perspective on economic growth and income? The provisional answer given in this paper is that globalization, beyond doubt, leads to serious

measurement challenges. The Guide to Measuring Global Production provides assistance in tackling several of the issues highlighted in this paper, while leaving other issues open for further research. The need for further research and follow-up on emerging global production arrangements means that updating the Guide each 5-10 years is strongly recommended.

At the same time, globalization does not seem to diminish the user demands for information from a national economy's perspective. From this point of view the national accounts and balance of payments are still valuable frameworks for providing statistical information on the national economy level, including the interactions with the rest of the world, despite all the measurement challenges related to global production.

Perhaps a more diverse use of national accounts statistics may help overcoming some of these obstacles. As production fragmentation may disturb some of the analytical uses of GDP, Gross National Income (GNI) as an indicator is perhaps less prone to the distortionary effects caused by the dominance of multinational enterprises in the domestic economy. GDP measures the value added produced in a country irrespective of whether this value added is generated by foreign or domestic owned companies. However, the profits generated by direct investment enterprises are entirely attributed to the parent company abroad and reflect the difference between the output, mainly exported, and intermediate consumption, largely imported, leaving behind in the domestic economy the residual of tax paid and the compensation of employees at their plants. In this way GNI measures only the income accruing to residents of a given country and excludes income earned in the country by foreign owned companies, whether or not it is inflated by transfer pricing and includes income earned abroad by residents of the country. However, retained profits on portfolio investment will not show up in GNI either, so moving from domestic product to national income may solve some, but not all of the disturbances encountered in the context of multinational enterprise groups.

The Task Force's most important recommendations are the following:

- The typology of global production arrangements developed to enhance international comparability of national accounts and balance of payments should be tested and kept up to date on the basis of new case studies;
- The industrial classification of factoryless goods producers should be refined according to the findings of the Task Force;
- On several occasions, a strict recording of international transactions on a transfer of ownership basis, as recommended in 2008 SNA and BPM6, can be challenging, in terms of statistical measurement but also with respect to economic analysis. The Task Force recommends identifying the 'artificial' intellectual property product services provided by special purpose

entities separately in the national accounts and balance of payments, for example by presenting them in supplementary tables, to inform users about the significance of these flows;

- Measuring global production requires data that, at present, cannot always be obtained from existing surveys or registers. The design of business surveys should be such that the principle of ownership, and not that of territory, is used as a key concept (e.g. in questions on inventories held by the surveyed unit as changes in inventories of goods held abroad need to be recorded in supply and use tables). It is advised to explicitly address the reporting of intra-group services in international trade in services surveys, depending of course on the relative size of the activities of multinational enterprises and the related output or consumption of intra-group services;
- Measuring global production requires new methods to compile economic statistics. So-called large and complex cases units, set up in recent years by several statistics institutes, can be successful in collecting and compiling data on the largest and most complex enterprises in a consistent and effective way. Issues around global production may oblige statistical institutes to combine efforts in completing their views on MNEs and global production and international trade more generally;
- Price and volume measurement in the context of global production is another important area for future research;
- Research in global value chains and trade in value added amplifies the need of high quality statistics on global production and international trade, in goods and in services.

As a follow up of the Task Force's work, it is recommended to set up an information exchange platform for the stocktaking of complex cases, identifying best practices and further harmonization of accounting practices. Part of this work will also encompass testing and further refining or expanding the typology of global production arrangements presented in the Guide through the examination of new case studies. The proposed platform could also be used for the exchange of practical experience on data collection, compilation methods, and organizational issues and the involvement and operation of large and complex cases units, international data confrontations, and engaging price statisticians in research on global production. The platform could take the form of face-to-face meetings but may also include a (protected) website for the collection and dissemination of case studies and new methodology.

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