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THE NEW ARCHITECTURE OF THE U.S. NATIONAL ACCOUNTS AND ITS RELATIONSHIP TO THE SNA

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1. Introduction

A New Architecture for the U.S. National Accounts, edited by Dale W. Jorgenson, J. Steven Landefeld, and William D. Nordhaus (henceforth JLN), is a contribution volume that contains the proceedings of the April 16–17, 2004, Conference on Research in Income and Wealth. Its purpose was to propose, as a work-in-progress, "A New Architecture for the U.S. National Accounts." This agenda is further elaborated in Jorgenson (2009). The book is a rather long one (638 pages). The Jorgenson paper (42 pages) provides a presentation, both conceptual and numerical, of the proposed Architecture as such.

The U.S. national accounts have traditionally been somewhat isolated from developments in the rest of the world. This situation, rooted in history, can be attributed to two main factors—the existence in the U.S. of a decentralized statistical system, and the particularism of the National Income and Product Accounts (NIPAs). The NIPAs have evolved very little since the middle of the 1940s. They did not follow the world movement since the 1960s toward a developed and integrated standardized system of national accounts. This first led to the 1968 System of National Accounts (SNA) of the United Nations (United Nations, 1968), which was much more embracing than the first standardized 1952 system (Organisation for European Economic Co-operation (OEEC); UN). Later the 1993 SNA was published under the label of the UN, the OECD, the IMF, the World Bank, and the European Communities. As a result the U.S. national accounts have suffered from a deficient integration with emerging international national accounting standards.

As is well known, Richard Stone held a dominant position in the international process of standardization from the middle of the 1940s until the adoption of the 1968 SNA. Simon Kuznets, the leading scholar on national income in the 1930s in the U.S., did not play any role in this respect. Nor did Kuznets participate in the development of the NIPAs. His approach to national income as aiming at a measure of welfare was not adopted in the emerging national accounting frame-

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work. Though he was not opposed to the concept of accounts and their usefulness, he did not think that accounts were of any use in solving issues related with a proper definition of national income.

In the U.S., the architects of the NIPAs adopted a top-down position in the 1940s. To them the accounts were a means to link the aggregates and to show their main components. This position has been maintained over time.

Stone, on the contrary, in a memorandum prepared for the League of Nations in 1945, proposed a system of accounts developed from the bottom-up, adding up the elementary flows concerning economic transactions. The first standardized system of 1952 was actually still close to the 1947 NIPAs. In contrast, the 1968 SNA drew its inspiration from Stone's 1945 memorandum. It took advantage of the progress made by a number of countries to achieve a significant step in international standardization in various fields, integrating input–output tables, institutional sector accounts, and financial tables. Only balance-sheets were provisionally left aside. A similar design was adopted in the new 1970 European system of accounts. The American contribution to the international discussion was limited during this period, in spite of George Jaszi being a member of the World Expert Group which was involved in the preparation of the 1968 SNA.

The American attitude changed by the middle of the 1980s as the U.S. was a very active participant in the preparation of the 1993 SNA.

In any case, it is surprising, even putting issues of integration with the SNA on one side, that the NIPAs remained basically unchanged for half a century, despite sharp criticisms by scholars (see, for instance, Nancy and Richard Ruggles' 1982 proposals; Ruggles and Ruggles, 1982).

Part of the explanation for the lack of reform in the NIPAs may lie in the decentralization of the U.S. statistical system. None of the three big statistical agencies (BEA, BLS, and the Census Bureau—leaving aside the Federal Reserve Board system) has been in charge of coordinating the statistical system. Coordination was assigned to the Budget Office, which essentially focused on administrative procedures and the checking of questionnaires and, from time to time, on the elaboration of an inter-administrative classification, notably that of industrial activities. A developed and integrated accounting framework could have helped U.S. national accountants in getting more consistent data, but there were some important obstacles. Firstly, input–output techniques, which had begun to play a central role in the statistical synthesis in an increasing number of countries, were not highly favored in the U.S. by the beginning of the 1950s. Later on benchmark tables were compiled only every five years and were only partially integrated in the NIPAs estimates. Secondly, significant features of business accounting in the U.S. did not allow statisticians to use business accounting standards as a means of coordination. In any case national accounts had no access to business accounts on an individual basis. Finally, there were, and still are, legal obstacles to the exchange of confidential data between statistical agencies, even leading to a plurality of business registers.

For decades the solutions to the deficiencies of such a decentralized system were sought in the direction of establishing a central statistical agency, like those existing elsewhere in the world. All these attempts failed, due to resistance of the

individual parties and the difficulty of changing considerable amounts of existing legislation. The focus of attention has now shifted to improving collaboration between agencies within the framework of a reshaped and extended accounting system much closer to the SNA than the present NIPAs are.

2. Integrated Macroeconomic Accounts Following the SNA Pattern

The NIPAs had been conceived as a way of presenting some important aggregates and their principal components, and they are backed by a fabulous set of supporting tables. Most elements of the integrated accounts are present in currently published material with a level of detail and quality and a length of series rarely matched in the accounts of other countries. However, it is difficult for non-sophisticated users to see how the various pieces are related, the use of combined accounts is made cumbersome, and the existence of remaining inconsistencies is not well known.

The purpose of the "New Architecture"-like integrated macroeconomic accounts is threefold: (1) make the NIPAs internally more consistent (for instance, sector definitions are not presently consistent between production accounts and income accounts); (2) integrate the non-financial accounts of the BEA and the financial accounts (flow-of-funds accounts) of the FRB; and (3) align U.S. statistics more closely with those of other nations. This concern emerged progressively in the U.S., since the late 1980s, and changes to the U.S. accounts have moved them closer to the 93 SNA standards over the last decade. However, for people familiar with the present international standards and terminology, either through the 93 SNA or through the ESA 95 (which became compulsory in the European Union), the use of the U.S. accounts, either for studying the U.S. economy or comparing it with other economies, is still problematic (one only has to remember the efforts devoted, some years ago, to trying to get comparable estimates of saving, especially household saving, between the U.S. and various other countries). After Russia, China, and other followers of the Material Product System (MPS) adopted the SNA or the ESA, the NIPAs particularism looked untenable and increasingly has become a nuisance for U.S. scholars themselves. With the U.S. following the SNA standard, the international system of accounts will finally, after more than half a century of great efforts, become universal—a perspective to be warmly welcomed.

In Chapter 11 of JLN a real effort has been made to correctly understand the present accounting structure of the SNA. For instance, table 11.1 (p. 475) clearly shows the fundamental distinction between the three parts of the sequence of accounts, that is, current accounts (with saving as their last balancing item), accumulation accounts, and balance sheets. This distinction is not always well understood elsewhere. A frequent misinterpretation is to continue to think in terms of the previous SNA versions ending with the financial accounts. This truncated sequence of accounts is even presented sometimes as a full accounting system for "transactions." Such a position leads to an unfortunate underestimate of the importance of the two new accumulation accounts (the "other changes in volume of assets account" and "the revaluation account"). On the contrary, in

Chapter 11 creative use is made of the other changes in volume of asset account.[1] However, since table 11.1 is a condensed one, it is not possible to see at this stage if the intention is to use more fully the potentialities of the detailed SNA sequence of accounts. For instance, the redistribution of income in kind account through social transfers in kind is not shown. Chapter 11 presents the proposed integrated accounts using the traditional time series format. While this is the kind of presentation preferred by most users, it may make less easy the perception and the understanding of the integration structure itself. From this viewpoint it is unfortunate that the authors of Chapter 11 did not try to present, at least for one year, the most embracing table which, in the SNA, is precisely called "Integrated economic accounts." This table shows institutional sectors and the total economy accounts and their sequence in columns (resources on the right side, uses on the left side), transaction accounts and other accumulation flow accounts in rows, except for the global goods and services account which is presented in specific columns, and finally balance sheets.

As there are columns for the total economy, a number of significant aggregates directly appear in the SNA Integrated Economic Accounts, like GDP and Gross National Income (GNI); GDP as the sum of final expenditures is also directly calculable in these accounts.

Looking at the integrated economic accounts presentation allows an easier understanding of what an integrated system is. It could even avoid the risk of some inconsistencies. For instance, it is not easy to understand why the item "equity in noncorporate business" is found as a financial asset in the balance sheet of households (line 121 of table 11.5) but not as a financial liability in the balance sheet of the nonfinancial noncorporate business sector, and as a consequence why the latter sector, which has no net saving, has a net worth (line 110 of table 11.6) when, if made up of units that are treated as quasi-corporations, it should have, according to the 1993 SNA, no independent net worth at all.

Actually, the intended treatment of the nonfinancial noncorporate business sector does not follow the SNA classification of unincorporated enterprises in the household sector and denotes a lasting hesitation between, on the one hand the functional approach of the NIPAs and the 1952 version of the UN–OEEC standardized system and, on the other hand, the institutional approach adopted by Stone in his 1945 report and extensively applied in the 1968 SNA/1970 ESA after the 1952 parenthesis.

Actually, Chapter 11 seems to follow various approaches that are not totally consistent with each other and with the SNA recommendations. Government enterprises (market units that are not incorporated or eligible to be treated as quasi-corporations) are rightly included in the general government sector, as in the SNA and contrary to the traditional NIPAs treatment. In contrast, as said above, unincorporated enterprises of households are separated out from the household sector and classified in the nonfinancial noncorporate business sector, even though they do not meet the requirements for being considered as quasi-corporations. As

[1]See the way the financial statistical discrepancy is dealt with (p. 495), or the consumer durables are conveyed to the balance sheet (p. 496), something that the 1993 SNA only covers as a possible memorandum item.

a consequence the balancing item "mixed income" for unincorporated businesses, that was introduced in the 1993 SNA and generally considered a significant progress in the description of activities, is left out. Owner-occupied housing activity is in the household sector, like in the SNA. However, does the formulation "treated as business-type transactions within the sector" (p. 480), mean that these transactions would be treated as market output, when the SNA treats them as non-market (own-account production for final use), a significant clarification as compared to the 1968 solution?

In spite of these questions or reservations, this draft SNA-USA is certainly a promising effort to move out of a long particularist tradition in order to join the world level national accounting standards, something certainly very useful in current times of globalization.

In order to avoid any misunderstanding however, one should have in mind that Jorgenson (2009) does not include a draft SNA-USA as is done in Chapter 11 of JLN 2006. The prototype accounting system in Jorgenson (2009) "builds directly on the NIPAs" (p. 9) which are extended. The structure of the prototype "is similar to the NIPAs" (p. 10). The same approach actually is followed in Chapter 1 of JLN 2006 (written by Jorgenson and Landefeld). Therefore the respective roles of the NIPAs type accounting presentation and the SNA-USA type accounting presentation in the future still seem uncertain.

3. Data Consistency and Integration

A number of inconsistencies exist in the NIPAs that impede integration of the system. Four of these are considered below.

(1) A well-known statistical discrepancy in the NIPAs is that between final expenditures (their sum is called GDP) and incomes from production (their sum is called GDI). However the production "approach" to GDP is not present in the NIPAs. Thus, the word "product" in the expression NIPAs is a little misleading. In the second part of the 1990s, the statistical discrepancy increased and the GDI figures were considered more significant, when the expenditure approach had been preferred by the BEA to be the official GDP figures.

(2) Final expenditures from BEA benchmark I-0 tables are introduced in the NIPAs for the base-year of the accounts. However value added figures by industry in the benchmark I-0 tables, calculated as a residual between output and intermediate consumption, and value added figures in BEA GDP-by-industry accounts based on income data (total intermediate consumption by industry is there calculated as a residual) are not consistent with each other. As GDI in the NIPAs is based on the same income data as GDP by industry, including for the benchmark years, there are implicitly in the NIPAs two disguised breakdowns of value added by industry. Formerly, in the-GDP-by-industry accounts, the total figure for official GDP is obtained by treating the NIPAs statistical discrepancy as a nominal industry.

(3) A number of various "output" measures are available from the BEA and the BLS, ranging from "gross output," an expression not used in the SNA

that simply says output, to "value added output" (BEA), not used either in the SNA, and which corresponds to value added at producers' prices. The BLS also uses a concept of "sectoral output" which excludes intra-sectoral sales. For various reasons (see p. 356), there exist many inconsistencies between these figures, which creates difficulties for researchers, like productivity analysts.

(4) Differences between income accounts (BEA), financial flows and balance sheets (FRB), that lead inter alia to different estimates for saving. The main problem (not specific to the U.S.) is the statistical discrepancy between the two figures for net lending/net borrowing derived respectively from the capital accounts and the financial accounts of the sectors. As often noticed, the financial discrepancy is particularly important for households and nonfinancial corporate business (see, for example, JLN, fig. 11.3, p. 535).

Equality between the two measures of net lending/net borrowing is not forced by most countries and is probably the best approach for the time being. In contrast, most countries that used to show in the past a statistical discrepancy between various measures of GDP progressively chose to carry forward the analysis of data until the discrepancy was completely deleted, possibly using an automatic procedure to finalize the balancing of the accounts. This has been done increasingly in the framework of annual supply and use or other types of input–output tables. This is the final objective of the BEA, and is called full integration in Chapter 6 (pp. 225–8) of JLN.

Actually, the data on intermediate consumption by industry and by product is one of the weakest points, if not the weakest, in most countries' input–output tables. Those data are difficult to collect and I suspect that in many countries statistical agencies have largely given up any significant effort to improve the situation. The U.S. experience aiming at drastically expanding the coverage of intermediate inputs will be followed with great interest. This point is crucial in the context of the U.S. decentralized statistical system in order to avoid forcing integration. Some participants (e.g., Corrado and Slifman) in the 2004 conference clearly expressed their concern that integration could be obtained at too high a cost, while others such as Abraham pushed for elimination of inconsistencies.

4. National Accounting, Growth Accounting, and Multifactor Productivity Estimates

Should the production account in the national accounts' central framework[2] be redesigned in order to integrate growth accounting and multifactor productivity estimates, as argued by Jorgenson and Landefeld in Chapter 1 of JLN?

Opponents to this proposal essentially argue on the basis of the theoretical assumptions that are used in growth accounting and the measurement of capital

[2]I prefer myself the expression "central framework" to the terms "standard or core accounts" that are less rigorous.

services (see, for instance, de Haan *et al.*, 2004, paras 18–33). They express the view that the multi-factor productivity estimates depend on analytical models and assumptions that are stronger than those used in the central framework. The problem is linked to the distinction between an observation system and an analytical framework. National accounting is conceived of as an observation and measurement system. In contrast, growth accounting and MFP estimates have been considered by most researchers as analytical constructs, which use data coming from the statistical system, including the national accounts and elaborate them, complete them, and interpret them to derive research results and findings. It is true that an observation system like national accounting cannot avoid using certain conventions and imputations, including some modeling. Most difficulties in this respect are linked to the measurement of capital issue. As a consequence, one could argue that there is no difference in nature in this respect between national accounting (or business accounting?) and, for instance, growth accounting. It could even be said that there is a continuum from the direct observation of primary data, national accounting elaboration, and, say, MFP estimates, which is a question of degree not a difference in nature. But this is precisely the problem. The possible existence of a continuum in making assumptions (an assertion that certainly would need further elaboration and evidence) does not avoid raising the question: Until what point or zone of assumptions can an information system like the national accounting central framework still be considered an observation system?

To my knowledge, no ready-made answer to this question exists in the national accounting literature, even less in official statistics ethical norms. However it always concerned Stone, who wrote in chapter I of the 1968 SNA some paragraphs that deserve to be quoted in full.

> In the development of national accounting emphasis has been placed on the distinction between what can be observed and measured and what can only be inferred on the basis of some theory or convention. This distinction is an important one because while it is almost necessary to process data in order to obtain something useful for analysis it is possible to carry the processing to a point where the results are no longer data. For example the supply of a commodity may be allocated to users on the assumption that each user draws his supply from domestic production and imports in the same proportion. The result may be something quite different from what is obtained by observing the proportions in which different users actually make use of domestic production and imports, and it may be seriously misleading. While, as has been said, assumptions are always needed in processing data, it should be recognized that when they come to play a major role the result is no longer an observation but an inference. (para 1.96)
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> At the same time the main purpose of making observations is to enable us to make inferences; all that is important is that we should not confuse the two. This point is exemplified in chapter III below which is concerned with the use of input and output tables which are useful in analysis. The observational and analytical tables are linked by assumption and the role of observation and assumption is made quite plain. (para 1.97)

> Developments of the type exemplified by (g) and (h) above[3] aim at providing an observational basis for new types of analysis. The accounts based on these developments would still represent objective facts modified as little as possible by the introduction of assumptions. But the analysis built on these accounts would come more to represent a system of imputations in which market prices were supplemented by shadow prices. It is too early to say how this tendency will develop but it is noteworthy that the experiments now being made by large institutions in the use of mathematical programming and cost–benefit analysis represent steps in the same direction. (para 1.98)

For some epistemologists a concept like "objective facts" might sound nearly obscene—nevertheless I think national accountants could benefit from a debate along these lines. In Stone's terms growth accounting and MFP estimates belong to the world of inferences, not of observation. Indeed, the expression "growth accounting" itself is misleading, since a balanced table or a set of balanced tables does not necessarily represent accounting in the sense of national or business accounting.

Some national accountants raised similar questions in the 1990s, in the context of environmental accounting. In a 1996 paper (see Vanoli, 1998), I suggested myself a distinction between "soft modeling" (in the national accounts central framework) and "hard modeling" (elsewhere). This suggestion was tentative and not rigorously elaborated. It seems that a distinction of this type was implicitly present in recent national accounts discussions and deserves to be elaborated, which can be formulated as follows: "Measurements in the national accounts central framework should not depend on theoretical assumptions that are in contradiction with important characteristics of the real-world economy."

In Chapter 5 of JLN, Hulten presents the issue very well. He summarizes the theoretical assumptions of the accounting models of Jorgenson and others (competitive markets, constant returns to scale, etc), which Hall (2001) has collectively termed the "zero-rent economy." The real world is a "Nonzero-Rent Economy" with "economic rents generated by monopoly power, intramarginal [or should it be 'inframarginal'] efficiency rents, persistent disequilibrium, imperfect information, or uncertainty" that characterize a "more realistic world." He notes that "Any attempt to impose the zero-rent economy rules in this world results in a biased estimate of the return to the specific capital assets included in the analysis."

Actually the zero-rent economy rules assume that the labor primary income and the capital primary income are fair values through their respective marginal productivity. This implies, by assumption, that the distribution of primary income or value added is not an issue. It simply results in this model from the addition of the (gross or net) actual (supposedly fair) values of labor services and capital services. This constitutes a strong normative hypothesis in context of the economic and social debate, which cannot be imposed on the observation of the real world diverse economies either at the global, national, industrial, or regional levels. Statistical data produced by official statistical offices (as observers) should not

[3]Stone is referring to paras 1.93 and 1.95 which deal with the functional classification of inputs and the boundary between current and capital expenditure, concerning, for instance, consumer durables, expenditure on research and development, education, and many forms of expenditure on health.

adopt such a normative assumption. They should keep the issue open and leave to analysts the task of analyzing and interpreting the "facts."

From that I personally conclude that measurements depending so heavily on the assumptions of the "zero-rent economy" are not relevant for inclusion in the national accounting central framework. Much to my surprise, the author's conclusion is totally different (we must keep in mind of course that Hulten is not writing from the viewpoint of a national accountant): "Given the difficulty of adapting models of imperfect competition, Schumpeterian entrepreneurship, and uncertainty to national income accounting problems, the zero-rent model is a logical and important step along the way toward Koopman's vision of measurement with theory." Many thanks to Hulten for such a clear presentation of the terms of the debate we are facing. There are two connected issues involved which I think national accountants, and more widely statisticians and analysts, should consider very carefully again. One is the relation between observation and economic theories, while the other is a reflection on a set of interrelated issues: "measurement without theory," "measurement with an irrelevant theory," "measurement without history" (Judy Klein; Klein, 1997), "theory without measurement," "theory without history," etc.

There has been a growing tendency in recent decades to give a central role to (standard) economic theory in national accounting measurements (actually such a tendency extends beyond national accounting). Sometimes consistency with economic theory seems to be the main criterion to be applied for appreciating the relevance of certain methods of measurement and interpreting their results. Such a tendency may produce results that are far from the observation of the real world and belong to the field of inferences and analysis. I think we should definitely be more concerned by Stone's considerations and revert to his approach. Our measurements in central national accounting should depend, as little as possible, on theoretical economic assumptions which are not needed or not realistic.

Some Implications of the Zero-Rent Economy Assumption

Under the "zero-rent economy" assumption, and leaving aside taxes, all gross primary income that is not treated as labor income is treated as capital income and considered as corresponding to the imputed value of capital services. The rate of return included in the formula for determining the rental prices of capital assets (the user cost of capital) is determined endogenously, taking into account the structure of capital finance between debt and equity. This has a number of implications.

(1) The 1993 SNA "mixed income" of owners of unincorporated enterprises, either employers or self-employed, has to be split between labor income (estimated first here) and capital income as a residual. This is something that national accountants always refused to do (this point was discussed again during the preparation of the 1993 SNA). They leave this to productivity analysts that apply various methods in their research work.

(2) Complementary assumptions are that the rate of return on equity for consumer durables (treated as fixed capital) is set to the corresponding rate of return for owner-occupied housing. For government, the imputed rate of return is

set equal to the average of corporate, noncorporate, and household rates of return. The rate of return is assumed to be the same for all assets within a given (institutional) sector. All these assumptions could be questioned.

(3) The blueprint presented in Chapter 1 of JLN is consolidated at the level of the total economy. Would exactly the same methods and assumptions be applied at the level of individual industries? One must remember that, in the 1993 SNA as well as in the 2008 SNA, production accounts are established by industry in the supply and use or other input–output tables. If the intention is to follow a top-down methodology, the capital services corresponding to the assets belonging to a given institutional sector would then be allocated between the industries in which this sector is engaged in the same proportions as the corresponding assets themselves. However, would the resulting capital income in a given industry equal the capital income measured as a residual in the production account of that industry? Continuing the top-down movement, what about the micro-level of the establishment or the firm? Chapter 12 of the JLN shows how difficult it is to get consistency between capital flows (capital formation) and stocks measured at the macro levels and data collected at the micro level.

(4) Exogenous methods can also be used for imputing a rate of return to capital. Assumptions linked to exogenous methods, which seem to be preferred by the OECD manuals on the measurement of capital and productivity (OECD, 2001a, 2001b), are more flexible and can be made compatible with a "non-zero rent economy." Exogenous methods can also be used to answer different questions. For instance, in the financial analysts approach, an opportunity cost of own (financial) capital or a normal rate of return is chosen and the difference between this imputed cost of capital and the actual rate of return is a key variable for analyzing an entity performance. In the context of the measurement of the value of capital services, there are much less implications than in the "endogenous—zero-rent economy" assumption. Naturally, the choice of an exogenous (or of various exogenous) normal rate(s) of return is in part necessarily conventional and open to discussion. If applied in a national accounting framework, it would also give rise to interpretation issues, as the total value of capital services would generally differ from gross non-labor income in the national accounts. The resulting residual can cover both effective differences in performances and the impact of various approximations and inconsistencies in the measurement process. If only for this reason, it may not be also advisable to introduce such a methodology in the national accounting central framework.

(5) Chapter 1 of JLN, according to its theoretical assumptions, equalizes the gross capital income (gross operating surplus after tax in national accounts terminology) and the value of the rental services of assets, the return to the "physical" capital (structures, equipments, intangible fixed assets, etc) and the return to the financial capital. From that, it follows that all primary income flows from production can be calculated in constant prices. In this consolidated framework, as there are no current transfers, it is then easy to get all income and saving in constant prices (or in volume, according to the SNA terminology that leaves the term "quantity" to the tradition of the index numbers methodology). Saving and investment are taken as identical in constant as well as in current prices. Thus the issue of building a full set of national accounts in constant prices that so much puzzled

national accountants in the past (see Vanoli, 2005, pp. 380–4) seems to be solved automatically in passing. This is probably, however, an illusion which is due to the theoretical framework used.

National accounting distinguishes "physical" capital formation in volume terms and financial capital investment in real terms, even when they are equal in current prices. The volume (constant prices) change of "physical" capital formation is linked to the change in quantity and performance of the "physical" assets acquired. The financial capital investment on the other hand consists of amounts of abstract economic value ("money"), either lent or used to buy firm equity or for self-financing, whose value in real terms depends upon inflation.

(6) The problem with Chapter 1 is that it is rooted in a long-run model of "zero-rent" economic growth, following, for instance, Irving Fisher, Paul Samuelson, and Martin Weitzman (see Weitzman, 1976; Weitzman and Löfgren, 1997). In such a perspective physical and financial distinctions vanish; costs, incomes, and services of capital coincide. In contrast accountants, either business or national ones, move in the current real world, where many distinctions and specificities matter.

(7) The introduction of the term "service" in expressions like "labor services" and "capital services" in the SNA central framework would be problematic. National accounting, after the transition period from national income estimates to proper national accounts, clarified its terminology by using the word service only in order to distinguish services from goods among the products that are the outputs of production processes. When necessary, in the context of input–output tables for instance, national accounts use the expression labor inputs and capital inputs.

The word service may have many different meanings—for example, the services rendered to consumers by goods (including non-durable goods), or the services rendered to consumers by service workers, or the services rendered by nature out of any kind of production process. In expressions like labor services and capital services, the meaning is "productive service of . . . ," which is totally different from the meaning of services in the national accounts "goods and services" category.

In my view, national accountants should be very careful about the integrity of their conceptual framework, including their terminology. In this respect, even in a satellite account for productivity analysis, I would still favor using the "labor inputs," "capital inputs" terminology. Using "inputs" instead of "services" probably can help to give a more realistic representation of the working of the production process of enterprises. The efficiency of the means of production materializes in the process of production itself. Terms like "labor services" and "capital services" may give the wrong impression: that they are ready-made flowing from outside.

(8) Finally, a new concept of level of living appears in JLN (table 1.29, p. 89; see also Jorgenson, 2009, pp. 29–30). Calculated as the ratio of expenditures in constant prices to income in constant prices, it is defined as "a quantity index of welfare generated from current and future consumption in proportion to the effort required in the form of supply of labor and capital services" (p. 88). Though it is then explained that "this must be carefully distinguished from multifactor productivity, the ratio of GDP to GDI, a measure of productive

efficiency," the fact that figures for MFP (table 1.25, p. 82) and for level of living (p. 89) are nearly identical is a little puzzling for the "amateur" or unsophisticated user. Probably, the alleged sharp distinction is due to the theoretical model used (see p. 46: "the interpretation of output, input and productivity requires the concept of a production possibility frontier"; and p. 47: "the interpretation of these magnitudes [income and expenditures] in constant prices requires the notion of a social welfare function"). It thus seems to be a pure question of interpretation, when the same magnitude is actually measured in both cases. It can also be noticed that the figures for labor quality (table 1.21, pp. 70–1) are very close to the MFP and LOL figures (probably because of the way labor quality is estimated through compensation differentials). However, the relation with MFP seems less easy to grasp in this case.

(9) More generally, the interpretation of MFP estimates as "a measure of productive efficiency" in JLN (p. 88; see also Jorgenson, 2009, p. 29) remains an issue. Over-interpretation is especially dangerous if attention is focused on aggregate MFP as a kind of general indicator significant by itself. Paradoxically, this interpretation issue is made clearer but at the same time more problematical since, thanks notably to Jorgenson and associates, the idea is widely accepted that the changes in performances of the capital and intermediate goods or services should normally be included in the volume change (in SNA terms) of capital (and intermediate) inputs (embedded technical progress), even if this is not yet always achieved in practice. The same is true in principle for changes in labor quality (embodying also a part of technical progress). Thus the main sources of changes in output growth seem included in the changes in input volumes of labor, capital, and intermediate products. However, a series of questions arise. What should not be included in the volume change of inputs, as a matter of principle? What is not captured in practice in the actual measurement of inputs (and their previous production, an issue that can be especially significant in the case of education and health—services which are crucial in the change in labor quality)? The time-lag between their output and their subsequent use as inputs of production means must be taken into consideration. More generally the analysis should be carried upstream, from industries using capital products to industries producing them. Then the sources of output growth in the latter industries deserve careful investigation, raising the issue of the analysis of innovation and scientific progress. Upstream analysis is also relevant as regards the interrelationship between countries producing outputs that are exported and countries using the corresponding inputs that are imported.

It seems to me advisable to leave growth accounting and MFP estimates to the field of economic research and analysis. The idea of "official productivity statistics" seems highly questionable. National accountants and statisticians in various fields should improve the observation and measurement of output and the various flows of goods and services, both in current and constant prices. They should carry on their efforts toward better measurement of capital formation and stocks. Following Stone's approach, national accounts should stay as much as possible, even if the borderline is not always easy to draw, in the realm of the observation of "facts," taking into account the requirements of users, but leaving to them to go beyond and make "inferences."

Jorgenson seems to think that the discussion is over (Jorgenson, 2009, pp. 5–6). He argues basically that "the incorporation of the price and quantity of capital services into the revision of the 1993 SNA was approved by the United Nations Statistical Commission at its February–March 2007 meeting" and that a chapter (chapter 20) "Capital services and the national accounts" will be published in 2009 in the SNA 2008 handbook. However, as the issue was and remains controversial, one must be clear about the exact role and place of this construct in the architecture of the SNA as a whole. This is explained in a draft (I suppose it is the final version) of chapter 20: "This chapter differs in content and style from those describing the accounts of the SNA. . . . it is proposed that, for those offices interested, a table supplementary to the standard accounts could be prepared to display the implicit services provided by non-financial assets" (para 20.1). Such a table is proposed in a final section of chapter 20: "E. A supplementary table on capital services" (see table 20.11: The outline of a possible supplementary table). The presentation of the issue in chapter 20 is in line with the Report of the 2007 Statistical Commission.

So in the 2008 SNA, the production account of the SNA has not been restructured in order to incorporate labor and capital services and multifactor productivity estimates. In passing, the SNA terminology that uses the word "services" as referring to outputs of production was not changed either. Chapter 20 (para 20.5) acknowledges that "this terminology [i.e. capital services] sits a bit uncomfortably with national accountants" but it is "well established [in the theory of capital services]." Well! The meaning of the term "service" is also well established in national accounting and statistical activities at large.

Finally, in order to avoid a possible misunderstanding, I like to stress the following point. I argue in this paper that the theory of capital services and multifactor productivity estimates should not be imported into the conceptual central framework of national accounting. This does not mean that official statistical offices should necessarily abstain from elaborating productivity estimates and analysis beyond apparent labor productivity figures. However, this should be part of their research and analysis activities, and not confused with their observational function.

5. Satellite Accounting and Nonmarket Accounting

Satellite accounting is a means of extending the coverage of national accounts without overburdening the fully integrated central framework and of introducing complementary or alternative concepts and definitions in additional constructs without putting at risk the central conceptual framework itself as an observation system. When the idea was introduced in the late 1960s (see Vanoli, 2005), the scope was limited to fields and issues close to the traditional national accounts centers of interest. As new social concerns emerged in the public debate, ambitions extended very much toward environmental and social (or "societal") issues. Increasingly nonmarket accounting became prominent among the purposes of satellite accounting.

On nonmarket accounting, JLN clearly favors the satellite accounting approach. The boundary between what is worth inserting in the central framework

and what is ascribable to a satellite account is not totally rigid. Not everyone is pleased to see their concerns "relegated" in a satellite account position. For instance, a stream of researchers and institutions have argued in favor of introducing housekeeping nonmarket activities in central GDP or, in a more radical view, replacing GDP by NDP adjusted for the environment (sometimes awfully called "green GDP"). Sometimes, it has even been argued that national income should be defined and measured as sustainable income in a sustainable development perspective.

What is the nature of Nature? To be more specific: is nature (or are uncultivated natural assets) a part of the economy? The (implicit) usual answer to this question in environmental accounting seems to be "yes." In contrast, I think Nature should be treated as an "entity" outside the economy and flows between Nature and the economy as flows external to the economy—which implies that the net consumption of nonmarket natural assets due to depletion or degradation should be recorded as an (involuntary) capital transfer from Nature to the economy. In a satellite account, it should increase the current value of the economy's final consumption and not reduce NDP as often proposed, because NDP current valuation does not include any value for the free gifts of Nature which could be deducted.

What is important would be an actual estimate of this (unpaid) consumption of natural assets. Among the various valuation methods analysed in the SEEA 1993, the maintenance cost approach was conceptually more relevant in this direction. Other methods were market valuation and contingent valuation. Unfortunately, the maintenance cost method was soon criticized not only on practical grounds, but as a matter of principle because "it was not rooted in economic theory" (this kind of argument is so frequent, that no particular author needs to be cited here). Chapter 1 of JLN reiterates, without an explicit argument, the BEA's nonadoption of this method and its choice of market prices or proxies thereof. However, maintenance costs (the costs that would be necessary to avoid the deterioration of the environment or to restore it to the chosen level, not at the beginning of times but at the beginning of the accounting period) are not in contradiction with the idea of market valuation, since they should be costs estimated at market value. Both Chapters 1 and 3 of JLN are rightly very cautious toward the use of the contingent valuation ("willingness to pay") surveys. Thus Chapter 1 is left with market prices that Chapter 3 (written by Nordhaus) does not find relevant for the measurement of free natural assets. But Chapter 3 in turn is left with an academic answer (value of the stock equals quantity times the marginal value; accumulation equals marginal valuation times the quantity change in the stock), without indicating how the marginal value would be estimated and how it could be interpreted as an equilibrium price.

In my view, the maintenance cost approach should be revisited in order to see how far it can be extended. Physical measurement of the change in the state of natural assets is anyway fundamental (as the climate change issue demonstrates). Valuing the maintenance costs that would have been necessary to avoid the degradation of certain natural assets would not necessarily enable us to value the stock of the corresponding assets, in the absence of any sound equilibrium mechanism, but it would be very useful information.

The lack of agreement internationally on the treatment of the extraction of mineral resources is a vexing issue in the central framework. The 93 SNA treats the discovery of new resources in the other changes in volume of assets account (appearance of a non produced asset). In a framework with Nature as an entity outside the economy, this could be recorded as a kind of capital transfer from Nature to the economy. This flow is valued in any case as the intrinsic value of the natural resource itself measured by the rent component (rent, not rental) of the market price, after deduction of all costs incurred including the exploration costs (and a normal rate of return on market costs if relevant). Chapters 1 and 3 of JLN maintain the view (Chapter 1, pp. 42–3; Chapter 3, pp. 152–5) that proving reserves is producing them (creating a developed asset as opposed to a useless undiscovered natural asset in the ground). This "faustian" conception of the world looks strange to many people, including me, in the context of environmental concerns, and in Chapter 3 Nordhaus, after a technical presentation of opposing "European" and "American" views, draws himself a parallel with "the American frontier": "Under the American view, there is implicitly a superabundant supply of improved resources—something akin to the vast frontier available for Americans moving west in the nineteenth century" (p. 154). In such an approach, one could say, the Americans not only created the U.S. as a Nation, they also created the physical territory itself—an interesting view of colonization indeed. And there are other connected aspects: when the government of a country, which in most countries owns the sub-soil, hires a firm, generally a foreign one, to do successful exploration work, is this firm producing the natural resource, etc?

Once the deposit is exploited, how should one treat the sale of the extracted quantities (valued at the resource rent value)? I maintain that this is the sale of a slice of an existing asset (an inventory of natural resources), and that this value should not enter the value of production. The main other view, shared by the BEA, considers the deposit as a fixed asset, and the slice sold as equivalent to a consumption of fixed capital plus a return to the deposit. In this approach, the resource rent of the extracted quantities enters GDP (the CFC part is then excluded from NDP). The parallel with a fixed asset and its consumption is in my view purely artificial and formal. It no longer fits the idea of an asset that is used durably in production, as a machine. In addition, the representation given of an oil rent economy, for example, does not seem realistic. Things are there for the time being.

In nonmarket accounting, two main purposes are envisaged, environmental accounting touched upon above and something like enlarged final consumption, with possible negative adjustments. In this second aspect, there is a certain terminological ambiguity, especially in Chapters 1 and 3. The purpose of the measurement of welfare is stressed many times and the "notion of a social welfare function" was introduced in Chapter 1 to interpret income and expenditures in constant prices and reiterated in Chapter 5.

In Chapter 3, Nordhaus is consistent with his 1970 work with Tobin on "Measure of Economic Welfare," arguing that "'output' and 'income' in economic accounts should, in general, be designed to measure concepts that are consistent with economic welfare" (p. 145). Chapters 1 and 5 also refer to Weitz-

man ("as Weitzman [1976] puts it, NDP is a proxy for the present discounted value of future consumption," Chapter 5, p. 209), as does the book Nature's Numbers (Nordhaus and Kokkelenberg, 1999). However, all chapters of JLN seem to reject the use of valuation methods using the consumers' surplus and total economic value, or total willingness to pay, favored by a number of environmental economists. They prefer to keep to market prices. The reference to welfare is then in my view purely formal (a representative consumer with stable preferences maximizing intertemporal utility). The difficulties that were judged insurmountable in the 1940s and 1950s "Economica debate" initiated by Hicks, in order to interpret a change in national income in real terms as a measure of the change in global welfare, are not solved. They are simply hidden. Thus the welfare terminology is misleading, as it evokes either the total economic value covering both market values and consumers surpluses (cardinal utility approach)—which is rejected by everyone at aggregated levels—or the interpretation of changes in global consumption at market constant prices as a change in global welfare (ordinal utility approach), a problem that welfare economics could not solve. It would be better to use a less connoted terminology like, for instance, well-being (it appears once in Chapter 1, p. 35: "indicators of economic well-being"; and also in Chapter 4, p. 170).

The place and role of monetary valuation, discussed for decades, is in any case an issue. The main argument, stressed again in Chapter 4, is that monetary valuation better attracts the attention of economists, policy-makers, etc. The explicit orientation of Chapters 3 and 4 is toward the extension of nonmarket monetary accounting. However the issue of the limit to monetization is not discussed. The concept of the monetization frontier has been introduced in the field of environmental accounting (see O'Connor, 2000; O'Connor *et al.*, 2001). A systematically applied monetary approach still seems to be favored by the authors of "A New Architecture." However, is it possible even to speak in terms of monetary value of social assets? The sustainable development orientation has given rise to the three pillars approach (economic, environmental, social), and in the social field, the problem of the monetization frontier also comes up—perhaps even more acutely than in the environmental field (e.g. the concept of social capital is both peculiar and limited in scope).

As a consequence, social researchers are increasingly tempted to imagine indicators of well-being, or various aspects of well-being, that combine monetary and nonmonetary variables (see for instance, Osberg and Sharpe, 2002), which raises of course inter alia the issue of choosing the weights. When reading the very interesting and thoughtful Chapter 4, one gets the impression that most probably people working in certain of the directions indicated there would have to go beyond the limits of monetary valuation. This could be due, for instance, to deeper investigation of the issue of the relation between output and outcome. In fact, the distinction between output and outcome is less easy for many services than for goods. Education, health, social services, culture and the arts, and recreation are especially mentioned but it is a general problem, even for goods.

My feeling is that it would generally be useful to distinguish between a production process, that ends up in certain types of goods or services (the output),

and a consumption process where possibly a combination of various means gives at the end a certain outcome. A good example is given on page 163: "a health account would relate health improvements . . . to medical treatments, as well as to a wide range of other inputs, including diet, the environment, exercise and research and development." However, one must be very careful not to confuse output and outcome. This risk is not avoided here, as the quote above qualifies health improvements as "the real 'good' that is produced." Health improvements or more generally changes in the health status, of a person or the population at large, are an outcome, not an output. However, when estimating the volume of output of health services, account may need to be taken of the resulting health improvements arising from changes in the performance (quality change) of medical treatments. This may necessitate, as the above example shows, separating out the respective role of various factors. There are obviously various meanings of the word outcome and further clarification is certainly needed. Fortunately there is presently a lot of research work devoted to this issue.

6. Conclusion

The intended restructuring of the U.S. national accounts is particularly important because the future relations between them and the world national accounting standards are at stake and the U.S. can influence the evolution of these standards.

At this stage, however, the central accounting framework of the future U.S. SNA does not seem completely specified. In particular it is not clear if the production accounts of the various institutional sectors, in an integrated approach, would follow the same pattern as outlined in Chapter 1 of JLN. Would value added lose its present central position in the future design of a production account with labor and capital services and would it have to be calculated on a complementary basis? Would the concept of gross operating surplus disappear and be replaced systematically by the one of value of capital services? Would a full set of accounts in constant prices be introduced in parallel with the accounts in current value, which would inter alia introduce MFP estimates in production accounts in constant prices for institutional sectors?

Another puzzling feature is that the borderline between central accounting and satellite accounting is rightly given a prominent position, as regards nonmarket accounting, notably because of the assumptions that are needed when trying to make estimates for nonmonetary nonmarket flows and stocks. On the other hand, the introduction of hard theoretical assumptions is recommended when dealing with accounting for market and monetary nonmarket activities in the central accounts.

There are obviously different views on the conception of what an integrated system of national accounting should be and its relationship with economic theory. The major issue is the importance given (or not given) to the delimitation between an observation system in statistical activity and an analytical framework in research work. In my view, the fundamental issue that deserves further discussion by national accountants and more generally statisticians and analysts is to keep in

mind Stone's formulation and characterization of a system of national accounting as an observation system.

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