Discussion by Ernst R. Berndt of "Integrated GDP-Productivity Accounts" by Michael J. Harper, Brent R. Moulton, Steven Rosenthal and David Wasshusen – American Economic Association Annual Meetings, San Francisco, California, January 4, 2009

Accounting, and more specifically, national income and product accounting, is viewed by many in the economics profession as dull, boring, not exciting, and not worthy of major textbook or classroom treatment. But as recent events have again reminded us, national income and product accounting is critically important in understanding what is taking place within our economy.

Let me begin this discussion by placing today's session in context. It should not be surprising that the US's national income and product accounts ("NIPAs") were conceived and implemented soon after the stock market crash of 1929 and the subsequent Great Depression years. Today we are again finding ourselves focusing on attempting to measure and monitor aspects of our economy – trying to link what is happening in financial markets to economic activity in non-financial markets, and vice-versa.

For several decades now, national income accountants and statisticians from a variety of countries have worked diligently at making their lives more exciting and interesting by regularly convening in exotic locations, arguing about how to standardize accounting concepts and procedures across countries. One of the important achievements of this process was the publication of SNA(93) – the 1993 System of National Accounts. This document embodied a number of important changes that reflected the increasing influence of the economic theory of index numbers on practices incorporated into NIPAs, such as the use of chained Divisia or Fisher indexes rather than fixed weight Laspeyres indexes for computing gross domestic product ("GDP").

Although the SNA(93) represented a major step forward in incorporating the economic theory of index numbers into its recommended accounting guidelines, it conspicuously failed in its guidance regarding the measurement of capital input. Specifically, even though it is widely acknowledged that capital assets vary systematically in their useful lifetimes, implying that a dollar acquisition of a long-lived asset generates a smaller annual service flow than does a dollar acquisition of a shorter-lived asset, the SNA(93) treated capital input as a wealth stock, and not as a real capital input services flow. Moreover, while SNA(93) provided important new guidance on measuring labor productivity, its failure to deal properly with measuring capital input implied that it was essentially completely silent on properly measuring multifactor productivity ("MFP", combined capital-labor productivity).

Then in 2007, after 14 more years of national income accountants and statisticians traveling to exotic locations to ruminate over esoteric and mundane accounting issues, and coaxed on by others such as Paul Schreyer at the OECD, the Intersecretariat Group on National Accounts issued new recommendations including ones distinguishing real capital service flows from capital stocks, thereby creating a more coherent and integrated set of accounts for measuring GDP and MFP. While important controversies still remain to be resolved – such as how to treat owner-occupied housing in the national accounts -- SNA 2007 represents a very important achievement in providing guidance to government accountants, statisticians and economists around the globe on how to measure GDP, MFP and various financial activities within an integrated and consistent architectural framework.

This background discussion brings me to the current paper coauthored by Michael Harper and Steven Rosenthal of the Bureau of Labor Statistics ("BLS") and Brent Moulton and David Wasshusen of the Bureau of Economic Analysis ("BEA"). This is a remarkable paper,

particularly when viewed in historical, and for that matter, cultural contexts. Why is that the case? Unlike in most countries where the data collection and publication of NIPAs are centralized in one agency such as Statistics Canada, in the US we have a decentralized set of agencies responsible for distinct aspects of national economic accounting. In the 1950s, 60's and early 70s, now legendary battles were fought among economic statisticians at the BEA, the BLS, the Department of Agriculture, academics, and occasionally the Federal Reserve Board. As an aside, I very much hope that someday soon some economic historian or well-informed journalist will chronicle the history of how the various measurement battles and wars were waged, the role of commanders and self-appointed generals such as George Jaszi, John Kendrick and Edward Denison, the brazen invasions by academics such as Zvi Griliches and Dale Jorgenson along with their students and grand students, and the eventual diffusion of modern index number economic theory into the government NIPAs.

The settlement outcome of these long wars was the establishment and perpetuation of fiefdoms and silo publication responsibilities. The BEA was tasked to publish nominal and real GDP, as well as capital stocks, while the BLS's role was to publish labor input and labor productivity. BEA published components of GDP (consumption, investment, government expenditures and net exports), nominal gross output by industry, and occasional input-output tables.

A major conceptual innovation with very significant practical implications took place in the early 1970s, when Dale W. Jorgenson and his student Laurits R. Christensen published an important article in an obscure journal showing how and empirically implementing an accounting framework in which outputs, inputs and productivity could be measured within an integrated architectural framework. Then in 1983 Michael Harper – a second generation

Jorgenson student (mentored by Laurits Christensen) led a group at the BLS that built on the Christensen - Jorgenson framework, and began publishing MFP numbers, employing aggregated capital service flows (not aggregate stocks) in their calculations.

So here we are in 2009. For many years now, BEA has published GDP measures for the overall economy, even as the BLS has published output measures at the private non-farm business level of aggregation, at the private business level that includes farm output, as well as at various detailed industry levels, but *not* at the total economy level. Recall that to move from the private business level to that of the overall economy, one needs to augment the private business sector output with that from various governments and not-for-profit sectors. So for decades now, the BLS' output and MFP measures have conflicted with a less inclusive concept of output and MFP than has that from the BEA.

Today I am pleased to announce that the cold civil war (note, I did not say civil cold war, for civility was not always present) between the BEA and BLS has thawed significantly, with final peace talks underway. This ceasefire has been spurred on by enlightened leadership from Michael Boskin at the Council of Economic Advisors, Katherine Abraham at the BLS, and Steven Landefeld at the BEA. This agency leadership has been aided and abetted by successive generations of Jorgenson students – Robert Hall, Jack Triplett, W. Erwin Diewert, Charles Hulten, Barbara Fraumeni, for example, by other multigeneration Jorgenson students now employed by these statistical agencies, and by the tactical defections and loyalty transfers carried out by economists migrating from one agency to the other, such as Brent Moulton, Dennis Fixler and Marshall Reinsdorf from the BLS to the BEA.

Moreover, sensing that the SNA concensus recommendations were inevitable and imminent, already in 2004 Brent Moulton began preparing for the Potsdam post-war

rapprochement realities. Those efforts have laid the basis for today's paper and the ultimate display of shock and awe – a paper jointly authored by economists at the BEA and the BLS that constructs and reports estimates of output, inputs, and MFP at a comparable level of aggregation – the overall economy – in a consistent manner, using critical data from each of these agencies, as well as other sources. Today, instead of Potsdam, we can rejoice and shout, "Hot Dam! Peace At Last!"

Let me add a few more serious comments. In going from the BLS's private business level to the BEA's economy-wide level of aggregation, the authors need to construct measures of labor and capital input services input, along with output measures for the various government and not-for-profit sectors. For governments, this requires aggregation over 22 types of capital asset flows, using rental service price share values as weights. But what measure of r – the rate of return, or cost of capital – should be used to compute the government user cost of capital? In their paper the authors report various sensitivities based on eight alternative measures of r, and end up using an internal rate of return measure that is based on *ex post* total property income, and an assumed r that in any given year is equal across assets and industries.

Now as the paper in this session by Palumbo and Parker documents, it is extremely important that differential risk across assets and industries be taken into account when accounting for economic and financial activities. A major focus of future research, I believe, should be on how to adjust rates of return within the NIPA architectural framework for differential risk. Here I think we need to import concepts from finance theory. According to the simplest risk-return financial models, such as the Capital Asset Pricing Model, differential sensitivity to market-wide risk is captured by the departure from unity of a firm's or an industry's beta, with the weighted average of all betas by construction being equal to unity. By

analogy, I conjecture that it would be very useful to investigate replacing an equal r across all assets and industries assumption with a common r multiplied by industry and/or asset betas, inserting this risk-adjusted r into the service price or user cost formula, thereby preserving overall property income and rate of return accounting identities. More generally, getting economic statisticians from the Federal Reserve Board involved in investigating in greater detail the linkages among measures of risk and rates of return in the NIPAs would seem to be a high priority endeavor, now that the measurement wars are over.

There are two other brief comments I would like to make. First, several of the papers in this session make reference to the need for the Congress to pass data sharing legislation so that, for example, the Census Bureau and the BLS can compare and reconcile their establishment sample frames. This is not as exciting as current discussions concerning the size and composition of the stimulus bill to be considered by the incoming Obama Administration and Congress, but it is nonetheless very important legislation. I urge each of you here today to contact your Representatives and Senators, as well as your former students now employed in Washington at various agencies or on Capital Hill, finally to pass this much-needed enlightened legislation.

Second, as we think through infrastructure investments and how to monitor the impacts of likely unprecedented huge "shovel ready" investments on employment and output, let us exploit this experience and opportunity by putting into place new statistical efforts to better measure government (and, for that matter, not-for-profit) inputs, outputs and productivity. The extent to which we now realize we currently fail to understand the nature and depth of economic fluctuations and financial activities highlights the absolutely critical need for more reliable, timely and detailed economic measurement.

Now that the measurement wars are over, let us marshall a plan for significant new investments in economic measurement, at our state and federal statistical agencies. National income accountants may not do their seemingly mundane work with highly visible panache, and their tools may not be glamorous, but with their shovels they do dig up data. The data shovels are ready, so let's get those shovels moving, and make data, not war.

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