

THE SYSTEM OF NATIONAL ACCOUNTS FOR THE NEW ECONOMY: WHAT SHOULD CHANGE?

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The publication of the 1993 System of National Accounts served as a major milestone in creating international standards for compiling a fully integrated set of accounts measuring a nation's production, income, and wealth. While statistical agencies continue to make progress toward full implementation of the 1993 SNA, attention is now turning to perceived deficiencies of the system and areas for possible improvement. This paper discusses several suggestions for possible changes in the national accounts, including inclusion of multifactor productivity measures in the production account, changes to the definition of output for certain financial services, expanded coverage of intangible assets, capitalization of military equipment, inclusion of consumer durable goods in measures of saving, imputation of a rate of return to fixed assets used for nonmarket production, reconsideration of sectoral boundaries, and modification of the definition of capital transfers for capital gains taxes.

1. INTRODUCTION

The publication of *System of National Accounts 1993* served as a major milestone in creating international standards for compiling a fully integrated set of accounts measuring a nation's production, income, capital, financial transactions, and wealth.¹ The SNA resolved many long-standing issues in national accounting and introduced revaluation and other-changes-in-volume-of-assets accounts that provide a complete reconciliation between the stocks and flows in the system. In response to the growing importance of information and communication technologies, the 1993 SNA recommends quality adjustment of price deflators, annual chain-weighting of price and volume measures, and recognition of software as fixed capital formation.

Nancy and Richard Ruggles were long-time advocates of improving the national accounts and specifically recommended many of the features that were incorporated in the 1993 SNA. Indeed, their work probably played an important role in determining the shape of the system. For example, Ruggles and Ruggles

Note: An earlier version of this paper was presented, along with another paper on the same theme by Edwards, Comisari, and Johnson (2002), at the International Association for Official Statistics conference on "Official Statistics and the New Economy" in London, August 27–29, 2002, and at the OECD National Accounts Experts' Meeting in Paris, October 8–11, 2002. Subsequently, in March 2003, the UN Statistical Commission agreed to undertake a revision of the System of National Accounts, which is scheduled for completion in 2008. The author thanks Dennis Fixler, Barbara Fraumeni, Ralph Kozlow, Steve Landefeld, Rosemary Marcuss, Brooks Robinson, Obie Whichard, Helen Tice, two referees, and the participants at the IAOS and OECD conferences for comments.

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¹See Commission of the European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations, and the World Bank (1993). Subsequent references to *System of National Accounts 1993* will take the form of (SNA c.p), where c and p represent the referenced chapter and paragraph numbers, respectively.

(1982) and Ruggles (1983) emphasized: (a) the importance of integrating the production and income-and-outlay accounts with the financial accounts, revaluation accounts, and balance sheets; (b) the importance of defining sectors and transactions in a way so the accounts can be built up as aggregations of the accounts of individual institutional units; and (c) providing linkages to other economic and social data—for example, to data for the analysis of nonmarket activities. They also strongly advocated the separation of the sector accounts for households from those for nonprofit institutions serving households; this was also a recommendation of the 1968 version of the SNA, but one that had not been implemented by many countries. Although some of their proposed innovations, such as the “transactor approach” for measuring the value of financial services and insurance (that is, treating gross insurance premiums and interest as the value of services based on the assertion that this was how these transactions were viewed by the transactors), were not incorporated in the 1993 SNA, clearly their overall contributions to the development of national accounts were immense.

While statistical agencies continue to make progress toward full implementation of the 1993 SNA, attention is now beginning to turn to perceived deficiencies of the system and areas for possible improvement. The SNA’s prefatory section, “Perspectives on the 1993 SNA: Looking Back and Looking Ahead,” recognizes that a number of unresolved issues require additional research; among the topics mentioned are the cost of capital owned and used by government and nonprofit institutions serving households, consumer subsidies, environmental accounting, output of services, including services produced within households, and the scope of capital formation, such as treating research and development and education as capital (SNA, p. xliii). The United Nations Statistical Commission has already updated the SNA’s treatment of financial derivatives, and the Inter-Secretariat Working Group on National Accounts has sponsored at least five electronic discussion groups on other topics of concern to national accountants.² Economists who have studied the SNA have also made a number of suggestions for possible changes in the national accounts; this paper will discuss several of them.

In considering possible changes to the SNA, we need to take account of the different needs of various users of the accounts. Among the most important uses are analysis of economic fluctuations and economic planning. National accounts, where successful, are sufficiently transparent, accurate, and timely to be used confidently in government and business planning. National accounts rely on sound, high-frequency source data, which must actually be collectible from the accounts or other records of the enterprises and other institutional units in the economy. Some SNA concepts depend on institutional arrangements that are likely to differ among countries. Finally, the SNA is designed as an integrated, complete set of accounts, so any changes in concepts in one part of the accounts must be carried through to the entire set of accounts. These considerations place limits on the changes that may be considered, and in some cases it may be preferable to develop a new concept through satellite accounts rather than in the core accounts.

²The Organization for Economic Cooperation and Development’s National Accounts Web site includes links to electronic discussion groups on share options, mobile phones, transfer costs of assets, accrual accounting of interest, and real interest.

This paper does not attempt to provide a comprehensive list of suggested improvements to the SNA; instead it focuses on a few issues that tend to be raised when knowledgeable economists from academia or from major research institutions discuss national accounts. A few of the issues raised in this paper are long-standing problems that have been debated since the origination of national accounts. Even these long-standing problems, such as the treatment of intangible assets, have obtained a new urgency in the last few years with the changing economic environment that has come to be known as the “new economy.” Although some of the proposals in this paper raise difficult measurement issues, all of the proposals also potentially add to the value of the accounts and therefore deserve further discussion by the international community of statisticians.

2. PRODUCTION ACCOUNT

One of the most important puzzles in interpreting the new economy was the so-called “Solow paradox,” which asked if computers were so important, why didn’t their effects show up in the productivity statistics. Several prominent recent studies, including a study by Oliner and Sichel (2000) and Dale Jorgenson’s (2001) presidential address to the American Economic Association, conclude that computers and other information and communication technology (ICT) investment have, indeed, contributed to economic growth. This analysis used a framework of multifactor productivity that many consider to be a necessary extension to the SNA. Another key issue brought to light by studies of multifactor productivity is the problem of measuring output of financial services; Gullickson and Harper (1999) find that insurance and banking in the United States are characterized by negative multifactor productivity trends, which seem implausible and suggest that measurement of volume of output for these industries may be problematic. Finally, if multifactor productivity techniques are to be applied to the nonmarket production of the general government and nonprofit sectors, one must confront old problems in national accounting: the inadequacy of measures of output volume for these sectors and the lack of a measure of the rate of return for capital. Estimation of multifactor productivity requires an estimate of capital services, which in turn requires an estimate of the rate of return (implicitly treated by the SNA as zero for nonmarket production).

2.1. *Multifactor Productivity*

The SNA includes estimates of volume and price changes using chain indices (either annually chained Laspeyres or, preferably, chained Fisher indices) for gross value added and GDP. It includes measures of jobs, hours worked, and full-time equivalent employment, and also discusses estimating volume changes for employee labor input at constant compensation using an index that adjusts for the mix of types of jobs (SNA 17.3, figure 17.1, 17.19–21). The SNA, however, treats capital primarily as a component of wealth and does not recommend the compilation of volume and price indices for capital inputs. Consumption of fixed capital in the SNA is a cost of production, representing the decline in the value of capital as it is used in production; it is not a measure of the value of capital inputs. A system that accounts for all inputs would require volume and price indices for capital services,

which must be aggregated appropriately across heterogeneous types of capital. Simple, unweighted aggregates, such as the net value of fixed assets, are not the appropriate aggregates to use for indices of capital inputs at constant prices, just as weighted volume indices must be used for measuring outputs at constant prices. Christensen and Jorgenson (1973) propose a set of accounts that incorporate indices of input volume by sector, and Jorgenson, Gollop, and Fraumeni (1987) extend the accounting system to measures of output by industry. Measures of multifactor productivity—that is, output per unit of combined inputs—are included in this system, whereas they are not available as part of the SNA.

Measurement of the services of capital inputs requires (a) aggregation of each type of capital across vintages, and (b) aggregation across different types of assets. Generally, the former aggregation is based on a “relative efficiency” schedule that is mathematically co-determined with the depreciation schedule. The latter aggregation is based on the rental price, which is determined by depreciation, the discount rate (which is usually proxied by the internal rate of return), and the rate of price change (or revaluation) for each type of asset.

Measurement of the contribution of all factors of production as well as the contribution of the residual multifactor productivity to economic growth has been a central concern of economics for more than 40 years. In the United States the Bureau of Labor Statistics has compiled and published multifactor productivity statistics for nearly 20 years (Dean and Harper, 2001). Internationally there has been growing interest as a number of countries have recently added multifactor productivity programs, and the OECD has published a manual on productivity measurement that emphasizes the multifactor approach (Schreyer, 2001). Although this work is moving forward without official endorsement from the SNA, several economists including Hill (1999) and Jorgenson (1999) recommend that the production account of the SNA be modified to recognize and add volume measures of capital services.

Several objections might be raised to this proposal. Source data on capital—service lives, depreciation schedules, and constant-quality price indices by type of asset and by industry—are generally considered to be less reliable than data measuring most of the other flows in the SNA. Measurement of capital services involves a rental equivalence or rate-of-return calculation that may be controversial for nonmarket producers. On the other hand, most of the information required for the revised production account—consumption of fixed capital, price indices, supply-use tables, etc.—is already available for countries that fully implement the 1993 SNA. Another question is whether multifactor productivity needs to be part of the core national accounts or may be more appropriately dealt with as part of a satellite account. In view of the great importance attached by data users to information about the role of multiple factors of production and multifactor productivity in explaining long-term trends in economic growth, careful consideration of the proposed revised production account is warranted.

2.2. *Financial Services*

Financial services industries have undergone transformation during the past 20 years. Financial markets have become much more closely integrated, regionally

and internationally. The growing importance of equity markets has led to growth in activities such as issuing shares and managing portfolios. Securitization allows financial intermediaries to package illiquid assets for sale to holders of securities. Complex derivative instruments have transformed global financial markets.

The SNA's treatment of financial services assumes that: (a) not all financial services are paid for by fees and other direct charges—for both financial intermediaries and insurance corporations, part of the service is implicit and is paid for by foregoing interest or other property income;³ (b) the implicit services can be inferred directly from the flows of property income that occur during the period—there is no need to refer to expected outcomes; and (c) holding gains are not to be included in the calculation of implicit services. Recent papers by Stauffer and Meier (2001) and Fixler and Moulton (2001) question assumptions (b) and (c).

In the case of insurance, the 1993 SNA infers that a premium supplement needs to be included as part of insurance services because the insurance enterprise can use property income from technical reserves (that is, funds collected from policyholders and invested in financial or other assets) to pay for part of the services that are provided to policyholders. Hill (1998) notes that the same reasoning would suggest including expected holding gains (or deducting expected holding losses) in the measure of premium supplements. That is, just as an insurance enterprise can use property income from technical reserves to provide for a portion of the services provided to policyholders, and therefore does not need to set the premium rates to cover the full amount of the services, similarly the insurance carrier can take account of expected holding gains to cover a portion of the services provided to policyholders, and can therefore charge lower premiums than would be charged in the absence of an expected holding gain. Conversely, if the insurance enterprise expects to incur holding losses on technical reserves, it may need to charge higher premiums than would be charged in the absence of an expected holding loss. Hill clarifies, “including holding gains or losses in the calculation or estimation of the service charge does not imply that they are themselves a form of output any more than the income earned on the invested reserves.”

Fixler and Moulton (2001) note that expectations are critical to separating pure holding gains or losses (that is, the unexpected portion) from production, because producers make their decisions about the use of inputs and the volume of output to be produced based on expected prices, not actual prices. Although all producers may form expectations in conducting their business, and may take account of expected holding gains and losses, it should not be necessary to incorporate information on holding gains or losses in measuring most nonfinancial goods and services, because prices are directly observable. It is the absence of directly observable prices or fees in the case of insurance and financial intermediation that make it necessary for the system to develop indirect methods to measure the value of these services. Thus, this proposal is not intended to be a broad change in the treatment of holding gains and losses in the SNA. Rather, we argue that

³For banks, examples of the services that are indirectly paid for include checking, bookkeeping, investment, and intermediation services. For insurance carriers, the income from technical reserves may help pay for services that pool risk and services that provide financial intermediation, thereby lowering premiums charged for policies.

where values must be inferred indirectly, it may be appropriate to take into account expected holding gains and losses.

In the case of financial intermediaries, similar reasoning applies. The SNA's recommended calculation of financial intermediation services, indirectly measured (FISIM) is based on the difference between property income receivable and property income payable. The idea underlying FISIM is that intermediaries are assumed to provide unpriced services to depositors that are valued at the difference between rate paid to depositors and the reference rate (a rate such as an interbank rate that represents the pure cost of borrowing funds). Similarly, intermediaries are assumed to provide services to borrowers that are valued at the difference between the loan rate and the reference rate (SNA 6.124–131). In calculating FISIM no account is taken of expected holding gains or losses, such as loan defaults. Fixler and Moulton (2001) argue that this is an important omission—the intermediary will surely adjust the loan rate offered to different classes of customers for the expected holding gain or the expected rate of default for each class. Financial intermediaries are able to provide services with loans equal in value to the difference between their expected holding income—which is equal to the interest rate received, plus any direct service charges, plus expected holding gains (or less expected holding losses), less the loan loss rate—and the reference rate (Fixler and Zieschang, 1999). Because banks generally expect loan losses and allow for this in setting rates, it is likely that FISIM as calculated by the SNA overstates their value added if there are not substantial, offsetting expected holding gains. It may be possible to adjust for the overstatement using data on additions to loan loss reserves. On the other hand, as Stauffer and Meier (2001) emphasize, some financial intermediaries may increasingly rely on expected holding gains to finance provision of services; in this situation FISIM may understate production by excluding expected holding gains.

In the case of property and casualty insurance, another problem is accounting for the effects of large claims associated with catastrophic losses. The problem is that services are measured based on premiums less actual claims accrued, even though the claims accrued during a particular period may have little to do with the actual services provided by the insurance enterprise. During the third quarter of 2001, the treatment of claims associated with the terrorist attacks of September 11th, 2001, caused the U.S. national accounts to show a large decrease in household consumption of insurance services at current prices, as well as a large decrease in imports of reinsurance services. The Australian Bureau of Statistics (1999) develops a modified approach for handling catastrophes that is based on expected claims; Whichard and Borga (2002) present research on a similar approach, which BEA has subsequently adopted. These papers and others have shown that it is possible to derive well behaved estimates of expected variables (expected claims, or expected premium supplements) using historical data. Because these expected variables can be based exclusively on past data, they are not necessarily subject to large revisions after actual data become available. The proposed use of expectations to measure financial services does not represent a fundamental reformulation of the national accounts; rather it is based on the idea that these prices are not directly observable and must be inferred indirectly from the conditions affecting both parties to the transaction. Also, the use of expected claims in

place of actual claims would reduce the volatility of the estimates and presumably thereby make them more useful for analysis.

2.3. Rate of Return to Government and Nonprofit Assets

Objections have long been raised to the national accounts convention that the net operating surplus of nonmarket producers is zero—that is, the net return to fixed assets used by general government and nonprofit institutions serving households for nonmarket production is zero (SNA 6.91). The “Perspectives” prefatory section of the SNA (p. xliii) lists the cost of capital as one of the topics mentioned most often in the 1993 Statistical Commission. Parker and Triplett (1995) state, “Use of depreciation as a measure of the value of services of government fixed assets is a partial measure of the total value. In theory, the service value of an asset should equal the reduction in the value of the asset due to its use during the current period (depreciation) plus a return equal to the current value the asset could earn if invested elsewhere (net return).” Determining a more complete measure of the value of services of these assets has been a long-standing interest of BEA (for example, see Martin, Landefeld, and Peskin, 1984). A recent review of the government sector of the U.S. national accounts by the Committee on National Statistics of the National Research Council, in a section entitled “Going Beyond the System of National Accounts,” puts forward the case against the standard convention: “The assumption of zero net return is implausible. If net return were really zero, it would imply substantial overinvestment in public capital. In fact, however, serious shortages of many types of public infrastructure, ranging from schools to transportation systems, are widely perceived to exist” (Slater and David, 1998).

Slater and David mention four general approaches for estimating the rate of return to general government fixed capital formation: (1) a rate of return can be estimated directly from econometric models; (2) a pre-determined rate may be applied—for example, the Committee on National Statistics report suggests the rate established by the U.S. Office of Management and Budget (OMB) for evaluating the costs and benefits of proposed federal capital projects; (3) the rate of return for comparable private business activities can be applied; or (4) the interest rates at which governments borrow can be used. Other approaches that do not directly focus on estimating a rate of return may also be considered. For example, for structures, cars, and light trucks where rental markets exist, a rental equivalence method similar to that used for owner-occupied dwellings may be appropriate.

The econometric approach was explored in a flurry of papers beginning in the late 1980s; for an overview see Munnell (1992) or Gramlich (1994). An example of this approach is a regression of output volume on labor, private capital, general government capital, and a constant for the level of technology; the estimated coefficient for government capital can be used to derive an estimate of the marginal product of government capital. Several early studies claim to find large net returns to government capital—indeed, many readers think the returns are implausibly large—which are interpreted as spillover effects of government capital on private output. Subsequent research that corrects some of the econometric flaws of the

earlier studies finds smaller and more plausible net returns, but this literature has not yet led to a consensus on the rate of return.

One point that often is overlooked in discussions of the implications of these estimates for the national accounts is that in addition to suggesting a rate of return, these models also seem to suggest that part of government services should be treated as intermediate consumption of private enterprises. The long-standing convention in national accounts is that all nonmarket government services are treated as final consumption expenditures, whether consumed by enterprises, households, or collectively by society as a whole (SNA 9.88–89). The logic of the econometric estimates seems to suggest, however, that the spillovers from government capital to private output should be counted as intermediate consumption by enterprises, with an accompanying implicit subsidy. The dependent variable in many of the econometric models is conventionally measured GDP volume, so raising government value added (by adding a net return to government capital) must implicitly lower the value added of private enterprises (and the net return to private capital) by an offsetting amount. The advantage of the econometric approach is that it is based on empirical data. The econometric studies, on the other hand, do not provide direct evidence on the net return to services that do not benefit enterprises—such as capital expenditures that are designed to benefit households or to enhance the general quality of life.

The second approach, applying a predetermined rate, is favorably regarded by Slater and David (1998), who say, “the OMB discount rate . . . offers the advantages of simplicity, reasonable stability, and consistency with the federal government’s conclusions as to what the minimum expected rate of return ought to be in order for a federal investment to be undertaken.” On the other hand, there are potential disadvantages to this approach as well. The OMB discount rate is set for administrative purposes and is not directly based on measurement of actual rates of return—indeed, there may be considerable disagreement as to whether the rate is higher or lower than actual rates of return. It is likely that various countries would select different rates, thereby reducing international comparability, unless a decision is made to apply a single rate for all countries. If the administrative rate were changed, a decision would need to be made whether to carry forward the new rate into the national accounts, which would result in a change to GDP.

The third approach proposes applying the rate of return for comparable private business activities. Among the advantages of this approach are that it can be implemented using private sector data and it provides symmetry of treatment between private and public capital. On the other hand, there are a number of important government activities, such as national defense and administration of justice, that do not have close private counterparts. Even where private counterparts exist, however, some observers may question whether the production processes and resulting net returns are comparable. For example, private elementary and secondary schools tend to rely on a different mix of inputs and provide services to different types of students from public schools. Finally, many observers question whether public service providers use their resources as efficiently as their private counterparts.

The fourth approach, applying the rate at which the government can borrow, is closely tied to the national accounts concept that the output of nonmarket

producers should be measured by the cost of inputs. Including a measure of the cost of borrowing is analogous to the general use of cost of production in measuring output of nonmarket producers (SNA 6.90). Interest rates are usually observable from securities markets, and even if a government does not borrow, it may be possible to substitute the rate paid by a comparable government unit. Consequently, this fourth approach seems largely consistent with basic national accounting concepts. A disadvantage is that borrowing costs tend to be volatile, which may lead to large movements in the imputed cost of government capital.

If one wishes to apply the net rate of return as part of a capital service rental price, as described in the section on “Multifactor Productivity” above, the appropriate interest or discount rate in the user cost formula is a real rate—that is, it deducts the inflation rate. Furthermore, the inflation rate that is to be deducted should be asset-specific—for example, the (negative) inflation rate for computers should be deducted in calculating the services of computer capital, thereby raising the user cost. One must also decide whether the expected inflation rate or the actual inflation rate is more appropriate.

In summary, this proposal carries both potential risks and benefits. As with any imputation, adding an imputed rate of return carries the risk of making the accounts less useful as an indicator of cyclical activity. A program to create an expanded production account for the government sector as described above, including measures of multifactor productivity, would necessitate the estimation of a net return. As part of such a program, developing improved measures of changes in volume of government output should also be considered a priority along with improved imputation of the services of government capital inputs. The statistical agencies of several countries have recently undertaken interesting work on volume measures of government output, but much remains to be done in this area.

3. ASSET BOUNDARY

As the SNA acknowledges, “. . . the borderline between gross fixed capital formation and consumption, whether intermediate or final, is not always easy to determine in practice” (SNA 1.50). Many commentators have interpreted the rapid increase in equity share prices that occurred during the late 1990s, followed by the subsequent “dot-com” crash, as an illustration of both the importance and the difficulty of valuing intangible investments, such as research and development, advertising, and organizational capital. Presumably, share prices reflect a market valuation that includes the value of these kinds of intangible assets. The increase in share prices also improved the balance sheet of households and helped fuel a surge in consumer spending on consumer durable goods such as cars and light trucks, which increasingly were acquired through leasing arrangements. Terrorist actions, especially the September 11th attacks on the World Trade Center and the Pentagon, have led to heightened focus on the importance of security and defense activities in providing an environment in which businesses can protect their employees and assets. The SNA, however, treats weapons-related equipment as intermediate consumption and therefore omits the services provided by existing

equipment in the ongoing provision of defense. Because of these concerns, economists are increasingly questioning the SNA's asset boundary.⁴

3.1. *Intangible Assets*

Economists have long recognized the potential importance of intangible assets such as research and development, education and worker training, organizational infrastructure, and the value of brands and trademarks. All of these represent the outcome of activities in which producers devote resources in one period with the intention of improving products, processes, or knowledge for use in future production and thus, at least in principle, could qualify as a type of intangible capital formation. The "Perspectives" prefatory section of the SNA (p. xliii) says, "On . . . research and development, substantial work was done during the review and revision toward treating relevant expenditures as capital formation. On . . . education and other aspects of human capital, not now treated as capital in the SNA, little progress has been made."

In an influential article, Robert Hall (2001) argues that increases in the value of financial securities during the 1990s implied a huge rise in the accumulation of intangible assets by U.S. corporations. This theory is controversial because it assumes that share prices can be used as direct measures of the net value of the tangible and intangible property owned by corporations. Although Hall's theory is interesting and suggestive of the increasing importance of intangibles, it is limited to intangible assets of publicly traded corporations and does not provide valuations by type of asset or by region that are needed for national accounts. Thus it does not provide methods for measuring intangible assets in a manner that could be used in national accounts.

A recent conference of the Conference on Research in Income and Wealth examined the issues related to measuring intangible capital. Corrado, Sichel, and Hulten (2002) examine the conceptual issues and put together some rough estimates of business spending on intangible capital formation according to a broader definition that includes scientific research and development, other product development and research expenses, firm-specific human capital, organizational structure, and brand equity created through advertising. They conclude that recognizing all of these expenditures as intangible investment would add at least \$420 billion to U.S. gross fixed capital formation in the late 1990s, and could reasonably be as large as \$900 billion. Fraumeni and Okubo (2002) present a partial research-and-development satellite account for the United States, extending the national accounts by treating R&D as capital formation. They find that the returns to R&D capital account for about 10 percent of the growth in GDP for 1961–2000 and that capitalizing R&D raises saving, capital formation, and the net capital stock. Other papers were presented at the conference on measuring organizational capital, knowledge capital, and human capital (Abowd *et al.*, 2002; Black and Lynch, 2002; Jorgenson, Ho, and Stiroh, 2002; Lichtenberg, 2002).

Despite the great interest in intangibles, a number of important weaknesses are apparent in the available data on intangible capital formation and asset values.

⁴Ruggles and Ruggles (1982) include consumer durables and military equipment within their integrated set of national accounts.

The accounts of business enterprises are not designed to provide information on intangible capital formation, especially when the capital formation consists of production for own final use. For some types of intangible investment, especially organizational capital and advertising, it often is not directly apparent whether expenditures have an expected service life of less than one year—in which case they should be treated as current expenditures—or more than one year—in which case they arguably should be classified as capital formation. Intangible expenditures are generally not adequately measured in official price statistics, so there is a lack of appropriate quality-adjusted price or volume indices. There is little or no information on service lives or depreciation rates. Perhaps the most vexing problem, however, is lack of adequate information on valuation, other than the highly aggregated and indirect information that may be reflected in share prices. Because most intangible assets are by nature unique, valuation according to current cost of production would generally not be appropriate. Similar valuation issues occur within the SNA's current asset boundary with respect to software and artistic originals; for own-account software, the SNA recommends valuation on the basis of costs of production, whereas for entertainment, literary or artistic originals, it suggests using either costs of production or estimates of the present value of the expected future receipts (SNA 13.44–45).

Because of the substantial data and measurement problems associated with intangible assets other than those already recognized by the SNA, it seems prudent at this point to encourage development of estimates as part of satellite accounts and not immediately add new intangible assets to the core SNA asset boundary. If analysis of data on certain types of intangible assets within the context of satellite accounts demonstrates that they are robust and useful, it may then be appropriate to propose adding them to the core accounts. Data on R&D and on worker training appear to be better developed than for other intangibles, and serious attention should be given to the research needed for evaluating them as potential fixed assets in the SNA.

3.2. Military Equipment

The 1993 SNA says, “expenditures by the military on weapons of destruction and the equipment needed to deliver them should be classified as intermediate consumption” (SNA 6.170). Such equipment—the warships, fighters, bombers, tanks, and other equipment that are used in a modern military force—appear to meet the standard definition of a fixed asset; they are used repeatedly in production of defense services and have a service life of more than one year. The reasoning applied in the SNA for excluding weapons-related military equipment from fixed capital formation is complicated. Because weapons are used for destructive purposes, it is inferred that they cannot be used in production (SNA 6.168). By extension, any equipment that is used to deliver weapons to their targets is deemed unproductive, regardless of whether the equipment can be continuously used or how long it may last in service. On the other hand, SNA (6.169) argues that defense, in fact, does constitute a productive service because people benefit and are willing to pay for its provision. Furthermore, some types of durable goods or structures used by the military that have a potential civilian use, such as cargo

aircraft, docks, or airfields, are described as being used continuously in production and are to be treated as fixed assets.

The logic of these paragraphs is quite weak. Many non-military production processes include actions that could be described as destructive—for example, the slaughtering of livestock in meat production or the clearing of vegetation prior to construction. In none of these cases has the SNA ruled that the equipment used for these purposes is to be deemed unproductive. Also, in contrast to other assets, the determination of whether an asset used by the military is to be considered productive is based not on how it is actually used by the producing unit (the military force), but on how it *might* be used if it were used for another, civilian purpose. Finally, the logical consistency breaks down entirely in the final paragraph of the section, where the SNA says that the same light weapons and armored vehicles that are deemed destructive and non-productive when used by the military are to be considered productive fixed assets when used by police or internal security forces (SNA 6.172).

Despite its logical inconsistencies, the real weakness of the SNA's treatment is that it makes the accounts less useful. The SNA recognizes the provision of defense as a productive service, and the labor and non-weapons equipment and structures that are used by the military are considered productive inputs. Technologically sophisticated aircraft, tanks, and warships, however, are increasingly used as substitutes for personnel in defense activities. By not counting these critical inputs as providing capital services to the military forces, the SNA's treatment seriously impairs the accounts in describing the actual production process of defense services.

The failure to recognize most defense equipment as capital also makes the accounts less useful in measuring saving and wealth. Military equipment is a valuable asset that is sometimes sold and that should be reflected in national balance sheets. In the United States the net stock of military equipment amounts to more than 3 percent of the total stock of fixed assets.

For most of the proposals discussed in this paper arguments are presented on both sides of the issue. In this case, however, it is difficult to see merit in the current SNA treatment. It appears that the decision to exclude weapons-related military equipment from fixed capital formation must be interpreted as an attempt to make an ideological point that is inappropriate for international guidelines that are intended to reflect technical expertise. National accountants should not be making value judgments on what government expenditures contribute to welfare. The appropriate economic theory argues strongly for treating all military equipment that is used continuously for more than one year as fixed assets. BEA has decided to treat military equipment as fixed assets in the U.S. national income and product accounts (Parker and Triplett, 1995).

3.3. *Consumer Durable Goods*

The treatment of consumer durable goods other than owner-occupied housing as final consumption expenditure rather than as fixed capital formation is also a long-standing criticism made by many users of the national accounts. Consumer durables are similar in many ways to owner-occupied dwellings, but the

treatment in the accounts is quite different. The owner of a dwelling is treated as an owner of an unincorporated enterprise that produces housing services, but consumer durables are not assumed to provide services within the SNA production boundary (SNA 6.89, 9.40). Many durables, such as cars, trucks, and furniture, can be used either by consumers or by business enterprises—the SNA definitions count their purchase by households immediately as final consumption expenditure, whereas they are to be capitalized by enterprises. “Extended” national accounts developed by researchers such as Eisner, Jorgenson and associates, Kendrick, and Ruggles and Ruggles include the services of consumer durables (for a review, see Eisner, 1988). Fraumeni and Okubo (2001) illustrate the possible options of capitalizing motor vehicles or all consumer durables.

Another concern is that there is an asymmetric treatment of owned and leased consumer durable goods. A car that is purchased by a household for own use is immediately counted as consumption, but if it is used under an operating lease it is counted as gross fixed capital formation for the enterprise that owns the car and as a purchase of rental services by the household. Thus GDP is not invariant to the choice between purchasing and leasing, which is fundamentally a financing decision that many argue should not affect GDP. In the United States, this asymmetry is a real concern, because leasing of new cars and light trucks grew rapidly during the 1990s, rising to about 30 percent of all new vehicles acquired by consumers in 1997. Since then the share of new vehicles that are leased has gradually declined.

An additional complaint with the SNA’s treatment of consumer durable goods is that household net saving may be understated because consumption of these goods should occur over the service life of the good rather than when it is purchased. Consumer durables are assets that can be sold or used as collateral for loans, and thus should constitute an important component of wealth, though they are not included in net saving or in the core SNA balance sheets. The SNA (13.85) does, however, recommend their inclusion as an memorandum item in the balance sheets. Perozek and Reinsdorf (2002) present alternative concepts of household saving for the U.S. accounts, including a version that treats consumer durables as capital assets; they find that such a treatment raises the household saving rate between $\frac{1}{2}$ and $3\frac{1}{2}$ percentage points from 1991 to 2000. For more than 20 years BEA has estimated the stock of consumer durable goods in the United States, using a perpetual inventory method for most goods. For 2001 the value of the net stock is about \$2.8 trillion, or about 10 percent of the net stock of fixed assets. Omission of assets of such value from the core balance sheets is a significant deficiency in the SNA’s measures of wealth.

Fixed assets are “produced assets that are themselves used repeatedly, or continuously, in processes of production for more than one year” (SNA 10.7). The issue with consumer durable goods is how to describe the process of production in which they are used and deciding whether the production lies within the production boundary. Some analysts have described owners of consumer durables as engaged in the production of “durable good services” for own final consumption, analogous to the SNA treatment of owner-occupants of dwellings as producers of housing services (SNA 10.70). The SNA, however, takes the view that if durables were recognized as fixed assets that are used in production, it would require an

extension of the production boundary to include services produced by households for own final consumption (SNA 9.40). Consumer durables often require the application of household labor to create a service—for example, a car is not useful without the services of a driver, and a stove requires the services of a cook. The SNA applies the same production boundary to labor as is applied to capital, so if the asset boundary is extended to include consumer durables as fixed assets, either the production boundary must be extended to include household labor used in producing services for own final use, or else the capital concept used for household production would be inconsistent with the labor concept.

Another concern that is often raised with the idea of capitalizing consumer durable goods is the problem of imputing a rental or service price. For durables with well developed rental or leasing markets, such as motor vehicles in the United States, it may be possible to develop an equivalent rent, analogous to the treatment of the services of owner-occupied dwellings. For other durables, however, it probably would be necessary to impute a rate of return and a capital service price using the user cost formula, as was described earlier in discussion of a possible rate of return to general government and nonprofit fixed assets. Such an imputation would raise all of the same concerns about choosing a rate of return. Katz (1983) discusses these issues and finds a large variation between alternative, plausible rates of return. For recent estimates of the value of consumer motor vehicle services, see Okubo, Fraumeni, and Fahim-Nader (2001).

Moulton (2001) suggests another possible option that would allow consumer durable goods to be included in measures of saving and wealth without changing the production boundary.⁵ An analogy may be the SNA's treatment of valuables, which are treated as assets and included in saving and in net wealth, even though they are not used primarily for purposes of production or consumption. Household final consumption expenditures could be reduced by the net acquisition of consumer durables (purchases less disposals of consumer durables less a depreciation-like charge for the decline in value of the durable good as it ages), thus raising net saving. The interpretation of the adjusted consumption expenditures would be that the consumer durable is consumed over time, as if it were gradually taken out of an inventory; no production of consumer durable services would be implied. In the capital account, the net acquisition would be treated as a change in asset, similar to valuables, and offsetting the effect on net saving. Revaluation and other changes in volume would be calculated, and the value of the net stock of consumer durables would appear on the core household and national balance sheets.

4. OTHER TOPICS

4.1. *Institutional Sectors*

The 1993 SNA gives increased importance to complete accounts for institutional sectors. Ideally the accounts will include for each sector a complete set of production, income and expenditure, capital, financial, and other changes in assets

⁵This approach to accounting for consumer durables was used previously by Ruggles (1983).

accounts, and balance sheets. For the U.S. accounts, BEA has long included basic sectoral accounts, but they do not presently follow all of the SNA sector definitions. As we have worked to develop sectoral data to complete the accounts, questions have been raised about rationale and uses of the SNA's sectoring rules.

Recently an international handbook has been developed on nonprofit institutions in the SNA (United Nations, 2003). It notes that under the SNA and the 1995 European System of Accounts (ESA) a nonprofit institution can be classified in any of the major sectors. If it sells most of its output or is created by and promotes an association of businesses, it is classified with nonfinancial or financial corporations. If it is controlled and mainly financed by government, it is classified as a nonprofit institution serving government within the general government sector. If it lacks legal status or relies solely on volunteer labor, ESA classifies it within the household sector. Finally, if it is engaged in nonmarket production and receives most of its support from contributions, it is classified as a nonprofit institution serving households. While the SNA sectoring rules are designed so that institutions with similar economic behavior together should be classified within the same sector, they do not serve the interest of the data users who are primarily interested in summary information about nonprofit institutions. A satellite account is needed to bring together the information about nonprofit institutions that the SNA scatters among all of the various sectors, and the new manual develops such a satellite account.

In addition, the nonprofit handbook points out issues in output measurement for nonmarket institutions. In particular, the nonmarket production of market nonprofit institutions is not included in measured output; for some countries this production may be substantial. The production due to volunteer labor is also omitted by the SNA.

Similar issues can be raised for other sectors. For example, data users are sometimes interested in comparing government enterprises to private enterprises, but under the SNA these institutions are consolidated within nonfinancial and financial corporations.

Data users also may be interested in separately analyzing production of market producers as a group, because output and volume measures for market producers may be considered more meaningful and reliable than for nonmarket producers. In the U.S. and in the Canadian accounts, information on these enterprises is consolidated in a sector known as the "business sector," which is used extensively in analysis of productivity. The SNA, however, does not provide for consolidating the production information of market producers in this manner.

The SNA's sectoring rules may be optimal for certain types of analysis. It is not clear, however, that they always provide the information that would be most useful to the users of national accounts data. Therefore it may be worthwhile to study users' needs and then consider whether alternative sectoring rules might be appropriate, either as satellite accounts or, possibly, as changes to the core accounts.

4.2. *Capital Transfers*

The SNA explicitly says that taxes on capital gains taxes should be treated as taxes on current income, "irrespective of the periods over which the gains have

accrued” (SNA 8.52). This treatment has been controversial in the United States; many data users argue that capital gains taxes should receive a parallel treatment to holding gains and be excluded from current taxes.

Perozek and Reinsdorf (2002) examine the roles of capital gains and capital gains taxes in household saving. They observe that disposable income excludes capital gains, but that capital gains taxes are treated as taxes on current income and therefore are deducted in the calculation of disposable income. With large capital gains realizations, as occurred during the late 1990s in the United States, the effect of capital gains taxes explains about a percentage point of the drop in the household saving rate. In their analysis of capital gains, they find that most of the growth in household net wealth since 1994 has been attributable to holding gains, rather than to net saving.

Greenspan (2001) argues that households are more likely to view capital gains taxes as a subtraction from their realized capital gains than as a subtraction from current income, and attributes the effects of capital gains taxes on the personal saving rate as a reflection of national income accounting conventions.

An interesting contrast is with inheritance and gift taxes, which the SNA explicitly classifies as capital taxes (SNA 10.136). Capital gains taxes appear to share many or most of the same characteristics of inheritance and gift taxes. Like other taxes, they fit the SNA definition of a transfer, that is “a transaction in which one institutional unit provides a good, service or asset to another unit without receiving in return from the latter any counterpart in the form of a good, asset or service” (SNA 10.131). They are “linked to, or conditional, on the acquisition or disposal of a tangible fixed asset or assets by one or both parties to the transaction,” and therefore do not appear to fit the definition of a current transfer (SNA 10.133). Thus, if the SNA did not explicitly say that capital gains taxes should be classified as taxes on current income, the other text in the SNA suggests that they appropriately would have been classified as capital transfers.

It is not clear why the SNA should treat inheritance and gift taxes as capital taxes while capital gains taxes are treated as current taxes; the two treatments appear to be inconsistent. The classification of one or the other should be reconsidered in the interest of consistency.

5. CONCLUSION

Many of the issues discussed in this paper represent long-standing controversies within national accounting community. When measurement problems are difficult, progress tends to come slowly, but the success of important innovations in the 1993 SNA such as the capitalization of software and the adoption of annual chain volume and price measures suggests that progress might also be achieved on some of these other problems. The SNA’s guidelines in these areas represent a mix of convention, judgment about data adequacy, and consensus about economic theory. Recent advances in research, data, and theory may have created opportunities for better measurement of a somewhat expanded set of accounts. The U.N. Statistical Commission has recently endorsed another revision of the SNA, and in this revision the topics raised in this paper merit further discussion and consideration. It is hoped that researchers and experts in national accounts as well as the

Inter-Secretariat Working Group in National Accounts will examine and carefully consider these issues.

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