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Title: Comment on "An Integrated BEA/BLS Production Account: A First Step and Theoretical Considerations"

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etary Fund, Organisation for Economic Co-operation and Development, and World Bank. 1993. *System of National Accounts 1993.* Series F, no. 2, rev. 4. New York: United Nations.

Comment Carol Corrado

The empirical analysis of the sources of economic growth requires consistent measures of outputs and inputs. The requirement is important because the rate of change in productivity is usually estimated residually from measures of outputs and inputs. This paper focuses on the definition and construction of the output measures used to estimate productivity. Because the BEA and BLS each publish apparently similar, but statistically different, major sector and industry-level output measures, a major goal of this chapter is to take some steps to document and understand these differences.

The chapter first reviews the theoretically ideal production account, that is, one that includes capital services so that the account can be used to construct estimates of multifactor productivity. The authors show how the theoretical account can be adapted for a major sector, which reveals the relationship between GDP and the output of the major sector. They also illuminate the role of imports and show how reconciling items in economic accounts (certain taxes and subsidies) should be treated to calculate capital income as required for productivity measurement. Using elements currently published by both the BEA and BLS, the chapter then illustrates an empirical production account for the nonfarm business sector and presents the BLS multifactor productivity (MFP) estimates derived from the account.

Thus, the U.S. national accounts, viewed broadly across the agencies, already contain a cornerstone of the new architecture, a production account for (something close to) GDP in current and constant prices. The new architecture also calls for a production account for GDI in current and constant prices and suggests that both be extended to the industry level. The theoretical framework laid out in the chapter shows how aggregate output and productivity can be built from industry-level data, an approach that is conceptually consistent with GDP as measured in benchmark input-output accounts. Other chapters in this volume indicate the BEA's plans for more timely integration of its industry and input-output accounts, and thus the theoretical section of this paper illustrates how productivity measurement fits into this longer range scheme.

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The paper's empirical results pertain to two themes in the recent productivity literature. First, many productivity analysts noted that the difference between GDP and GDI in the mid- to late 1990s was significant and affected estimates of the trend in aggregate productivity. The chapter documents and explains the statistical sources of these GDP-GDI differences. Second, productivity researchers have long pointed to conflicts in the industry-level data issued by various programs of the federal government. Accordingly, the paper documents and analyzes the sources of differences among available industry output measures during the 1990s.

With regard to statistical integration, the contribution and relevance of the two empirical exercises in the paper are different: the aggregate results, though important, are not new to the literature,[1] whereas the industry results represent an important first step in work to create consistent industry-level production accounts common to the two agencies. Moreover, the authors do *not* suggest that aggregate differences between GDP and GDI should be eliminated (as have some observers), but they are clear that the ultimate goal of their industry-level analysis is "reducing differences" among the myriad BEA and BLS industry output measures and "capturing the best in both data sets." I concur with this emphasis.

Aggregate Measures

The official aggregate productivity statistics are derived from expenditure-based GDP, but researchers and analysts also look at productivity derived from GDI. The paper provides a useful accounting for the sources of the difference in the growth rates of these alternative measures, reminding us of just how much alternative measures of the same or similar concept can differ.[2] The authors show that the step-up in real nonfarm business output in the late 1990s could have been as much as 2.7 percentage points—or it could have been 3/4 percentage point less! This statistical uncertainty flows through to the residually measured productivity figures and is especially large relative to the typical rates of change in MFP.

Despite the statistical imprecision suggested by the differences between GDP and GDI, macroeconomists and policymakers have been well served by the availability of official MFP estimates. Moreover, it is probably fair to say that this group of users views the consistency of the aggregate productivity data with GDP (rather than GDI) as a plus. Such users also recognize, however, that input-output relationships are held fixed in GDP for long periods, and that the income and tax data used in GDI, though not

1. See the references cited in footnote 1 of the chapter and Moyer, Reinsdorf, and Yuskavage.

2. With the 2003 comprehensive revision of the NIPAs, the BEA took an important step toward integrating the output data reported by both agencies by adopting the BLS definition of business-sector output. The empirical analysis in this paper pertains to the earlier data in which coverage and definitional differences also created inconsistencies.

without problems of their own, provide an additional perspective that often proves valuable. An important example is the pickup in productivity in the mid-1990s: productivity measures based on initial estimates of GDI showed an acceleration before the official measures based on GDP. All told, therefore, the occasional large size of discrepancies between alternative output measures is informative for aggregate analysis.

Industry Measures

Researchers seeking to attribute economic growth by industry have used industry-level data from the BEA, BLS, or a hybrid of both. Because these data often differ significantly, the choice can affect the resulting attribution of productivity to individual industries. A key contribution of this chapter thus is table 9B.1. The table summarizes the definitions and estimating methods employed in eight (*yes, eight!*) separate BEA or BLS programs that compile and/or issue industry output measures; that a ninth program, at the BLS, is not included in the comparisons is a drawback of the chapter. That said, related contributions are table 9B.2, which reports the availability of measures for detailed industries by program, and the discussion in section 9.4 of the results of comparing the alternative detailed measures. Much of this section of the chapter provides comparisons of alternative industry concepts and aggregates, which might be expected to differ. However, the results for detailed industries spotlight the actual statistical differences and issues.

Economic accountants and productivity estimators use the same basic data to compile different concepts and different aggregates to meet the analytical needs of their users. Table 9B.1 shows that detailed industry data on gross output (or gross receipts or gross margins, depending on the industry) in current and constant dollars are the basic building blocks of all output and productivity measures. The users of the data compiled in the industry programs at the BEA and BLS, as well as users of the IPI, issued by the Federal Reserve Board (FRB), need to know the role of differences in the basic building blocks used in each program. For example, differences in the price deflators for semiconductors and communications equipment explain virtually all of the difference between the FRB measure and the other measures shown in table 9.6, whereas differences in the treatment of oil pipeline company revenue explains some of the discrepancy between the BEA and BLS measures, and so on. The chapter would be stronger if it contained more of this concrete information. Importantly, though, when the authors narrow their BEA and BLS comparisons to detailed industry output data, they find that the rate of change in real output in the late 1990s was relatively different for only 28 percent of comparable SIC four-digit industries (128 out of 458). All manufacturing industries and nearly half of nonmanufacturing (in terms of gross receipts) were available for comparison (table 9.9).

The statistical agencies should collaborate so that, inasmuch as it is possible, their programs begin with common source data for detailed industries. The results quoted above suggest that developing a common industry-level database for real output is doable and that the agencies should work toward that end. The definitions and concepts used in this work should be as close as possible to those used in primary data collection. For example, the concept for gross output (or gross margins or receipts) should conform to the definitions used by the Census Bureau because they are the primary source for comprehensive data on the value of output by detailed industry; the BEA's definitional adjustments to Census gross output (the addition of own-account construction and own-account production of software to Census gross output) would be part of the data and documentation it provides to its users.

The industry output data issued by the Census Bureau, as well as the raw data on prices and inputs to production from other sources, periodically need to be adjusted for changes in classification systems, shortfalls in coverage, and the like. The various agencies often go their own ways in this work although, in the mid-1990s, a collaborative effort involving staff of the BEA, Census, and Federal Reserve developed adjustments for "drift" in the annual surveys of manufacturing between the periodic censuses; prior to that effort, time-series inconsistency in the Census Bureau's manufacturing data often caused confusion among users of the various data sets on manufacturing activity. The results in this paper suggest that the development of common source data and adjustments for nonmanufacturing output, and the resolution of issues with selected price deflators, are important next steps in the integration of the industry data systems issued by BEA and BLS