

PRESENT AND FUTURE CHALLENGES TO THE SYSTEM OF NATIONAL ACCOUNTS: LINKING MICRO AND MACRO¹

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The System of National Accounts has changed dramatically over the past decades, and it will continue to change, as a consequence of changes in the environment of producing statistics. These changes do not only relate to the user demands, also the source data and the means, in the sense of the available technologies for compiling national accounts, have undergone and will continue to undergo significant changes. After a short historic review of the main evolutions in the past three to four decades, the paper addresses the main developments and challenges in relation to the sources for compiling national accounts (input), the technologies for processing data (throughput), and the user demands (output) in the area of national accounts. The article concludes with some ideas and suggestions on how to move forward.

1. LOOKING BACK

Looking back in the recent history of compiling national accounts, one often tends to look upon the past developments as something logical and beyond dispute. History runs its course and that's it. Yet, taking a step backwards, and trying to imagine the perception of a national accountant in the 80s about the current status of macro-economic statistics, he/she would consider the messenger from the future as a complete nutcase. In this respect, one of the most striking developments in the past three to four decades relates to the timeliness of national accounts estimates. Whereas in the 80s, many countries only compiled annual estimates with a time lag of 6–9 months after the end of the reference year, nowadays national accounts are almost entirely focused on compiling quarterly estimates with a time lag of 30–45 days for GDP and main aggregates, and a time lag of 90–120 days for arriving at first estimates for a full-fledged system of institutional sector accounts.

Another striking development concerns the shift in focus of national accounts. In the 80s, the system was primarily concerned with compiling data on the production of goods and services with some data on income and finance at the margin. This focus has totally changed. Although supply and use of goods and services are still at the core of the system of national accounts, and more recently gained renewed interest in response to issues related to globalization and the state of the environment, data on income and finance, including

¹The views expressed herein are those of the author and should not be attributed to the Organisation of Economic Co-operation and Development. The author is accountable for any mistakes in this paper.

balance sheets, by institutional sector (non-financial corporations, financial corporations, government, households, etc.) have earned their rightful place in the heart of national accounts. In response to the economic and financial crisis in 2008, the G-20 Data Gaps Initiative (DGI), comprising 20 recommendations for the improvement of statistics, has put even greater emphasis on the compilation of the latter data sets, more specifically on balance sheets, to better account for risks related to excessive debt levels and those related to e.g. currency and maturity mismatches. The spreading of the financial crisis in the U.S. mortgage market to other sectors and the world at large has also shown the importance of better capturing the risks related to interconnectedness.

It goes without saying that in the past decades the development of computer technology has had a major impact on the compilation process of statistics. In national accounts, the main compilation procedures of relevance concern the input and transformation of source statistics to national accounts definitions, and the manipulation of these data to arrive at a consistent set of data, whereby (i) the transaction identity—total supply of goods and services being made equal to total demand, and more generally for each transaction, e.g. compensation of employees and interest, total payments being made equal to total receipts, (ii) the budget identity—the balancing item of non-financial transactions, for each institutional sector, being put on a par with the balancing item of financial transactions, and (iii) the balance sheet identity—the difference between the positions of each balance sheet item being made consistent with the transactions in the relevant item, the revaluations and the other change in volume—are met. Whereas meeting these constraints to the extent possible, and balancing all transactions and balance sheet positions, required a vast amount of manual interventions in the 80s, nowadays more and more automated procedures can be applied.

A final aspect that I would like to point out here is the “administrative use” of national accounts data. This administrative use concerns the use of certain indicators for rather specific purposes of monitoring. An example is the monitoring of government deficit and debt as part of the Growth and Stability Pact in the European Union (EU). Another example relates to the use of Gross National Income (GNI) to determine a country’s contribution to the budget of international organizations. This type of use of statistical data, hardly known in the 80s, tends to put special (political) attention on certain parts of the national accounts framework, with clear advantages and disadvantages as a consequence. Nowadays, one sometimes gets the feeling, at least in the EU, that it completely governs the life of a national accountant. Huge amounts of time and resources are spent to arrive at high quality, internationally comparable data for the relevant indicators, with noticeable (negative) consequences for other parts of the system of national accounts, including research into the conceptual framework.

The above provides an all but complete overview of the main developments in the past three decades. It is clear, however, that things have changed quite dramatically, and that the producers of statistics had to face tremendous challenges. It is also obvious that these developments have not suddenly come to a stop. In

the rest of the paper, the main present and future challenges, from the viewpoint of the author, are being addressed.

2. PRESENT AND FUTURE CHALLENGES IN INPUT AND THROUGHPUT

In addressing the main present and future challenges, first developments in the source statistics underlying the system of national accounts (input), and the main challenges or opportunities provided by the increasing technological advancements (throughput) are briefly dealt with in this section. In the following section, the ever changing economic environment and user demands (output) are discussed more extensively.

2.1. *Input*

One of the main input challenges comes from the continuing pressure to decrease the respondent burden. Respondents, individuals and enterprises alike, usually don't get particularly excited about being selected into the sample for a certain statistical survey. Although politicians would like to have high quality statistical output to monitor and analyze the latest economic developments, they are also very much prone to societal pressures to limit the burden from surveys, especially when they come from enterprises arguing that the surveys add to their costs and thus have a negative impact on their productivity and cost effectiveness. But then again, how good are the source data that can be derived from statistical surveys? I must admit that I have serious doubts. One can relatively easily measure sample errors, but what about measurement errors? How often is the completion of a survey taken seriously, and not left to the most junior staff member or intern? Direct comparisons between certain source statistics and national accounts results often show major discrepancies. Take, for example, household receipts of property income which can also be tracked by looking at the counterparty sectors paying the relevant income. The income surveys of households usually show remarkably lower estimates. This may be caused by under-representation of the rich and famous, but a major part is probably also caused by (deliberate) underreporting, for example related to missing one-off receipts like dividends and interest.

Whereas the future of surveys looks very gloomy, the availability of public administrative records increases continuously, including the knowledge, techniques and IT-tools to process them efficiently. The population and the definitions of these databases may not always be fully consistent with the objectives of official statistics, but one usually has a much better idea of the shortcomings and the areas for which one needs to make adjustments. And then there is Big Data, usually with capital letters, the latest buzz-word. Here, it is important to make a distinction between on the one hand "structured data" such as private records that are being collected as part of an administrative process (for example, scanner data of sales by supermarkets or the underlying databases of housing websites), and on the other hand "unstructured data" derived from scraping the internet to detect certain phenomena. An enhanced use of available structured datasets looks very promising, as they are usually well-defined in terms of population and concepts, the main problems in using them being related to getting regular access to them,

and influencing their content in order to avoid, for example, discontinuities over time. On the other hand, scraping the internet certainly has potential, for example in nowcasting certain phenomena for which the plausibility of the applied methodology has proven to be accurate by benchmarking it to past results from official statistics. But one also has to recognize that problems in this area can be multi-fold: representativeness of the observations, having continuous access to the relevant websites, consistency of the methodology over time given the quick changes in the environment, etc. Nevertheless, as said, it can create interesting opportunities.

National statistical offices also recognize the potential of the above data sets, as well as the importance of trying to have influence on the set-up or modification of these records to make them better suited for statistical purposes. It is clear that the availability of massive amounts of data from public and private records can provide great opportunities to produce more granular statistics, and thus address quickly evolving user demands for more detailed analysis. However, to fully exploit the potential of these micro data, it is important to be able to link the various datasets at the micro level, and—as discussed in the next section—to arrive at a transparent link between the micro data sources and the aggregates in national accounts.

The latter brings me to the statistical unit recommended in the international standards for national accounts. In the 2008 SNA, two units are being applied: the “establishment” for the description of the production process in the supply and use framework and the “institutional unit” for the description of income and finance in the institutional sector account. Here, a plea is made to confine the standards to using, throughout the system of national accounts, the enterprise, or a unit close to the legal unit, as the statistical unit, thereby amplifying the possibilities to use and link public and private records. More generally, the rapidly changing nature of production arrangements and in particular the ways in which producers produce goods and services has cast a spotlight on the 2008 SNA’s preference for the use of the establishment as the preferred unit to compile national accounts statistics by industry, in the supply and use framework. One of the primary motivations for this preference reflected the view that establishments classified to the same industrial classification grouping shared similar characteristics in their production functions, and, so, were considered broadly “homogeneous”. However, the increasing international fragmentation of production, coupled with the growing emergence of new types of producers, in particular factory-less producers, processors, and the growing share of output generated by foreign affiliates (and so the impact of transfer pricing), has further weakened the underlying assumptions of homogeneity. This has also been recognized in the research agenda of the 2008 SNA; see § A4.21.

But there are further reasons, notwithstanding those described above, why a fresh look would be useful. First of all, data for establishments often require arbitrary (pro-rata) allocations of operating surplus, and central services provided by head offices, various ancillary services, and also, importantly and increasingly, services related to intellectual property. Given the growing importance that knowledge based assets add to the value of any product, such allocations can significantly affect meaningful comparisons of value added to production ratios of

establishments in the same industrial sector. Using the enterprise as the statistical unit, overcomes, at least at the national level, this problem, and avoids arbitrary allocations.

More importantly in this context however, the enterprise would allow for increased opportunities to link statistics, thereby substantially enriching the potential for more specific economic analysis. As an example, using the enterprise as a unit would provide the vehicle for creating coherent information on supply and use tables broken down by foreign/domestic ownership and/or broken down by units either or not belonging to a multinational—which is essential to be able to fully understand how production, investment and trade are linked (see also below)—, as Foreign Affiliate Trade Statistics (FATS) and statistics on Activities of Multinational Enterprises (AMNE) are typically based on the enterprise unit.

Finally, using the enterprise as a unit would also provide opportunities for a far better integration of the description of producing goods and services in supply and use tables, and the description of income and finance in institutional sector accounts. Considering the increasing role of income and finance in recent decades, in particular showing up during the economic and financial crisis, and the interaction between the “real” economy and the financial economy, such integration could significantly benefit research and policy.

2.2. *Throughput*

In the introduction to this article the significantly enhanced ICT-capabilities for the core business of national accounts, the balancing process was already recognized. However, the potential of computerized handling of information has and will have much broader implications. Nowadays, it is so much easier to process vast amounts of data, to process and link the various large administrative registers, for enterprises as well as households. One of the most important features of present and future software is that it will also provide ample opportunities for developing and maintaining a transparent process design of statistics, from business and population registers to national accounts. This may need some further explanation.

For reasons of simplicity, leaving out all the nuances and only referring to economic statistics on enterprises (including government), the process of producing official statistics can be broken down into three major steps. It starts with the business register, its main goal being to have a complete and up-to date register of all enterprises and other institutions on the economic territory. This register is subsequently used to derive samples for surveys, and/or to link various administrative data sources. The next step concerns the compilation of statistics on a variety of industries, sectors and/or specific economic variables such as foreign trade, investments, etc. Using these and other sources, in a final step, national accounts try to come up with a consistent, i.e. balanced, macro-economic picture.

In the process of compiling national accounts, the source data are changed for a number of reasons, the most significant ones being (i) adjustments to the definitions according to international standards (SNA 2008 and ESA 2010); (ii) adjustments for incompleteness, for example hidden activities; (iii) adjustments for inconsistencies of source statistics over time, the primary goal of national

accounts being to arrive at consistent time series data; and, last but not certainly not least, (iv) adjustments because of balancing the whole system to arrive at a consistent set of data. In the process, often the connection between the national accounts aggregates and the underlying source statistics is, to say the least, not very transparent and well documented, for outside users as well as internal users.

The above lack of documentation clearly hampers the possibilities to drill down to more granular data, a request often voiced by researchers who would like to analyze, for example, productivity developments by (groups of) enterprises with certain characteristics, to analyze the contributions of various types of enterprises to output, value added and employment, or to analyze income, saving, investment and finance for different sets of corporations. It also seriously limits the flexibility of the statistical system, in the sense that it is quite difficult and resource demanding to quickly and efficiently respond to changing user demands requiring alternative breakdowns of national accounts data. Therefore, a strong plea is made here for viewing the statistical system as a whole, and using the technical possibilities to create, for example, standardized “process tables” to explain the changes made during the process of compiling national accounts and to clearly show the linkages between macro-aggregates and the aggregates that can be derived from (grossed up) micro-data. This would enable users to make alternative breakdowns based on micro data, with a better understanding of the mismatch between the micro data and macro-aggregates, and providing not only them but also the statisticians with enhanced possibilities to make adjustments for the gaps.

3. PRESENT AND FUTURE CHALLENGES IN OUTPUT

3.1. *Introduction*

The economic environment is continuously changing. As a consequence, international standards for compiling national accounts may also need to be adjusted, in order to keep abreast of these changes. In other cases however, current standards may appropriately reflect the changing economic environment, and newly arising user demands can be met by “simply” adjusting the output results. An example of the latter is the compilation of quarterly institutional sector accounts to meet user demands for more timely data on income and finance. Another example concerns the need for alternative classifications and/or more granular information by industry and institutional sector.

In this section, a number of output challenges are being addressed. A distinction is made between changes that affect the central framework of national accounts, and changes that go beyond the current system. In respect of the first category, the following issues are dwelt upon: (i) globalization and the international fragmentation of the production process; (ii) the knowledge economy; (iii) the change in focus from production to income and wealth; and (iv) the change in focus towards distributional aspects of income, consumption and wealth across household groups. The paper will also discuss some of the issues that go beyond the current system, albeit very concisely, and only making some hints to the ongoing discussion in which the national accounts is being criticized of not

(adequately) addressing the issue of a broader measure of (economic) well-being and almost entirely ignoring sustainability.

3.2. *Globalization and the International Fragmentation of Production Processes*

Production becoming more and more internationally integrated poses serious challenges to adequately account for domestic activities. To arrive at a consistent recording of all transactions of internationally operating enterprises becomes more and more complex, especially in an economic environment which is characterized by quickly changing organizational structures, also across borders. Having different statistical units, as described in the previous section, does not help. Also conceptual differences in recording international trade flows, on the basis of crossing national borders, and national and business accounts, on the basis of change in ownership, is not particularly helpful. When in practice combining the various source data for individual companies, one is faced with very significant inconsistencies, which also show up when balancing supply and demand of goods and services at the macro-level in the supply and use framework. One may also be confronted with significant differences between, for example, the transactions recorded in the Balance of Payments and the source statistics on income and finance of corporations. These consistency problems have triggered various initiatives, such as creating specific organizational units within national statistical offices, that are responsible for micro-balancing the transactions and positions of the largest and most complex corporations. Another initiative is the growing international coordination of the allocation of the various parts of multinational enterprises to countries, such as the Euro Groups Register, in which the register-information for multinational enterprises in Europe are coordinated across countries.

In addition to the above, more practical and source statistics related, problems, the activities of multinational enterprises also raise various conceptual or analytical concerns for the compilation of national accounts for national economies. The first and perhaps most prominent issue concerns the allocation of value added to national economies. Multinationals have substantial intra-group transactions in goods and services which cross the borders of national economies. The valuation of these transactions, often referred to as “transfer pricing”, has a direct impact on the allocation of value added and GDP to countries. If, for example, a multinational from the U.S. arranges the production of its goods in China, and subsequently distributes them to another subsidiary in Europe, a low price for the export from China to Europe will result in lower output, value added and profits in China, and higher values outside China, and vice-versa. Although such prices, according to most national tax legislations, have to be set at market-equivalent prices, there is obviously quite some room to maneuver, especially in the case the relevant goods contain high margins for reasons of knowledge content and/or brand reputation, or in the case the relevant goods are intermediate products which are not marketable as a consequence of which it is not possible to apply a true market-equivalent price.

Another issue concerns the appropriate allocation of the use of services which are produced within a multinational enterprise. Especially the recording of

the use of intangible assets may raise issues, but also various intermediate services of an ancillary nature can cause similar problems. Here, one can think of, for example, software that is produced in one location of the multinational and used throughout the enterprise. Another example is the expenditures on Research and Development (R&D), which according to SNA 2008 are to be treated as gross fixed capital formation.

To make things even more complicated brass plate companies, often referred to as Special Purpose Entities (SPEs), are being established in certain countries, to reallocate the collection and distribution of royalties, license fees, or profits more generally, with the purpose of avoiding or minimizing worldwide tax payments. For obvious reasons, some countries are very attractive for the establishment of such conduits. The use of them often gets front page news coverage, once they become publicly known and relate to well-known multinational enterprises. More generally, it also has become less obvious to exactly pin down the economic ownership, to be clearly distinguished from the legal ownership, of these intangible assets. Economic ownership, which is the basic principle of the 2008 SNA for allocating assets to its owner, deals with the question who runs the risks and receives the rewards from using the relevant assets in the production of goods and services.

The above examples clearly have an impact on the allocation of output, value added (GDP) and profits across the world. It goes without saying that not having an adequate description of production processes in the various national economies, but reasons related to worldwide tax minimization, will often govern decisions at the enterprise level, thus hampering the adequacy of providing a good macro-economic picture of national economies. As an example, Lipsey (2010) provides an overview of the profit allocation of multinational enterprises with their headquarters in the U.S. It shows that in some countries the ratio of profits to compensation of employees of subsidiaries is as high as 35–36 (Barbados and Bermuda). The Other Western Hemisphere as a total has a ratio which is close to 12, whereas for the Other Middle East the ratio is as high as 9.4. This is strikingly different from the worldwide average equaling 0.8. For European subsidiaries, the ratio is even lower, less than 0.6, although Ireland has a particularly high level of 6.6.

Also worth mentioning here is the diminishing validity of analysis based on gross trade flows between countries. Because of the growing international fragmentation, it may be better to look at the value added content of trade flows, by subtracting the import content from the exports and thus removing the double counting implicitly included in gross trade flows. As a consequence, a completely different picture emerges from bilateral trade flows between countries. To disentangle the trade flows, and to arrive at estimates of the trade in value-added, the OECD-WTO project on Trade in Value Added uses a global input-output table that brings together national input-output tables for national economies, combined with bilateral trade data on goods and services. See <http://www.oecd.org/sti/ind/measuringtradeinvalue-addedanoeecd-wtojointinitiative.htm> for more information.

The most recent standards for compiling national accounts, the 2008 SNA, address some of the above issues related to globalization. Much more attention is paid on phenomena like merchanting and goods for processing, which are typical

ways of arranging global production. Furthermore, a specific section is devoted to the existence of SPEs and other captive institutions (2008 SNA, § 4.55-4.67). However, at the moment of writing this article, one has to recognize that we are only at the verge of understanding the implications of globalization for the compilation of national accounts. In this respect, one also has to realize that it will not be possible to solve all issues. The allocation of value added and profits being governed by tax considerations, rather than by arriving at an accurate understanding of production processes, is a matter of fact, and from a certain perspective also reflects economic rationale. It is good to realize though that this kind of issues does affect, at least to some extent, the measurement of the level of GDP, perhaps less so the estimation of economic growth. Multifactor productivity analysis, the analysis of changes in the volume of output as compared to changes of the volume of all inputs including services provided by e.g. intangible capital, may also need to be treated with more care, especially in cases of knowledge intensive industries with high shares of foreign controlled enterprises. Clearly, the same holds, even to a larger extent, for analysis of value added and profits of foreign subsidiaries per se.

Some have argued that the increasing globalization will lead to the end of GDP as the principal indicator of economic activities for a national economy. Indeed, the Irish national accounts data for 2015, showing an economic growth of 26.3 percent indirectly caused by a relocation of knowledge intensive activities to Ireland, raised many eyebrows, to say the least. It opened up the eyes of many statisticians and economists, and people started to question the validity of the current accounting rules, the impact of which on the measurement of GDP they found “totally unacceptable”. It’s a complicated matter which mainly revolves around the economic ownership and the concomitant allocation to countries of economic activities using easily movable assets, such as intellectual property products, transport equipment and the like.²

More generally, it would be preferable to put more emphasis on alternative indicators, such as Gross or Net National Income (GNI/NNI), or even better, (adjusted) disposable income of households, which provide a more robust indication of the developments in material well-being of a society. It is indeed true, for example, that GNI/NNI is much less affected by the allocation of value added and profits across countries, as all profits will anyhow end up in the country of residence of the multinational, via “reinvested earnings on foreign direct investment”.³ Although ..., one nowadays also observes the phenomenon of multinationals reallocating their headquarters from one country to another, which raises the question of the economic validity of GNI/NNI in reflecting the income generated in a national economy. This view on the validity of the macro-economic aggregates according to the current international standards may be overly pessimistic, but it has already become reality in the Irish

²See <http://oecdinsights.org/2016/10/05/are-the-irish-26-3-better-off/> for a more elaborate explanation.

³Actually, in the Irish case, this shows not to be true for GNI, as the relocation of considerable amounts of intellectual property products also led an increase of related depreciation, thus leading to a rather substantial increase of GNI as well (and a less significant increase of reinvested earnings paid to the rest of the world).

case, where calls are made for redefining GDP. Question remains how to address these issues.⁴

The first more generic response to the challenges posed by globalization concerns the impact it has on the compilation and interpretation of national accounts data. In recent years, quite some work has been done to provide more guidance on how to deal with globalization; see e.g. the work of the Expert Group on the Impact of Globalisation on National Accounts (UNECE, 2011) and the work of the follow-up Task Force on Global Production (UNECE, 2015). In addition, and certainly not that revolutionary, it clearly becomes more relevant to separately distinguish foreign controlled enterprises, or internationally operating enterprises, from other enterprises in the description of the national economy. This is not only true for the detailed analysis of the production process in supply and supply use tables, but also for the analysis of income and finance as described in the institutional sector accounts. By separately distinguishing these corporations, one could substantially improve the analysis the behavior of internationally operating enterprises, which in a national setting by definition only describe parts of (substantially) larger entities. In its classification of institutional sectors, the 2008 SNA already includes a breakdown of the corporate sectors into: (i) public corporations, i.e. controlled by government; (ii) national private corporations; and (iii) foreign controlled corporations; see 2008 SNA, Annex 1, section B. However, the proposal here goes further. It is not only suggested to also consider the separate distinction of units belonging to multinational enterprises, either domestically controlled or foreign controlled, but in addition it is proposed to have a similar breakdown in the classifications by industry, if needed at the detriment of the granularity of the classification by activity.

Having data on units belonging to multinational enterprises at the national level would potentially also allow for the compilation, at an aggregate level, of worldwide consolidated data on multinational enterprises, consistent with the description of the national economies, and enabling an integrated analysis of multinationals as a whole. As a starting point, this could be done as a set of supplementary tables, in addition to the standard national accounts. Over time, the creation of such international accounts may also improve the consistency in the recording of (international) transactions of multinationals, which countries currently predominantly survey and record at the national level, without an international exchange of data, for reasons of confidentiality, at the individual enterprise level. A first concrete step in the direction of the latter exchange of data is the construction of internationally consistent national business registers, e.g. the above mentioned Euro Groups Register.

3.3. *Knowledge Economy*

For developed economies, and more and more for developing countries as well, knowledge is a key driver for competitiveness, productivity growth, or more generally growth in the income generating capacity of an economy. This is also reflected in the international standards for national accounts. While the SNA

⁴In this respect, the “illusionary” nature of allocating profits of multinationals to countries may also lead to the consideration of extending the treatment of reinvested earnings to the owners of the corporations. This idea is also included in the research agenda; see § A4.28-4.29 of the 2008 SNA.

1993 already made a major step forward with the inclusion of (i) mineral exploration and evaluation, (ii) computer software and databases, and (iii) entertainment, literary and artistic originals in the asset boundary, the 2008 SNA extended this further with the inclusion of expenditures on Research and Development (R&D) as investments. However, there are several pleas for going beyond those categories. In Corrado e.a. (2005, 2009), for example, a call is made to apply the following general definition for delineating investments: “*any use of resources that reduces current consumption in order to increase it in the future qualifies as an investment. This result argues for symmetric treatment of all types of capital and that business expenditures aimed at enhancing the value of a firm and improving its products, including human capital development as well as R&D, be accorded the same treatment as tangible capital in national accounting systems*” (Corrado, 2009).

The 2008 SNA has clearly been struggling with the asset boundary, as can be derived from its research agenda which includes a special subsection on broadening the fixed asset boundary to include other intellectual property assets; see § A4.52–A4.55. Three possible extensions are explicitly mentioned: (i) innovation (going beyond the currently included R&D-assets, by also including expenditures made by production and engineering departments in identifying new products, and also expenditures related to market research to determine the demand for a new product, and marketing expenditures to promote the new product); (ii) marketing assets (brand names, mastheads, trademarks, logos and domain names); and (iii) human capital.⁵ It is obvious that a potential inclusion of these three categories would go considerably in the direction as proposed by Corrado e.a. However, it is also clear that the definition used by the latter goes even further. All kinds of expenditures related to reorganization, restructuring, etc. would thus qualify as investments, while in the SNA research agenda no reference is made to this type of expenditures.

In respect of the above, it is probably fair to say that in an accounting framework one would prefer to apply a more prudent approach, in the sense that, in order to treat expenditures as investments, future economic benefits linked to expenditures made today are highly probable. Furthermore, one should also be able to estimate the relevant expenditures and assets in a reliable way. Finally, the resulting asset should be (economically) owned by the entity making the expenses, meaning that the benefits are accruing to the economic owner by holding or using the asset over a period of time. The latter criterion should however not be interpreted too strictly. As extensively discussed during the process of updating the SNA, freely available R&D-assets produced by government should still be recognized as assets generating benefits for the society as a whole, although the (economic) ownership of such assets is questionable, to say the least.

Looking at a possible extension of the (fixed) asset boundary, the measurement issue is probably the most problematic one. Leaving apart human capital, which will be dealt with further below, including marketing assets seems to be

⁵It is important to note that the relevant subsection of the 2008 SNA makes reference to broadening the “fixed” asset boundary, meaning that the relevant assets could potentially be recorded as being the result of a production process, and the expenditures made to build up the assets are to be treated as investment expenditures. This notion is especially relevant for marketing assets which, at least partly, are already recognised in the 2008 SNA as an asset, but as a “non-produced” asset; see § 13.53.

more feasible than including other types of intangible assets such as those related to reorganizations and restructurings. However, even in the case of marketing assets, delineating relevant expenditures between those that have a long-lasting impact and those which are to be considered as current expenditures is far from easy. More complexities add into the process when trying to capture the asset value, where using the Perpetual Inventory Method (PIM) requires reasonable assumptions on service lives, depreciation patterns and mortality functions.⁶

One also wonders whether extending the asset boundary, in the central framework, will further enhance the usability of the system of national accounts. Surely, it will lead to further divergences between the SNA and business accounting standards. On the other hand however, it is also clear that “knowledge” is of primary importance for the future income generating potential of an economy and the economic actors constituting this economy, certainly for developed economies which derive their competitive edge from creating new products and new technologies. A possible alternative for getting a better grip on the knowledge economy may be to have a closer look at the product classifications in the supply and use framework, to distinguish more clearly products with a significant knowledge-content. This however would not yet solve the high share of own account production of such products. Here, one would need to extend the production boundary by including the own-account production of such products within enterprises, which could be done in a satellite account type of setting.

Regarding human capital, § 1.54 of the 2008 SNA states that this cannot be considered as a produced asset, because they “... *are acquired through learning, studying and practising, activities that cannot be undertaken by anyone else on behalf of the student and thus the acquisition of knowledge is not a process of production even though the instruction conveyed by education services is*”. Personally, I am slightly hesitant to apply this third party criterion so rigorously. In practice, there may be other examples of services which cannot be sold on markets or which cannot be provided from one unit to another.⁷ Take for example the brand name which may be fully embodied in the enterprise. Furthermore, in other parts of the 2008 SNA, it is stated that human capital is not included as an asset, because they are “*not capable of bringing economic benefits to their owners*” (§ 2.34), because they are “*not owned*” (§ 3.45), and/or “*it is difficult to envisage ownership rights in connection with people*” (§ 3.48). Although I must admit being part and parcel of the update process of the SNA, and therefore also bear full responsibility for the final text, with the benefit of hindsight, I feel quite uncomfortable with these latter statements. It goes without saying that one would not like to see ownership of people, but if one looks upon human capital as a separate, although in a person embodied, entity, I don’t see any problems with the relevant

⁶In the case of listed corporations, one could possibly use, as a way of testing the reliability of the PIM-values, information on the difference of the stock market value and the intrinsic value of an enterprise as being an approximation of the brand name (and other expenditures made to increase future profits), but it is highly likely that, disregarding the volatility of the resulting value, this difference includes various other elements. Brand names, for example, may well be related to a consistent production of high quality products in the past, which are not directly related to expenditures on advertising.

⁷See also § 1.40 of the 2008 SNA, describing the production boundary.

person owning human capital which clearly brings future economic benefits to him/her.

One could very well look upon the creation of human capital as a “production process”, for which the following (intermediate) inputs are being used: formal education services, either paid by households or provided for free or at reduced prices by government and non-profit institutions serving households (NPISHs); training and courses provided by the employer; time spent on learning and studying at home; other expenditures on, for example, school books and other training material; etc. Slightly problematic in this view on the “production of human capital” is the fact that most of the expenditures are actually made by other units/actors than the one embodying/owning the assets; see also below.

Various methods are available to value human capital stocks. In the literature, two methods are preferred in trying to arrive at an estimate of the value of human capital stock: either the “cost-based approach” or the “lifetime income approach”. In the former approach, past expenditures on education are aggregated using the Perpetual Inventory Method. The latter approach is based on the Net Present Value of the future benefits earned with the input of human capital, the latter often set equal to the labor income by different categories of age and educational attainment. Past research shows that the estimates from the lifetime income approach are (substantially) higher than the ones using the cost-based approach. Various reasons may cause this difference, one of them being that not all future labor income can actually be attributed to human capital, but that only the difference between actual future earnings and some base earning for people with hardly any education is related to the investment in education and training. Another reason may be that part of human capital is actually not produced, but genetically inherited or “simply” built up by increasing working experience. In this paper, this will not be further dwelt upon. For a more detailed overview, including the various pros and cons of the different valuation techniques, reference is made to Liu (2011), UNECE (2013) and UNECE (2016).

However, if one could overcome and agree on the above issues related to human capital, it shows that a full integration of (the production of) human capital into the central framework of national accounts is slightly problematic, to say the least. Several imputations need to be made.⁸ First of all, one would need to impute income transfers from the units actually paying for the education services (provided for free or at reduced prices), to the persons/households to whom the economic benefits from human capital accrue. With this additional income, the households can pay the relevant expenditures. In the case of expenditures by government and NPISHs, this is not that far-reaching, as the relevant expenditures are already recorded as social transfers in kind and also as part of actual final consumption. The next step would be to consider the latter expenses and the education expenses which are included in household final consumption expenditure, either directly as investments in human capital, or as intermediate inputs in the production of human capital. The latter approach is more consistent with the

⁸Another, more encompassing, way of dealing with the differences between the actors making the relevant investment expenditures and the actors benefiting from these investments is presented in Harrison (1999).

view of considering the creation of human capital as a kind of production process, in which various intermediate input are combined with labor (and capital) inputs. A final question concerns the valuation of the total output of human capital investments. If one applies the cost-based approach, one would still need to add a value for the time spent on learning and studying at home. The difference between the total output of human capital investments and the various (intermediate) expenditures would then equal this imputed value and feed into mixed income of the households producing human capital. However, one could also value the output of human capital with the lifetime income approach, as a consequence of which the residual mixed income represents not only the imputed value of own time spent on learning and studying, but also the difference between the lifetime income approach and the cost-based approach in a particular year.

However, with the above imputations, one is not yet there. One would also need to reconsider the nature of compensation of employees. In line with the lifetime income approach, compensation of employees, or the difference between the total value of labor income and some basic earnings, has become a form of compensation for putting human capital at the disposal of employers. As such the owners of human capital have become producers of human capital services which are sold to the employers. Of course, such a far-reaching proposal would constitute a complete overhaul of the present system of national accounts. A completely new interpretation of the economy would become apparent. It certainly will be very counterintuitive, having the present “economic story” in mind. But also a less far-reaching proposal, such as recording the expenditures on education as investments by the households being the economic owners of human capital would constitute a major divisive line between past and present.

Given the above, it may be clear that the author of this article is not particularly thrilled about including the concept of human capital in the central framework of national accounts. One could potentially add a value of human capital to the core system, as a non-produced asset. But in a way this capital would be totally disconnected from the rest of the system. Therefore, applying a satellite account approach seems to be the preferable option. Here, one can distinguish two basic alternatives: (i) a more limited approach in the form of satellite account for education, in which the various expenses, including in-house production of education services, are spelled out, and in which one would also distinguish, for example, labor inputs by level of education; or (ii) a full-fledged satellite account for human capital, in which the various imputations described in the above are applied. These and other issues have been discussed in the UNECE Task Force on Human Capital; see UNECE (2016).

3.4. *From Production to Income and Wealth*

As stated before, in section 1, the focus and attention of national accounts has shifted more and more from production to income and wealth. Three main developments may have caused this gradual shift. The first one concerns the well-being agenda. Reinforced by the “Report by the Commission on the Measurement of Economic Performance and Social Progress” (Stiglitz *et al.*, 2009), GDP and economic growth are strongly criticized for not appropriately reflecting the

developments of (material) well-being or welfare. Although the 2008 SNA clearly outlines that the SNA makes no claim for GDP being a measure of welfare (see e.g. § 1.75–1.84), one has to acknowledge that in public debate economic growth is often put on a par with societal developments are heading the right or the wrong way. One of the possibilities to address this deficiency is to put much more attention to other macro-economic indicators, such as real household disposable income and actual consumption of households, which definitely come much closer to, although still not to be put on a par with, material well-being of households. The development of quarterly institutional sector accounts has added to the timely availability of these alternative indicators (see also below), but it is obvious that communication still needs continuous and persistent efforts to increase the status of these national accounts indicators as compared to GDP growth.

The second longer term development affecting the shift for production to income and wealth relates to the increasing impact of developments in (financial) wealth on the real economy, and vice versa. Developments in finance can affect economic growth and employment for longer periods of time. The most dramatic example of this increasing role of finance is what can be considered the third reason for the shift in focus and attention: the recent economic and financial crisis. Although data gaps probably would not have prevented the crisis, the crisis did lead to a thorough reflection of the data needs for policy and research: the G-20 Data Gaps Initiative (DGI); see IMF (2009).⁹ This G-20 DGI has put forward 20 recommendations for improving statistics, grouped together into four main categories: (i) better capturing the build-up of risk in the financial sector; (ii) improving data on international financial network connections; (iii) monitoring the vulnerability of domestic economies to shocks; and (iv) improving the communication of official statistics.

From the perspective of macro-economic statistics, the second and third categories are most relevant. Under the second category, one can find recommendations on the enhancement of the availability and timeliness of cross-border exposures (Coordinated Portfolio Investment Survey, CPIS; International Banking Statistics, IBS; and International Investment Position, IIP). It also contains a recommendation on improving the availability of data on “shadow banking”, i.e. non-bank financial corporations involved in financial intermediation. The core recommendation under the third category relates to having timelier, more detailed and high quality data on institutional sector accounts, including financial accounts and balance sheets. Such data would not only make it possible to have an improved analysis of the interactions between the real economy and the financial economy, they could also provide the statistical backbone for the analysis of potential vulnerabilities at sector level, e.g. the building up of unsustainable debt levels. In relation to financial accounts and balance sheets, one can also notice a major increase in demand for data on the interconnectedness between sectors and the rest of the world, calling for more detailed data on financial transactions and positions by

⁹In the meantime, the G-20 DGI has entered into a second phase; see e.g. Heath and Bese Goksu (2016).

counterparty sector, often referred to as “flow of funds” or “from-whom-to-whom tables”.

As a consequence of the economic and financial crisis, user demands for wealth data, including its distribution across households (see section 3.5) and corporations, have increased considerably. In the context of financial stability analysis, this first and foremost concerns data that appropriately capture “bubbles”, e.g. in the real estate market. New guidance has been developed for appropriately measuring price changes for residential property (see Eurostat, 2010), while guidance for commercial property price indices is under development. Initiatives to collect internationally comparable house prices, e.g. by Eurostat and the OECD, have resulted in the development of internationally comparable official statistics on house prices, supplementing the price statistics already collected for some time by the Bank for International Settlements (BIS) and the OECD from various national (private) sources. However, in respect of the measurement of wealth, much work still remains to be done. Although an integral part of the system of national accounts, data on non-financial assets are much more sparsely available, especially where it concerns data on non-produced assets such as land, and mineral and energy resources.¹⁰

In the above, several concerns are related to capturing risks in macro-economic statistics, such as foreign exposures, building up of unsustainable debt levels, the exposure to certain countries and/or sectors, and the potential emergence of asset price bubbles. However, when trying to capture risks, the valuation of assets, the accounting for contingencies, and the recording of currency and maturity mismatches may also need further consideration. In respect of this, the 2008 SNA has made major steps forward by recognizing (more explicitly) standardized guarantees (see § 17.207–17.224), and by recommending a supplementary table on the recording of all pension entitlements/liabilities related to social security (see § 17.116–17.206). However, as noted in the SNA research agenda (see e.g. § A4.40 –A4.43), further discussion is needed. Capturing risks and vulnerabilities certainly warrants further reflection and elaboration in a more systematic way.

It goes without saying that macro-economic statistics will never be fully equipped to address very specific questions, such as the possible risk exposures of a certain domestic sector to let’s say Greek government bonds or to the U.S. real estate market. That would require a granularity of data which is inconsistent with the main goals of macro-statistics. It does however call for a re-thinking about the possibilities for enhancing the link between the system of national accounts and underlying source statistics including the micro-data. Similar requests for granularity is rapidly growing in other areas of research and policy analysis, such as above mentioned analysis of enterprises in a globalizing world, or the research into the distribution of income, consumption and wealth across household groups that is shortly addressed in the next section. In the area of getting to grips with risk exposures to other sectors within and outside the domestic economy, current developments in the compilation of, for example, databases with very granular information on the issuance and holdings of securities may be a very promising

¹⁰For the results of further work, see e.g. OECD (2015).

way forward, certainly if such databases can be directly linked with the statistics at the macro-level.

3.5. *Distribution of Income, Consumption and Wealth*

Related to the discussion on having better metrics for the measurement of (material) well-being, the distribution of income, consumption and wealth has also received growing attention in the policy debate of the last couple of years. The massive worldwide success of Piketty's "Capital in the Twenty-First Century" is only one of many examples. Yet, if one takes a closer look at the national accounts typically produced in countries, it shows that hardly any country provides more details on the distribution of income and wealth across household groups. Households are simply presented as one homogenous group, if they are not combined with non-profit institutions serving households. Annex 1 of the 2008 SNA includes a substantial amount of possible subsectors for corporations and government, for financial corporations even the excessive amount of 97 different subgroupings, yet for households it contain one sub-classification of seven subgroups according to the main type of income households receive.

One wonders about this disparity. It's most certainly not related to user demands. Even in the G-20 DGI, a rather unsuspected call from a group dominated by institutions primarily involved in more financially related concerns, one of the recommendations calls for the further development of the information basis on the distribution of income, consumption, savings and wealth across household groups. The only reason one can think of is the problematic nature of the relevant source data. Data on households, at least the level estimates for income, consumption and wealth, are primarily compiled as a residual of the transactions and positions of other sectors, whose source information is generally considered more reliable. As a consequence, micro-data on households show substantial gaps with the equivalent national account aggregates, creating problems on how to link and align the two datasets. For some transactions and positions, first and foremost those related to property/entrepreneurial income and related assets, the coverage of micro data can be extremely low. While some argue that we cannot solve these issues and that we will have to live with them, I think that these problems only provide all the more reason for making the effort to get them aligned, as momentarily statistical offices publish two diverging and sometimes contradicting data sets on one of the most important policy issues. And not only levels can be quite divergent, also developments may show quite different trends. In Pinkovskyi and Sala-i-Martin (2015), for example, it is mentioned that in some developing countries growth of consumption per capita according to national accounts was over 100 per cent between 1994 and 2010, while micro-surveys only showed an increase of only 29 per cent in this period. Obviously, this has massive implications for policy. And that does not even take into account the discrepancies between often quite independently conducted micro-surveys on income, consumption and wealth, leading to implausible results for savings, and/or inconsistencies between savings and changes in balance sheet positions.

On the positive side, one has to acknowledge that more and more countries are doing in-depth research into bridging micro-data with macro-aggregates, also

leading to improvements of the system of national accounts. Here, reference is made to the work of the OECD Expert Group that was created, initially together with Eurostat, to develop methods for compiling distributional information consistent with national accounts. Another goal of this group is to look into possible methodologies for compiling more timely estimates on distribution of income, consumption and savings, by combining less timely structural information from micro surveys and the latest available information from macro-statistics such as national accounts, labor force surveys, etc. Although in relation to the G-20 DGI, the user demand may be primarily triggered by having more detailed information on the financial vulnerabilities of certain groups of households masked at the macro-level, it nicely coincides with the increased interest for distributional issues from a (material) well-being perspective. At the time of writing this article, several countries have started to publish the results of their research (Australia, the Netherlands and the UK) while others have more or less advanced plans to disseminate their results (Slovenia, Sweden and the U.S.).

3.6. *GDP and Beyond: the Agenda for Measuring Well-being and Sustainability*

As stated before, there is an increasing user demand for arriving at metrics that provide a more encompassing measure of developments in societal well-being. Leaving apart the work on subjective well-being, one can however argue that well-being is a multidimensional phenomenon, which is not easy to capture in one single headline indicator. The OECD Better Life Index, for example, consists of 11 dimensions, with for each of them one or more indicators: housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety, and work-life balance. To include all these aspects into one consistent (monetary) accounting framework, similar to the system of national accounts, thus arriving at one single measure, is, in my opinion, a mission impossible. Even responding to the often voiced demand to also include unpaid household activities and volunteer work, a relatively “easy” extension of the SNA as compared to other aspects of well-being, creates significant challenges, not only in estimating the monetary value of these activities, but also in communicating the results of such an extension of the production boundary. It is often totally ignored that in an accounting framework such a broadening of economic activities does not only affect output and value added, but also levels and developments of household disposable income. How would users respond, if household income would increase during an economic crisis, because imputed income from unpaid activities increases more than the decrease in monetary income due to people becoming unemployed? And then one does not even address the more down-to-earth problems of estimating quarterly economic growth at 30–45 days after the end of the quarter, with no information available at all about time spent on unpaid activities.

It is not to be expected that in the near future there will be a major re-orientation of the system of national accounts, and one simply has to accept that GDP is first and foremost an indicator of income or economic activity, which may actually be instrumental to the greater good of well-being but is not to be set on a par with (material) well-being. That’s not to say that nothing can and should

be done. There is a great need to establish a much better link between the SNA and the work on well-being. In my opinion, the most promising avenue, certainly with the enhanced technical capabilities, is to create a suite on interrelated satellite accounts (and related aggregates and indicators), linking the central framework with a number of aspects which are considered important for progress in societal well-being (e.g. health and education). If one would also manage to create enhanced linkages between the meso-macro information base and various micro datasets, such a system would provide a marvelous system for analyzing trade-offs and win-wins between various aspect of well-being. It would also be instrumental to enhancing well-being functions. This may take time, but it would be a perfect guiding point on the horizon when redesigning official statistics.

As a more concrete example, one could look at issues related to environmental sustainability. It is clear that the present SNA deals poorly with environmental sustainability issues. Nevertheless, the recent endorsement of the System of Environmental-Economic Accounting (SEEA) Central Framework, in which statistics on environmental issues are linked to the SNA, can be considered as a major step forward. While further work is needed on, for example, accounting for (degradation of) ecosystems, the focus should be on getting SEEA implemented across countries, as they would provide a very rich information base to analyze economic and environmental issues in an integrated way. In future, the further development of this work could also potentially lead to the development of physical and monetary estimates for capital stocks and depletion/degradation of natural resources and ecosystems, thus contributing to GDP adjusted for depletion and/or degradation.

4. MOVING FORWARD

In the past decades, national accounts have become very successful, although a large part of the economic research community nowadays seems to have turned their back to the intricacies of defining and measuring macro-economic data. National accounts also increasingly have become the object of criticism in media and academic research, the most notable recent examples being the measurement of financial services, the inclusion of illegal activities, and the way in which the digitalization of the economy is being represented. Sometimes these critiques are justified and call for further investigation. In other instances the comments and remarks simply show a certain ignorance of the standards and what they intend to measure, and call for enhanced communication between the research community and the national accountants. A more substantive body of criticism relates to the measurement of (material) well-being. Various initiatives are going on to address this issue.

The main trends relevant for the future development of the central framework of the SNA can, in my opinion, be summarized as follows. First and foremost, user demands will continue to grow. One can also expect more rapid changes in the statistics researchers and policy analysts would like to have available. Furthermore, future policy analysis will require a broader, more integrated set of statistics, in which the analysis of the production process is combined with

the impact on income and wealth accumulation, and vice versa. And then there is the growing demand for much more granularity of statistics, related to the monitoring of distribution of income and wealth, the measurement of risks and vulnerabilities, the analysis of globalization, etc. On the other hand, on the input side, one can observe quickly evolving products and technologies, including less homogenous, ever changing production arrangements, which make it more challenging to monitor and analyze developments. But then again, on the upside, the availability of very detailed data sources, in the form of administrative registers, public as well as private, and other new data sources will continue to grow tremendously, including the ability to process these vast amounts of data.

Going beyond the central framework, it is considered of the utmost importance to develop metrics that cast a wider net on the monitoring of well-being of people, beyond the traditional economic indicators. In this respect, the best way forward is the establishment of a link between the “economy” and well-being, by developing satellite accounts, which also allow for the analysis of win-wins and trade-offs between various aspects of well-being. As a point on the horizon, one would like to see the development of an overarching accounting framework, in which statistics on economic, social and environmental issues are integrated (not necessarily monetized), and in which one can easily drill down into micro-datasets. It is clear that this would definitely be a long-term goal, also requiring the development of a suitable conceptual framework. As a more realistic goal for the nearer future, one could envision the regular compilation of certain satellite accounts, which from a communication point of view should not be viewed upon as some kind of appendix to the central framework, but would have a status more or less equal to the central framework.

Question is how to cope with this changing environment. Perhaps the most important piece of advice for the central framework is “to keep it simple”. Stay, for example, closer to business accounting standards, and make the process of compiling national accounts more transparent and flexible, so that it can more easily adapt to changing and/or additional user demands. We should not go for the most perfect conceptual framework for national accounts, if that can be defined at all, but think more in pros and cons of introducing certain refinements. In relation to statistical units, for example, one could consider having only one statistical unit for supply and use tables as well as institutional sector accounts. This will make the compilation of full-fledged national accounts less complicated, it will increase the potential for micro-macro linking, and it will also enhance the potential of analyzing production and income generation in combination with income distribution and wealth accumulation.

More generally, official statistics will need a further re-thinking of their process design. Starting with economic statistics, one would need to develop and implement a much more transparent design, from business registers, via source statistics, to national accounts. To arrive at a fully integrated set of statistics will not be feasible, but it should most certainly create a better understanding of the links between the various datasets, and thus create enhanced possibilities for users to link micro data to macro data. As a consequence, the system as such would become more flexible to adapt to user demands, and also provide more

opportunities for users to do their own more in-depth research, using more detailed data or alternative concepts.

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