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**A NEW ARCHITECTURE FOR THE U.S. NATIONAL ACCOUNTS:**

by

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**Introduction.** The purpose of this Grand Challenge is to accelerate the development of new economic data for the resolution of policy issues involving long-term growth. Significant examples include public and private provision for retirement income and the outlook for health care expenditures and public programs to cover health care costs. The public programs for retirement income and health care are critical components of the long-term development of the federal budget. Other important examples include broadening the concept of investment to include investment in human capital through health care and education and investment in intangibles, such as research and development.

The first question to be addressed is, why do we need a new architecture for the U.S. national accounts? In this context “architecture” refers to the conceptual framework for the national accounts. An example of such a framework is the new seven-account system employed by the Bureau of Economic Analysis (BEA).<sup>1</sup> A second example is the United Nations’ System of National Accounts 2008.<sup>2</sup> Both provide elements of a complete accounting system, including production, income and expenditure, capital

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<sup>1</sup> The BEA’s seven-account system of summarized by Dale W. Jorgenson and J. Stephen Landefeld, “Blueprint for Expanded and Integrated U.S. Accounts: Review, Assessment, and Next Steps,” in Dale W. Jorgenson, J. Stephen Landefeld, and William D. Nordhaus, eds., 2006. *A New Architecture for the U.S. National Accounts*, Chicago University of Chicago Press, pp. 13-113. An electronic version of Jorgenson and Landefeld is available in [Blueprint for Expanded and Integrated U.S. National Accounts: Review, Assessment, and Next Steps](#), with J. Stephen Landefeld, in D.W. Jorgenson, J.S. Landefeld, and W.D. Nordhaus, eds., [A NEW ARCHITECTURE FOR THE U.S. NATIONAL ACCOUNTS](#), Chicago, University of Chicago Press, 2006, pp 13-112.

<sup>2</sup> United Nations, Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, and the World Bank, 2009. *System of National Accounts 2008*. ST/ESA/STAT/SER.F/2/Rev.5, New York: United Nations.

formation, and wealth accounts. The purpose of such a framework is to provide a strategy for developing the national accounts.

The U.S. national accounts were originally constructed to deal with issues arising from the Great Depression of the 1930's, focusing on the current state of the economy. The basic architecture of the national accounts has not been substantially altered in fifty years. Recovery from the economic crisis of 2007-2009 has shifted the policy focus from economic stabilization to enhancing the U.S. economy's growth potential. In addition, the economy is confronted with new challenges arising from rapid changes in technology and globalization. Meeting these challenges will require a new architecture for the U.S. national accounts.

**New Architecture.** The key elements of the new architecture are outlined in a "Blueprint for Expanded and Integrated U.S. Accounts," by Jorgenson and Landefeld.<sup>3</sup> They present a prototype system that integrates the national income and product accounts with productivity statistics generated by BLS and balance sheets produced by the Federal Reserve Board. The system features GDP, as does the National Income and Product Accounts; however, GDP and domestic income are generated along with productivity estimates in an internally consistent way. The balance sheet covers the U.S. economy as a whole and fills a gap in the existing Flow of Funds Accounts.

The prototype system of accounts developed by Jorgenson and Landefeld incorporates the cost of capital and the flow of capital services for all productive assets employed in the U.S. economy. This provides a unifying methodology for integrating the National Income and Product Accounts generated by BEA and the productivity statistics constructed by BLS. The parallel flow of labor services is broken down by age, sex, education and class of employment. Hours worked for each category of labor services are weighted by total labor compensation per hour worked. The underlying source data on employment, hours worked, and labor compensation include public use data for individuals from the decennial Censuses of Population and the monthly Current Population Surveys generated by the Bureau of the Census.

The production account for the prototype system of accounts is based on the gross domestic product (GDP) and gross domestic income (GDI) in current and constant prices. This production account has been disaggregated to the level of individual industries, by Jorgenson, Ho, and Samuels (2010), "New Data on U.S. Productivity Growth by Industry."<sup>4</sup> The methodology follows that of Jorgenson, Ho and Stiroh (2005), [Information Technology and the American Growth Resurgence](#). This methodology conforms to the international standards presented in the OECD *Productivity Manual* (2001).<sup>5</sup> The European Union (EU) has recently completed a project to develop systems of production accounts based on this methodology for the economies of all EU member states.<sup>6</sup> This has been expanded to an initiative involving more than forty countries on all six continents.<sup>7</sup>

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<sup>3</sup> See Jorgenson and Landefeld, *op. cit.*

<sup>4</sup> [http://www.worldklems.net/conferences/worldklems2010\\_jorgenson.pdf](http://www.worldklems.net/conferences/worldklems2010_jorgenson.pdf)

<sup>5</sup> See Paul Schreyer, 2001. *Productivity Manual: A Guide to the Measurement of Industry-Level and Aggregate Productivity Growth*. Paris: Organisation for Economic Cooperation and Development, May.

<sup>6</sup> For details on the EU project, see: [www.euklems.net/](http://www.euklems.net/).

<sup>7</sup> <http://www.worldklems.net/>

The prototype system of Jorgenson and Landefeld begins with the NIPAs and generates the income and product accounts in constant prices as well as current prices. An important advantage of beginning with the NIPAs is that the impact of globalization on the U.S. economy is reflected in BEA's system of international accounts. This system includes the Foreign Transactions Current Account, which records imports and exports, as well as receipts from the Rest of the World, payments to the Rest of the World, and the Balance on Current Account. The international accounts also include the Foreign Transactions Capital Account, which registers Net Lending and Borrowing from the United States to the Rest of the World. BEA's international accounts are undergoing substantial improvements intended to enhance the quality of information available to policy makers dealing with globalization.<sup>8</sup>

Another important advantage of beginning with the NIPAs is that the existing U.S. national accounts could be incorporated without modification. Improvements in the NIPAs could be added as they become available. For example, the BEA is currently engaged in a major program to improve the existing system of industry accounts. This program integrates the NIPAs with the Annual Input-Output Accounts and the Benchmark Input-Output Accounts produced every five years. Improvements in the source data are an important component of this program, especially in measuring the output and intermediate inputs of services. The Census Bureau has generated important new source data on intermediate inputs of services and BLS has devoted a major effort to improving the service price data essential for measuring output.<sup>9</sup>

**Next Steps.** The next step in unifying the National Income and Product Accounts with the productivity statistics is to develop a more detailed version of the production account. This would incorporate BEA's new system of official statistics on output, intermediate input, employment, investment, fixed assets, and imports and exports by industry. The system of industry production accounts would use the North American Industry Classification System (NAICS) employed in BEA's official statistics. The accounts would include capital and labor inputs for each industry, based on the methodology of Jorgenson, Ho, and Stiroh (2005). Industry outputs, as well as intermediate, capital, and labor inputs would be presented in current and constant prices along with productivity, as in Jorgenson, Ho, and Samuels (2010).

The next step in integrating the NIPAs with the Flow of Funds Accounts would be to extend the national balance sheet for the U.S. economy generated by Jorgenson and Landefeld to incorporate balance sheets for the individual sectors identified in the Flow of Funds Accounts. The Integrated Macroeconomic Accounts for the U.S. produced by Teplin, *et al.*, have focused on the income and expenditure accounts, rather than balance sheets and the wealth accounts.<sup>10</sup> A comprehensive wealth account for the U.S. economy

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<sup>8</sup> See, for example, Ralph Kozlow, "Globalization, Offshoring, and Multinational Companies: What are the Questions and How Well Are We Doing at Answering Them," BEA Working Paper, January 6, 2006.

<sup>9</sup> See the Panel Remarks by Thomas L. Mesenbourg of the Census and Kathleen P. Utgoff of BLS in Jorgenson, Landefeld, and Nordhaus, *op cit.*, pp. 611-625.

<sup>10</sup> BEA national income and FRB flow of funds data on income and expenditure are combined by 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:

is currently unavailable. Such an account is essential for measuring the accumulation of wealth to meet future financial needs for both public and private sectors, as well as assessing the levels of domestic and national saving and their composition. The new architecture project would involve close collaboration with the statistical agencies.

The final question to be addressed is, why not leave this as a Grand Challenge to the statistical agencies? The answer is that no agency has responsibility for producing a new architecture for the national accounts. Each of the agencies has a well-defined scope of activities supported through the federal budget. These activities have been developed over many decades of experience of operating within the decentralized U.S. statistical system. The existing architecture of the U.S. national accounts was developed through collaboration between the statistical agencies and intellectual leaders in the private sector such as Simon Kuznets and Wassily Leontief, but this architecture has important gaps and inconsistencies and is now in need of major updating and extension. The initial steps described above were carried out through collaborations among the agencies and between private and public sector investigators.

**Future Research.** The creation of a new architecture for the U.S. national accounts will open new opportunities for development of our federal statistical system. The boundaries of the U.S. national accounts are defined by market and near-market activities included in the gross domestic product. An example of a market-based activity is the rental of residential housing, while a near-market activity is the rental equivalent for owner-occupied housing. The new architecture project is not limited to these boundaries. Under the auspices of the National Research Council, the Committee on National Statistics has outlined a program for development of non-market accounts, covering areas such as health, education, household production, and the environment.<sup>11</sup>

An example of future opportunities for development of federal statistics is the integration of rental values for housing, the asset value of the housing stock, and level of investment in residential structures. All three have been the focus of intense media attention during the recent housing boom and bust, in part because of the importance of housing as a component of national wealth. Investment in housing also involves important long-term policy issues, such as the impact of federally subsidized mortgages, the effect of tax incentives for housing through income tax deductions for mortgage interest and state and local property taxes, and the role of investment in public housing. The value of the housing stock includes the value of residential structures, as well as the value of residential land. The value of land is included in the national wealth, but not in BEA's accounts for reproducible assets.

New accounts for health and education could make use of new data sources, such as the American Time Use Survey (ATUS), recently instituted by the Bureau of Labor

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Draft SNA-USA," in Jorgenson, Landefeld, and Nordhaus, *op. cit.*, pp. 471-541. These accounts are updated annually by BEA and the FRB.

<sup>11</sup> The NRC report is summarized by Katharine G. Abraham and Christopher Mackie, "A Framework for Nonmarket Accounting," in Jorgenson and Landefeld, *op. cit.*, pp. 161-192. The conceptual framework for non-market accounts is presented by Nordhaus, "Principles of National Accounting for Nonmarket Accounts," in Jorgenson and Landefeld, *op. cit.*, pp. 143-160.

Statistics.<sup>12</sup> This provides detailed accounts for time use for the U.S. population. Jorgenson and Barbara M. Fraumeni have provided estimates of investment in human capital, including education.<sup>13</sup> An important part of investment in education is the value of time spent by students enrolled in educational programs. Since this time is not evaluated in the labor market, the value of investment in education is outside the boundary of the national accounts, but could be included in non-market accounts.

The Jorgenson-Fraumeni estimates of education incorporate a detailed system of demographic accounts for the U.S. population, based on the work of Land and McMillan.<sup>14</sup> This includes a breakdown of the population by age, sex, education, and labor force status. Employed members of the labor force are included in the labor data base that underlies the prototype system of accounts developed by Jorgenson and Landefeld. Time spent in labor market activities is also included in the labor data base. Time spent in non-market activities, such as education, is included in the data base employed by Jorgenson and Fraumeni. BEA has recently undertaken a project to update the Jorgenson-Fraumeni estimates of investment in education as part of a program to measure the output of public educational institutions.

The availability of data on time use would also facilitate the implementation of measures of well being that incorporate social and psychological dimensions, as well as the economic dimension captured by the measure of income in constant prices employed by Jorgenson and Landefeld, following Paul Samuelson, William Nordhaus and James Tobin, and Martin Weitzman.<sup>15</sup> For example, a System of National Well-Being Accounts has been proposed by Daniel Kahneman and Alan Krueger.<sup>16</sup> This is based on the Day Reconstruction Method in which time use is associated with domain-specific satisfaction. Measures of satisfaction can be compared over time and among groups of individuals to measure levels of well-being and their evolution over time.

Finally, the World KLEMS project is now generating industry-level production accounts, like those described above for the U.S., for the economies of EU members and fifteen other major U.S. trading partners such as Brazil, China, India, Japan, and Korea. These data will greatly facilitate international comparisons and research into the impact of globalization on the major industrialized economies and the future impact of globalization on the U.S. economy.

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<sup>12</sup> See the BLS website for details about ATUS: [www.bls.gov/tus/](http://www.bls.gov/tus/).

<sup>13</sup> See Dale W. Jorgenson, 1996. *Postwar U.S. Economic Growth*, Cambridge, The MIT Press. An overview of issues in measuring investment in education is presented by Katharine G. Abraham, [Accounting for Investments in Formal Education](#) (PDF). The estimates of Jorgenson and Fraumeni have been updated by Michael S. Christian, [Human Capital Accounting in the United States: 1994 to 2006](#), (PDF).

<sup>14</sup> See Kenneth C. Land and Marilyn M. McMillen. 1981. "Demographic Accounts and the Study of Social Change, with Applications to Post-World War II United States." In F. Thomas Juster and Kenneth C. Land, eds., *Social Accounting Systems*. New York, Academic Press, pp. 242-306.

<sup>15</sup> See Paul A. Samuelson, 1961. "The Evaluation of 'Social Income'," In Fredrich A. Lutz and Douglass C. Hague, *The Theory of Capital*, London, Macmillan, pp. 32-57. William D. Nordhaus and James Tobin, 1973. "Is Growth Obsolete?" In Milton Moss, ed., *The Measurement of Economic and Social Performance*, New York, Columbia University Press, pp. 509-532. Martin Weitzman, 2003. *Income, Wealth, and the Maximum Principle*. Cambridge, Harvard University Press.

<sup>16</sup> See Alan B. Krueger, ed., *Measuring the Subjective Well-Being of Nations: National Accounts of Time Use and Well-Being*, Chicago, University of Chicago Press, 2009.