Improving US National Accounts Integration and Consistency: A Review Article on *A New Architecture for the U.S. National Accounts*

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J. JOSEPH BEAULIEU AND ERIC J. Bartelsman introduce Chapter 8 of this book by a French proverb: "A man with one watch knows what time it is; a man with two watches is never quite sure." The pending question is about that man without a watch; is he entitled to tell what time it is? With this addition, the proverb covers various problems faced by National Accounting which are the subject of this book.

In general, data users should aim to have a better understanding of the national accounts. This volume, entitled *A New Architecture for the US National Accounts* and edited by Dale W. Jorgenson of Harvard University, J. Steven Landelfeld of the US Bureau of Economic Analysis and William D. Nordhaus of Yale University,[2] contributes to this better understanding by providing an excellent overview of the many facets of this rapidly evolving subject. As the title indicates, it focuses on new developments in the U.S. National Accounts. Yet, the contributors also provide an overview of the system of accounts currently used in the United States, drawing parallels with the 1993 System of National Accounts (SNA93) in use elsewhere, especially in European countries. The United States. has taken the lead in terms of the development of the national accounts, and the work done by American institutions and agencies is of paramount interest. As such, we cannot do anything but strongly recommend that all macroeconomists closely examine the various chapters of this volume.

All systems of national accounts aim at providing users with comprehensive and consistent information about economic developments. This being said, a given system of accounts is composed of different parts which have been gradually developed for specific purposes, and may not be fully integrated with each other. One characteristic of the U.S. statistical system is that it is largely decentralised, involving *inter alia* the Bureau of Economic Analysis (BEA), the Bureau of Labor Statistics (BLS), the Bureau of Census, the Board of Governors of the Federal Reserve System, among others. Hence, despite the progress already achieved by these institutions, certain gaps and inconsistencies still

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remain between.the various programs. To promote further progress, a conference was held at the Board of Governors of the Federal Reserve System in Washington D.C. in April 2004, with the view of initiating the development of a comprehensive and fully integrated system of U.S. national accounts. This volume contains the proceedings of the conference. Participants had the opportunity to present a broad overview of the state of the art in their field, together with a review of the work already completed as well as the efforts required to achieve a higher degree of integration and consistency.

The review article first presents a brief overview of each chapter, focusing on the main contributions of the respective authors. This does not fully do justice to their work since these chapters include much more than can be considered here, but it will provide a useful summary of the main topics addressed idea of the various sections of the book. We then single out and discuss some of the most important implications of these new developments from the point of view of data users.

Overview of the book

The book includes twelve chapters which cover several dimensions of the proposed new architecture for the U.S. National Accounts. In Chapter 1, Dale W. Jorgenson and J. Steven Landefeld (*Blueprint for Expanded and Integrated U.S. Accounts: Review, Assessment and Next Steps*) propose an original way to derive a system of national accounts for the United States that fully integrates the BEA National Income and Product Accounts (NIPAs), the BLS productivity accounts, and the balance sheets provided by the Federal Reserve Board. Their proposal for a symmetric treatment of investment goods production and capital income relies heavily on the systematic utilisation of imputed rental prices for capital assets. They propose that these imputed revenues be included in GDP, which

translates into a 10 per cent increase in GDP in 2002 compared to the NIPAs estimate. In addition, the proposed Domestic Income and Product Account should allow for the ready identification of the sources of growth by providing both constant and current price series. Similarly, the Income and Expenditures Account should also present current and constant prices estimates. Finally, they suggest a Domestic Capital Account which would link the other two sets of accounts to the accumulation of wealth presented in the Wealth Account.

In Chapter 2, Karen Wilson (*The Architecture of the System of National Accounts: A Three-Way International Comparison of Canada, Australia and the United Kingdom*) first provides an overview of the System of National Accounts 1993 (SNA93). She then compares the systems of accounts of Canada, Australia and the United-Kingdom, which are all based on SNA93. In contrast to the United States,, these countries have highly centralised statistical systems and their accounts are highly integrated. They all include financial accounts, balance sheets and balance-of-payments statistics. Yet, some differences remain in the application of the SNA93 across countries and the sequence in which the accounts are presented differs significantly. One interesting point is that all three countries record statistical discrepancies between net lending/borrowing and financial requirements. Rather than a lack of integration between the various data sources, this information is viewed as a way to measure their quality.

The next two chapters make the case for an augmented sequence of accounts, namely for a system that would be extended to include economic non-market activities. This includes natural resources, the environment, unpaid work and investment in education and health. In Chapter 3, William D. Nordhaus (*Principles of National Accounting for Nonmarket Accounts*) recommends a structure of accounts for non-mar-

ket activities that would parallel those of market based activities, using the principles developed for environmental accounts as a reference. This would allow for the full integration of the augmented system of accounts. The author suggests that the activities covered could be restricted to near-market activities, that is those involving goods and services that can also be subject to market activities. A more ambitious programme would involve goods and services for which no market transaction exists. In the latter case, the evaluations would primarily focus on valuing the time used for these activities. In the United States, the American Time Use Survey (ATUS) initiated by the BLS would be the main source of information.

Katharine G. Abraham and Christopher Mackie in Chapter 4 (*A Framework for Nonmarket Accounting*) identify volunteer and home production, education, health, and environmental improvement and degradation as potential non-market activities that could be included in the SNAs. Accounting in this respect should adopt double-entry bookkeeping in a satellite system of accounts. This approach would help clarify a number of issues regarding the measurement of "production", "inputs" and even some business cycles considerations. But, as mentioned in the previous chapter, the most challenging issue would remain the measurement and valuation of the time used for non-market activities.

Charles R. Hulten introduces Chapter 5 (*The "Architecture" of Capital Accounting": Basic Design Principles*) by noting that a number of important problems in national accounting (including the treatment of non-market activity) are severe, but conceptually well understood. In these cases, the main difficulties relates to their implementation. Conversely, issues related to the Capital Accounts are more conceptual: we do not exactly know how to treat them. The use of a circular flow model (CFM) favours the reference to the functional activity (namely production and con-

sumption) over the institutional sectors. This way, capital is more a stock of productive assets for producers (where it is used) and, at the same time, a store of wealth for consumers (where it is owned). In terms of flows, savings increases wealth for consumers, and mirrors investment which increases the capital stock used by producers. In such a framework, investments are expenditures which will increase future consumption – rather than current consumption – which conceptually requires us to consider R&D, as well as other intangible forms of investment, as part of capital. In the same vein, it also requires a full integration of the user cost of capital into the production account.

The three subsequent chapters deal with the integration of the industry accounts and the NIPAs. In Chapter 6, Ann M. Lawson, Brian C. Moyer, Sumiye Okubo and Mark A. Planting (*Integrating Industry and National Economic Accounts: First Steps and Future Improvements*) review the challenge, tackled by the BEA, that is the integration of GDP-by-industry, annual input-output and benchmark input-output programs with the industry accounts. They then review the integration of the industry accounts with the NIPAs . The key issue faced by the BEA is not a lack of data, but rather the unevenness in the quality and coverage of the various data sources. To deal with this issue, the BEA has developed a method to properly weight the various sources of information relevant for estimating the annual I-O and GDP-by-industry accounts.

In Chapter 7, Brian C. Moyer, Marshall B. Reindorf and Robert E. Yuskavage (*Aggregation Issues in Integrating and Accelerating the BEA's Accounts: Improved Methods for Calculating GDP by Industry)* review another aspect of the integration of the GDP-by-industry accounts and the NIPAs. The authors try to identify the reasons behind differences in the measures of real GDP growth between the two sources, and conclude

that the two main contributors are differences in data sources and differences in methodologies. In comparison, differences in the statistical treatment of discrepancies, in the aggregation methods or in the formulas used for computing contributions play a more muted role. The authors show that, provided that the sources of data are the same, using the Fisher Ideal aggregation procedure used by the BEA to measure real GDP would lead to a full reconciliation. Likewise, the use of the NIPA "exact contribution" formula could also be applied at the industry level. This result underlines the need for improving the data quality at the industry level in order to obtain a better match between the two approaches.

In Chapter 8, J. Joseph Beaulieu and Eric J. Bartelsman (*Integrating Expenditure and Income Data: What to Do with the Statistical Discrepancy?*) deal with another discrepancy in the measures of GDP: the difference between the supply and use of goods and services (*GDP*) and the sum of factor and nonfactor payments paid to input provider (Gross Domestic Income, GDI). Conceptually, these two measures should correspond, but in practice they differ. The authors employ industry estimates of final demand and value added to identify the possible sources for the discrepancy. In doing so, they show that data from some specific industries (namely machinery and instruments, trade, and finance and insurance) may be the cause since, for those industries, data from the income side give markedly different estimates of the production of goods and services than those obtained from the expenditure side. The authors explore the possibility of combining data from the expenditure and the income accounts in order to produce a consistent and integrated set of estimates.

In Chapter 9, Barbara M. Fraumeni, Michael J. Harper, Susan G. Powers and Robert E. Yuskavage (*An Integrated BEA/BLS Production Account: A First Step and Theoretical Consider-*

ations) note that differences in the measures of output produced by the BEA and the BLS stem in part from the different objectives of these respective measures. Each has its own strengths and the authors seek to combine the best features of each data set in order to obtain a consistent and integrated measure. They construct a production account using guidelines not perfectly in line with those found in the SNA93. Indeed, the SNA93 makes no reference to any capital services measure, which is a key concept for productivity measures, and in particular for constructing multifactor productivity (MFP). In their framework, which is based on data by industry, the authors show that the BEA and BLS measures can be better integrated. They also suggest that the conversion of the NIPAs and the productivity statistics to the North American Industry Classification System (NAICS) would facilitate better integration in the future.

In Chapter 10 John R. Baldwin and Tarek H. Harchaoui (*The Integration of the Canadian Productivity Accounts within the System of National Accounts: Current Status and Challenges Ahead*) show how the Canadian Productivity Accounts (CPA) are integrated into the Canadian System of National Accounts (CSNA) so as to provide a consistent set of productivity estimates. At the expense of some minor differences, productivity measures follow the recommendations of the OECD "productivity manual", which itself refers to outputs and inputs data consistent with the SNA93. As a consequence, in Canada labour productivity and multifactor productivity measures are consistent with the CSNA.

In Chapter 11 Albert M. Teplin, Rochelle Antoniewicz, Susan Hume McIntosh, Michael G. Palumbo, Genevieve Solomon, Charles Ian Mead, Karin Moses and Brent Moulton (*Integrated Macroeconomic Accounts for the United States: Draft SNA-USA*) provide a diagnosis of the current level of integration of the U.S.

income and financial accounts and propose ways to improve it. In the United States. the main accounts concerned are the NIPAs and the International Transaction Accounts (ITAs) published by the BEA, and the flow-of-funds accounts (FFAs) published by the FRB. These accounts have each been gradually developed for specific purposes and, although they should be consistent conceptually, they are not in practice. The authors show that a number of changes to current practices could help improve the consistency: the use of harmonised definition for the "sectors", the use of common data sources, and a harmonised treatment of transactions. The authors propose a way to integrate financial and income accounts for 1985-2002, which is almost perfectly in line with the SNA standards.

In the 12th and final chapter, Randy A. Becker, John Haltiwanger, Ron S. Jarmin, Shawn D. Klimek and Daniel J. Wilson (*Micro and Macro Data Integration: The Case of Capital*) confront the discrepancy between aggregate measures of capital stocks and flows and the business-level measurement of capital. These two approaches seem difficult to reconcile given the wide differences in methodologies. More importantly, the limited degree of detail available from asset surveys and changes in the sample of firms overtime, especially in the case of younger businesses, create serious obstacles. Nonetheless, the availability of capital expenditure estimates at the firm level through the Annual Capital Expenditures Survey (ACES) could allow for a significant improvement in the measurement of capital. The authors propose a hybrid approach between the top-down and bottom up approach for the measurement of capital stocks and flows by asset and by industry. They justify their effort by noting that developments at the macro level result from very heterogeneous behaviours at the micro level. This reconciliation also sheds light on issues such as capital destruction over time at the micro level, which is assumed to be constant at the macro level. The authors also investigate the treatment of firm exits and whether the value associated with these firms is transferred or scrapped. They favour a hybrid approach, using both macro and micro sources of information and including the use of survey data.

An Assessment

Measurement is the cornerstone of the national accounts. Some transactions are directly measured, sometimes with a wealth of data, sometimes with a dearth of data. Inconsistencies emerge when different sources of information give different results due to a lack of integration and when different concepts – such as current price GDP and GDI – should correspond but do not in practice. This is the problem with having two watches. Some contributions have focused their efforts on sorting out the sources of these differences and, in many cases, proposing ways to reduce them. An interesting example is found in Chapter 2, where Karen Wilson mentions the statistical discrepancy between net lending/borrowing and financial requirements in Canada, Australia and the U.-K., and judges it to be more an information about the quality of the data than a matter for concern. It is indeed a good question to raise: at what price and to what extent should the gaps between the different sources of data be reduced? In some contributions a weighting scheme is introduced that clearly favours the sources that are identified as more reliable, but still tries to extract information from less reliable sources.

Yet, it has long been recognized that it was not possible to restrict the National Accounts only to transactions directly measured. Imputations have a long history and are common practice. The issue is not particularly problematic as long as it is possible to obtain direct measures which provide a close approximation of what one wants to quantify. Nevertheless, this is the problem

with having only one watch. On the other hand, expanding the system of accounts looks very much like trying to tell what time it is without a watch. In that context, the use of imputations is widespread, but is it justified? We do not think that there is a unique answer to this question, since in our view it depends very much on the purpose of this evaluation. This is very well illustrated by the attempt to quantify non-market activities and to measure productivity. It has been known for a long time, for instance, that a portion of actual consumption is made of goods and services that consumers produce themselves. The development of the internet and of consumer-produced goods and services, however, adds a modern twist to this old issue. It is hence interesting to estimate the value of this output, as well as the inputs used to produce it. But, since this is a non-market activity, by nature there is no transaction involved. Thus, it would be very doubtful to include non-market components in the aggregate driving money demand, for example, since no money is required if there is no transaction. It is hence key for the user to identify the various components and to treat them appropriately given different purposes.

Turning to productivity, a researcher may question how close an economy is from perfect competition. In a Cobb-Douglas framework, she could try to measure the gap between real wages and labour productivity. But, since labour productivity is not observable, if the available information on labour productivity has been built using real wages in a Cobb-Douglas framework under the hypothesis of perfect competition, her results will reflect the method used to construct the data, without guarantee that this actually reflects the state of the economy at hand. In other words, the use of theoretical foundations to build a measure of an economic

phenomenon not directly observable can be acceptable to estimatevaluate the order of magnitude of that phenomenon. This practice, however, can become problematic when researchers attempt to establish strict relationships between variables, rather than only estimate the magnitude or test the consistency across numbers.

These examples, although simplistic, show that in practice transparency about the methods and the estimations used in the National Accounts is the key element for practitioners. In this context, references like the volume under review are more than welcome. Users must be provided with a degree of details such that they can best use the data on purpose.

The structure of the national accounts is the way to deal with part of the problem. As Nordhaus recalls p. 144 "[...] *I must emphasize that, while non market and environmental accounts form an important addition to our understanding of economic activity, they are not ready for center stage. It would not be advisable to incorporate further major non market activities into the core National Income and Product Accounts at this time.* [..] *it would be sensible to set as a goal of the U.S. statistical system to develop satellite non-market accounts* [..]". Yet, satellite accounts are a way to provide some additional information in a framework consistent with the core system of accounts, together with the degree of freedoms required in fields where measures are less precise. Along these lines, for the sake of the users, it is indeed wise to stress how far from direct measurement some elements of the system of national accounts are.

For statisticians and economists around the world, this volume represents a valuable resource to learn about the future directions and solutions proposed by their U.S. colleagues for the development of the SNA.