

This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: Measuring Economic Sustainability and Progress

Volume Author/Editor: Dale W. Jorgenson, J. Steven Landefeld, and Paul Schreyer, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-12133-X (cloth); 978-0-226-12133-8 (cloth); 978-0-226-12147-5 (eISBN)

Volume URL: <http://www.nber.org/books/jorg12-1>

Conference Date: August 6–8, 2012

Publication Date: September 2014

Chapter Title: Expanded Measurement of Economic Activity: Progress and Prospects

Chapter Author(s): Katharine G. Abraham

Chapter URL: <http://www.nber.org/chapters/c12838>

Chapter pages in book: (p. 25 - 42)

## Expanded Measurement of Economic Activity Progress and Prospects

Katharine G. Abraham

---

Too much and too long, we seem to have surrendered community excellence and community values in the mere accumulation of material things. Our gross national product . . . if we should judge America by that—counts . . . ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for those who break them. It counts the destruction of our redwoods and the loss of our natural wonder in chaotic sprawl. It counts napalm and the cost of a nuclear warhead, and armored cars for police who fight riots in our streets. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children.

Yet the gross national product does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages; the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage; neither our wisdom nor our learning; neither our compassion nor our devotion to our country; it measures everything, in short, except that which makes life worthwhile. And it tells us everything about America except why we are proud that we are Americans.

—Robert F. Kennedy (1968)

Katharine G. Abraham is professor of economics and survey methodology at the University of Maryland and a research associate of the National Bureau of Economic Research.

For acknowledgments, sources of research support, and disclosure of the author's material financial relationships, if any, please see <http://www.nber.org/chapters/c12838.ack>.

During the Great Depression of the 1930s, the absence of systematic information on economic activity was a significant impediment to the development of sound economic policy. Recognition of policymakers' critical need for better information about current economic conditions gave impetus to work then underway in the United States to develop the nascent National Income and Product Accounts (NIPAs). The NIPAs, produced by the Bureau of Economic Analysis (BEA), have come to be recognized as a signature accomplishment. In the words of then secretary of commerce William Daley, speaking in December 1999 about the work of the Department of Commerce during the twentieth century, "As we searched for our greatest achievement, something . . . that had the greatest impact on America, it was the invention of the national economic accounts" (Daley 1999).

The NIPAs were designed from the start to serve the needs of policymakers for current information on economic conditions and continue to be critical in meeting those needs. While the importance of the NIPAs is widely recognized, the limitations inherent in their design also are well known. Simon Kuznets, the person most responsible for the early work to develop the NIPAs, himself noted that, "the welfare of a nation can scarcely be inferred from a measurement of national income as defined [by the GDP]" (Kuznets 1934). This does not imply that the existing accounts lack value or should be replaced. The existing accounts, however, may be seen as providing a framework on which a set of expanded accounts designed to meet additional needs can be built.

## 2.1 Building on the Existing Economic Accounts

In an influential paper, Nordhaus and Tobin (1972) discussed the limitations of the gross domestic product (GDP) as a welfare measure. They went on to suggest the rough outlines of an alternative measure that, among other things, would treat certain expenditures such as spending on police or defense as intermediate rather than final outputs (necessary for the production of output but not of value in and of themselves) and account for the services of household labor and consumer durables. Pioneering work by Kendrick (1976) and Eisner (1985, 1988, 1989) proposed expanded accounts that incorporated investments in human as well as physical capital. Interest in expanded economic accounting has been reinvigorated over the past decade, with two major reports on the subject issued in 2005 and 2009, respectively.

The first of these reports, a 2005 National Research Council volume titled *Beyond the Market*, laid out a framework for a set of satellite accounts for home production, education, health, government and the nonprofit sector, and the environment that would complement the existing NIPAs. Key recommendations concerning the development of these satellite accounts included: (a) measuring the value of outputs separately from the value of inputs (including nonmarket time); (b) using monetary rather than physical

metrics; and (c) assigning marginal valuations wherever possible based on the outcomes of market activities (Abraham and Mackie 2005, 2006).

The 2009 report of the Stiglitz-Sen-Fitoussi Commission—more formally, the “Commission on the Measurement of Economic Performance and Social Progress”—was broader in scope. A portion of this report was focused on what its authors termed classical GDP issues—broadening measures of household activity, improving measures of government services, and examining income, consumption, and wealth as well as production. The report also stressed the importance of considering distribution as well as average or aggregate levels, for example, looking at the median in addition to the mean of family income. In addition, however, it discussed measures of the quality of life and of the sustainability of economic development and environmental health. With respect to the quality of life, the Stiglitz-Sen-Fitoussi Commission’s report encouraged the measurement of subjective well-being together with consideration of objective factors such as education, health, time use, political voice, social connections, and insecurity that affect subjective well-being. With respect to sustainability, it argued for the development of a dashboard that focused on the “stocks” that underpin well-being, with separate measures for economic and environmental sustainability (Stiglitz, Sen, and Fitoussi 2009).

As these reports suggest, there are multiple possible objectives for an expanded set of economic accounts. First, expanded accounts might provide more complete measures of investment in capital—broadly speaking, any stock that contributes to the nation’s future productive capacity. Traditional measures of investment reflected spending only on physical plant and equipment. In a knowledge economy, however, business investment in intangible capital has become increasingly important. Taking an even broader perspective, households may make substantial investments in intangible human capital that are not captured as such in the existing accounts. Second, expanded accounts could provide more accurate measures of output and productivity in key sectors such as education, health, and government. Third, most closely in the spirit of the remarks by Robert Kennedy quoted at the beginning of this chapter, expanded accounts could contribute to the assessment of trends in societal welfare or well-being. Information on how the output of a society is distributed could be an important part of this. Finally, something I will not address here but that undoubtedly merits further exploration, an appropriately structured set of expanded accounts could contribute to an assessment of sustainability, especially environmental sustainability.

## 2.2 Accounting for Investment in Education

Even within the existing NIPAs, as the importance of intangible capital has grown, the treatment of investment in such capital has evolved. Invest-

ment in software was incorporated in the NIPAs in 1999 and investment in research and development in 2013 (Aizcorbe, Moylan, and Robbins 2009; Bureau of Economic Analysis 2013). In principle, other forms of business investment in intangibles, such as firm-specific human capital or organizational capital associated with the adoption of productivity-enhancing business practices, also could be incorporated (see, for example, Corrado, Hulten, and Sichel 2005, 2006).

The fact that the existing accounts are structured to reflect only business and government investment would make it more difficult to incorporate the investments in human capital made by members of households. Perhaps more importantly, the data needed to measure household investments generally are not available in “real time” or at quarterly frequencies. In any case, information about household investment arguably is important primarily for understanding long-term trends rather than short-term fluctuations in output and productivity, meaning that quarterly accounting for such investment would serve little value. Satellite accounts for investments in human capital, and in particular for investments in education and health, offer a possible path forward.

Table 2.1, adapted from a similar table that appeared in *Beyond the Market*, shows the potential elements of a double-entry satellite account for education. The costs of investing in education are shown on the left-hand side of the table; these include not only items whose acquisition involves market transactions and whose costs thus should already be reflected in the NIPAs, such as the paid labor of teachers and support staff, the cost of books and other materials, and expenditures on school buildings, computers, and other equipment (all shown in normal font), but also the unpaid time of students, their parents, and school volunteers (shown in italics). The outputs associated with investments in education are shown on the right-hand side; these

**Table 2.1** Elements of a double-entry education satellite account

Input	Output
Paid labor	Educated individuals
Teachers	Higher workplace productivity
Support staff	<i>Higher nonmarket productivity</i>
<i>Volunteer labor</i>	<i>Intangibles: Better informed citizens, improved individual and societal well-being</i>
<i>Students' and parents' time</i>	
Materials: Books and other	
Fixed capital: School buildings and other structures, equipment, and computer software	
<i>Social capital</i>	

Source: Adapted from Abraham and Mackie (2005).

include not only the higher market productivity of more educated workers, but also the higher *nonmarket* productivity of more educated individuals together with a broader set of intangible benefits associated with having a more educated citizenry.

The two sides of table 2.1 correspond to the alternative approaches that have been taken in the literature for measuring the value of educational investments. One strand of this literature, exemplified by Schultz (1961), Kendrick (1976), and Eisner (1985, 1988, 1989), has quantified investment in education based on the costs of the associated inputs, including both market and nonmarket time. The other strand in the literature, tracing back to Weisbrod (1961) and developed more fully by Jorgenson and Fraumeni (1989, 1992a, 1992b), measures the investment in education based on the estimated present value of the increment to earnings that is associated with additional education, presumed to reflect the higher productivity of more educated workers. The two approaches yield very different answers: estimates of the present value of the increments to earnings attributable to education generally are *much* larger than estimates of the cost of providing that education. These estimates can be reconciled in an accounting sense by treating the excess of returns over costs as “profits” accruing to the household sector, but this is not entirely satisfactory.

Over the last five years, the Organisation for Economic Co-operation and Development (OECD) has begun a major project to measure national investments in human capital. The project seeks in its first phase to build Jorgenson-Fraumeni-type estimates of the value of investment in education and the resulting stock of human capital across many of the OECD member countries (Liu 2011). Data inputs to the project include labor force surveys and country-specific mortality tables that provide information on school enrollment rates by age, gender, and previous educational attainment up to age forty; employment rates and annual earnings by age, gender, and educational attainment; and survival rates by age and gender. The project is focused on the returns to education realized in work by persons age sixteen to sixty-four; whereas nonmarket returns (higher productivity of more educated persons in nonmarket activities) are a large part of the returns to education estimated in Jorgenson and Fraumeni’s work, the OECD estimates do not incorporate nonmarket returns. Early results show that, even restricting attention to market returns, the estimated value of the stock of educational human capital generally is much larger than the value of traditional physical capital in those same countries.

Given the early stage of the OECD initiative, there are, not surprisingly, still a number of outstanding issues concerning the resulting estimates to be resolved (see Abraham [2010] for further discussion of many of these issues). As in the Jorgenson-Fraumeni papers, the OECD estimates of how educational attainment affects earnings begin with data for a synthetic cohort of individuals whose current earnings are used to infer the life-cycle

pattern of earnings for people with different amounts of education. To the extent that the relative earnings of those with different amounts of education vary over time due to changes in demand conditions or that the quality of education has changed, however, using synthetic cohort data to proxy for expected future earnings could be misleading. It is also possible that those with higher education tend to benefit more from other sorts of investment in human capital—early childhood investments, investments in on-the-job training, or investments in health—and that this confounds the estimates of the return to education. Even leaving these potential issues aside, estimates of the present value of the anticipated returns to education are sensitive to assumptions about future earnings growth, the discount rate, and the effect of failing to complete a year of schooling on expected educational attainment. Given the nature of the data on which they are based, the estimates produced to date have been relatively aggregated; there are many purposes for which estimates disaggregated by level and type of schooling would be of value. Finally, estimates of investment in education based on anticipated future earnings ultimately should be reconciled with estimates based on the costs of obtaining that education. These many challenges notwithstanding, the OECD project is an important step forward.

The growing interest within the statistical community in the measurement of investment in education has been paralleled by a growing interest among policy officials in better understanding what we are spending on education and what we are getting for that money. All levels of education, including early childhood and K–12 education, have attracted policymakers' attention, but for tractability I will restrict my attention here to higher education policy. As someone with ties to both the policy world and the data world, I am struck by the strong potential linkages between policymakers' interest in college affordability and the college value proposition on the one hand, and the work already underway within the statistical community to develop an educational satellite account on the other.

By way of background, average published tuition and fees at public US four-year colleges and universities—the schools that most students who pursue a bachelor's degree attend—have grown rapidly over the past decade, increasing 5.2 percent per year in real terms between 2002/3 and 2012/13, from \$5,210 per year in 2002/3 to an estimated \$8,660 per year in 2012/13, an increase of \$3,450 (2012 dollars, exclusive of room and board) (College Board 2012). Thanks in large part to growth in federal educational assistance in the form of Pell grants and the American Opportunity Tax Credit (AOTC), the net prices actually paid by students have grown much less than sticker prices over this period. Pell grant expenditures totaled an estimated \$35.6 billion in 2010/11, with awards reaching about 9.3 million undergraduates, or roughly half of the student population, compared to \$14.7 billion in Pell grants and 5.5 million students assisted in 2007/8 (US Department

of the Treasury and US Department of Education 2012). The AOTC was introduced in 2009; compared to the Hope Credit it replaced, the AOTC can be claimed for four years rather than just two years, is partially refundable rather than entirely nonrefundable, and has higher family income limits. In 2010, the latest year for which data are available, the combined value to American households of federal education tax credits totaled \$24.1 billion, versus \$8.2 billion in 2008 just prior to the advent of the AOTC (both in 2012 dollars) (US Department of the Treasury 2012). After adjusting for grants (from all sources) and tax credits, average net tuition at public four-year colleges and universities grew from \$1,490 in 2002/3 to \$2,910 in 2012/13 (both in 2012 dollars), an increase of \$1,420, less than half as large as the \$3,450 increase in sticker prices at the same schools noted above (College Board 2012).

While federal financial aid for education has played a critical role in helping to keep college affordable, future increases in the costs of higher education are unlikely to be offset by further growth in federal financial assistance. College graduates continue to earn substantially more than those with lower levels of education and college enrollments have remained high, but the large amounts of both public and private money flowing into higher education have lead to increasing discussion in the policy sphere of whether this money is being well spent. As a result, there is growing interest in tracking the labor market outcomes of those who attend and graduate from institutions of higher education.

It turns out that the information needed to construct the higher education component of an education satellite account is very similar to the information that policymakers are now seeking in order to evaluate the performance of the higher education sector as a whole and, at a more disaggregated level, the performance of different types of schools and even the performance of individual higher education institutions and programs. This confluence of interests creates both new opportunities and new urgency for work to develop an education satellite account.

A major barrier to satisfying both objectives—the statistical analysts' interest in developing an education satellite account and the policymakers' interest in holding the educational sector accountable for the labor market success of its students—has been the lack of data that allow student outcomes to be monitored, but this is beginning to change. Starting in 2005, the Department of Education has awarded several rounds of grants to states for work to develop student-level longitudinal education data systems. When fully realized, these longitudinal data systems will allow students to be tracked from the K–12 grades through the higher education institutions they may attend. Complementing the Department of Education's activities, the Department of Labor has funded grants to states through its Workforce Data Quality Initiative to support improvements in the linkages between

education and employment in existing longitudinal data systems, as well as improvements to the longitudinal data systems that track individuals through their working years.

More directly related to the desire to hold institutions of higher education accountable for their performance, earlier this year the Department of Education released the initial version of a College Scorecard that is intended to make it easier for students and their families to make comparisons across the different institutions they may be considering. The version of the scorecard released in February includes measures of the annual cost of attendance, the graduation rate, the median debt incurred by students who attend the institution, and the loan default rate among student borrowers at the school. Once student-level information about those who attend a particular institution can be linked to administrative information about their employment and earnings in the years following graduation, a measure of the average earnings of former undergraduates will be added to the scorecard. The measure currently planned for the scorecards refers to relatively short-term earnings outcomes, but longer-term earnings outcome measures also could, in principle, be produced.

These developments in the policy sphere can be expected to lead to improvements in the data available to those working to develop satellite accounts for education. The state longitudinal data systems, for example, may help analysts to identify the return to higher education separately from the return to earlier school experiences. Data that relate labor market outcomes to the institution attended or even the course of study pursued should be useful for producing more disaggregated estimates of the return to education. Further, the intense policy interest in understanding what we are getting from our investments in higher education implies that there is likely to be an appetite for aggregated statistical measures of the sort that would be embodied in a satellite account for education.

### 2.3 Accounting for Investment in Health

Table 2.2, adapted from a similar table that appeared in *Beyond the Market*, shows the potential elements of a double-entry health satellite account. The costs of investing in health are shown on the left-hand side of the table; these include not only items whose costs should already be reflected on the product side of the NIPAs, such as payments to health-care providers (shown in normal font), but also items that are not reflected in the NIPAs, such as the value of the time that individuals invest in their own health and the time of unpaid family caregivers (shown in italics). On the output side, better health is associated not only with higher market productivity and earnings, but also with the enjoyment of longer lives and a higher quality of life made possible by reduced mortality and morbidity.

**Table 2.2 Elements of a double-entry health satellite account**

Input	Output
Medical care	<i>Measures of health status, and valuations of changes where possible</i>
Market labor/capital	
<i>Volunteer labor</i>	Income from being healthier
<i>Time invested in individual's own health, time of family caregivers</i>	
Other consumption items	
Research and development	
<i>Quality of environment</i>	

Source: Adapted from Abraham and Mackie (2005).

Efforts to develop a satellite account for health have begun in recent years. If successful, these efforts will help to fill the information gaps that preclude a comprehensive assessment of output and productivity in the health-care sector and of that sector's contribution to the overall economy. A major limitation of existing data for the purpose of feeding a health satellite account is that both the NIPA data on health-care expenditures and the Bureau of Labor Statistics (BLS) data on medical prices are organized by type of product or service (e.g., pharmaceuticals, other medical products, physical services, paramedical services, or hospital services) rather than by disease. Developing an understanding of the efficiency and effectiveness of health care, however, requires data that are organized by disease. More specifically, development of a health-care satellite account will require information about the resources used to treat diseases and the outcomes achieved for people with those diseases.

While much remains to be done, the federal statistical agencies have made progress over the past five years toward developing these data. Research at the BEA has focused on developing disease-based measures of household medical care expenditure (Aizcorbe et al. 2012). Research at the BLS has focused on the development of disease-based price indexes that begin to account for shifts in treatment patterns (Bradley et al. 2010). The BLS price indexes will be of value to the BEA for breaking out the contributions of price and quantity to the growth of overall medical care expenditures.

As work to develop disease-based measures of medical spending and outcomes has progressed, some of the decisions and challenges that will need to be confronted to develop such data have become more apparent (National Research Council 2010; Aizcorbe et al. 2012). A necessary first step will be to agree upon a scheme for categorizing diseases. A major question here will be the appropriate level of specificity to use in organizing the data. Second, better and more comprehensive sources of data on health spending will need to be developed. Much of the work done to date in this area has made use of

the Medical Expenditure Panel Survey (MEPS), which has a nationally representative sample but is too small to represent unusual conditions. Perhaps not surprisingly, given the large share of health-care spending that occurs among those at the end of life, the MEPS also appears to underrepresent the highest spending individuals. Third, methods to allocate spending across diseases will need to be developed. Options that have been proposed include the encounter-based approach; the episode-based approach; and the person-based approach. As described by Aizcorbe et al. (2012), the encounter-based approach is relatively easy to implement, but does not deal well with comorbidities and leaves out spending with no diagnosis code. The episode-based approach uses a natural-seeming unit of observation, but defining what constitutes a health-care episode can be difficult, and comorbidities and spending without a diagnosis code again are problematic. Aizcorbe et al. (2012) suggest that, while it is more complex, the person-based approach, in which regression analysis is used to relate health spending by an individual to that individual's diagnoses, may be the most promising. Finally, in order to adjust appropriately for changes in the quality of treatment, evidence on treatment effectiveness and agreed-upon metrics for valuing improvements in health outcomes will need to be developed.

As with education, efforts by economic statisticians to develop a health satellite account have been paralleled by significant and growing policy interest in health-care spending and productivity. Health-care spending has grown much faster than overall GDP and, as a result, health care has represented an ever-growing fraction of total national output. There is enormous policy interest in what is driving per capita health-care costs—improvements in care versus increases in the price of care—and in finding ways to slow the growth of those costs without adversely affecting the quality of care. Health-care experts have suggested a variety of possible means of “bending the cost curve,” such as taking steps to reduce administrative overhead; increasing the availability of preventive care; redesigning payment schemes to provide doctors and hospitals with stronger incentives to control costs while maintaining the quality of care; and providing better information to patients and their providers on best-treatment practices to inform their health-care decisions. Much research is needed, however, to determine how well these strategies work and how they can be implemented most effectively.

Similar to the situation with respect to education, a major barrier to satisfying both the statistical analysts’ interest in developing a health satellite account and the policymakers’ interest in achieving better health outcomes at the lowest possible cost has been the lack of comprehensive data that allow health spending to be linked to health outcomes. Individual research teams have done interesting work based on insurance claims records; Cutler et al. (2001), for example, used Medicare claims data to study changes in the effectiveness of the treatment of heart attack patients over time, and Berndt,

Busch, and Frank (2001) used data on claims obtained from four large self-insured employers to examine changes over time in the treatment of depression. Better answers to the questions policymakers are asking about health care, however, will require more comprehensive data.

In this regard, efforts currently underway to develop health-care claims databases that can be used for analytic purposes are an exciting development. A number of individual states have passed legislation to establish state-specific All-Payer Claims Databases that can be used to provide cost information to consumers, inform the development of insurance products, determine provider competitiveness, and serve other purposes, potentially including research purposes (Miller et al. 2010). The Health Care Cost Institute (HCCI), a nonprofit organization that has as one of its primary objectives to foster a better understanding of the drivers of health-care costs, is developing a national claims database that is intended to be broadly accessible to bona fide researchers who need detailed data on health-care spending for their work. Researcher access to the HCCI data repository will take place under controlled conditions that protect the confidentiality of individual patients. The database, rolled out in May 2012, includes more than five billion claims records from four large insurers that, taken together, provide health insurance coverage for thirty-three million people, and there are plans to add claims records from additional insurers as well as Medicaid claims records (Kliff 2012). The HCCI repository could, in time, provide reasonably comprehensive coverage of the health-care sector, especially if, as expected, the implementation of the Affordable Care Act leads to a decline in the number of uninsured patients whose interactions with the health-care sector do not leave a trail of insurance claims (and who thus are not represented in insurance claims databases).

Another relevant development is the funding provided under the Affordable Care Act for comparative effectiveness research. Under the terms of the act, the agenda for this research is to be set by the Patient-Centered Outcomes Research Institute after broad public consultation. The first such review was recently completed. The language of the act states that estimates of cost-effectiveness will not be used “as a threshold to determine coverage, reimbursement, or incentive payments” under Medicare, but it is to be hoped that better information on what works and what does not will help to move spending toward more effective treatments over time.

These developments in the policy sphere can be expected to improve the information available to those working to develop health satellite accounts. Insurance claims data, such as those contained in the repository being developed by the HCCI, can help with allocating spending by disease category and also with tracking the experiences of individuals who may have multiple interactions with the health-care system. Better information about the effectiveness of alternative treatments can help with making appropriate

adjustments for changes in the quality of care over time. Further, as with education, the intense policy interest in understanding what we are getting from our investments in health care imply that there is likely to be an appetite for aggregate measures of the sort that would be embodied in a satellite account for health.

## 2.4 Improving the Measurement of Government Output

While this chapter has been focused primarily on the development of satellite accounts for education and health, there may be broader synergies between economic accountants and policymakers with regard to the measurement of government activity. The existing NIPAs measure government output based on the cost of the inputs (largely labor) that it employs. By construction, a measure based on the assumption that the output of the government sector grows in line with the labor it employs will show no improvement in labor productivity. Because they are based on an embedded assumption about productivity growth, such measures obviously cannot serve the growing policy interest in assessing and improving the efficiency of the government sector.

In the European Union, Eurostat has called for national statistical agencies to develop direct measures of the volume of government services provided to individuals (European Commission 2001). An influential report prepared for the Office of National Statistics in the United Kingdom (Atkinson 2005) offers one set of more specific guidelines for how such measures might be developed. Efforts to date in several countries have concentrated on education and health, using measures such as the number of students served and indexes of the number of health-care procedures performed. There also has been some work on public safety and social services, using measures such as the number of prisoner nights, the number of fires attended, and the number of adults and children in care.

For someone charged with managing the resources of a government department in order to provide a particular set of services, using available resources more efficiently in order to provide a larger volume of services is a positive accomplishment. Viewed from that perspective, volume measures of the sort recommended by Eurostat and in the Atkinson report make a great deal of sense. For a policymaker who is concerned more broadly with how well the government is doing its job, however, these seem like the wrong sort of metrics on which to focus. Ultimately, assessments of the value of government services should be based on outcomes rather than on outputs. Questions of interest might include, for example, whether public schooling raises students' subsequent earnings; whether the provision of publicly supported health services leads to longer lives and better health; and whether the activities of the criminal justice system are helping to lower the crime rate. The measurement of outcomes is, of course, a considerably more difficult

task than the measurement of the sort of outputs envisioned by the Eurostat guidance and in the Atkinson report.

Consider as an illustrative example the activities of an agency charged with protecting the safety of workers on the job. A first step for the agency is to develop an appropriate set of workplace regulations. Given those regulations, the agency can use its resources in a number of different ways—offering compliance assistance to firms subject to its regulations; conducting inspections to identify violations of the regulations; assessing fines or other penalties against those found to be in violation of the regulations; or engaging in broader public communications about the regulations and enforcement actions undertaken by the agency, designed to affect the behavior of a larger number of firms. The number of workplace inspections that the agency carries out would be a natural volume measure of this agency's activities, but conducting more inspections will not necessarily lead to better outcomes. The impact of an inspection program will depend, for example, on how it is targeted. Further, even if inspections tend to lower injury and illness rates at the workplaces that are inspected, at the margin there may be other things the agency could do with its resources that would have a larger impact, for example, engaging in broader employer outreach and education efforts. There is at present relatively little research evidence available to guide the resource allocation decisions this enforcement agency must make, but it seems clear that simply counting the number of inspections the agency performs—or even tracking some weighted average of the counts of all of the agency's various activities—could be a very misleading indicator of the value of its activities. As a conceptual matter, measures of value added and productivity for government based on outcomes rather than outputs—in this case, how the agency's activities have affected the incidence of occupational injuries and illnesses in the economy as a whole—seem clearly to be a more legitimate basis on which to evaluate the government's performance.

Here, too, the measurement challenges that confront the economic statistician overlap significantly with the concerns of policymakers. In an era of tightening government budgets, making efficient use of available resources is becoming increasingly important to government managers. Doing this well requires good evidence on what works and what does not work to produce desired outcomes. In May of 2012, Jeff Zeints, the acting director of the Office of Management and Budget (OMB), issued guidance to federal agencies calling for them to document how they use evidence to allocate their resources and to demonstrate a commitment to expanding the use of evidence in carrying out their operations. Specific suggestions mentioned in the guidance memorandum included seeking opportunities for low-cost evaluations using administrative data; expanding evaluation efforts within existing programs; using comparative cost-effectiveness data to allocate resources; tying grant awards to evidence; using evidence to inform the enforcement of criminal, environmental, and workplace safety laws; and appointing a

high-level official to strengthen the agency's evaluation capacity. The message that federal agencies increasingly will be expected to use evidence to improve the efficiency and effectiveness of their operations was reinforced in a July 2013 guidance memorandum cosigned by OMB director Sylvia Burwell. These are powerful documents—because OMB is responsible for developing and overseeing the president's budget, its stated view on how agencies should be allocating their resources carries great weight. The goal of this nascent initiative is to develop and apply a stronger body of evidence about the impacts of the full range of government activities.

As with education and health, then, there is hope for complementarities between the policymakers' interest in improving the functioning of government and the statistical analysts' interest in producing better measures of government output. Further, more meaningful measures of government output are apt to be of considerable interest to government policymakers and managers.

## 2.5 What about Measures of Well-Being?

My focus thus far has been on steps that could be taken to improve the measurement of resource utilization and production in key sectors that are characterized poorly or incompletely in the current accounts. Such improvements would be of great value to policymakers, but they would not fully address the somewhat separate interest that has been expressed in measuring the well-being of individuals in our society.

Producing better information about distributions as well as totals would be one path toward satisfying the interest in measures of well-being. Even in an economy that is growing, there is no guarantee that everyone in the economy or even the typical person in the economy will experience an improvement in material welfare. In the United States, for example, the distribution of income has become substantially more unequal since the mid-1970s, with a disproportionate share of the growth in total income flowing to those at the very top of the income distribution (see, for example, Piketty and Saez [2003] and subsequent updates to their estimates). Better information on the distribution of income, consumption, and wealth that sheds light on the experience of the typical member of society would be a natural complement to the existing aggregates reported in the National Income and Product Accounts. The announcement by the Bureau of Economic Analysis of long-term plans to work toward the development of such measures is welcome news and it is to be hoped that similar efforts underway in other countries also will bear fruit.

Finding a way to measure well-being directly is another path that has attracted considerable interest. Several alternative approaches to measuring well-being have been proposed (Smith [2011] provides a useful review). First, the existing GDP measure can be adjusted so that it comes closer to

capturing the output that one would expect to contribute to well-being; for example, the value of household production could be added to the conventional estimate of GDP and defensive expenditures could be subtracted. Second, composite indicators that weight measures for several individual dimensions of interest can be constructed; examples of this approach include the United Nations Human Development Index and the Genuine Progress Indicator. As a variant on this approach, indicator dashboards can be developed that leave the weighting of the various dimensions to the user of the data; the OECD Better Life Initiative, which provides measures for a range of domains, together with a tool that allows data users to construct their own aggregate measure, is a nice example. Development of aggregate measures of subjective well-being is a third approach. There is a growing literature about how best to do this, whether using global measures of life satisfaction, measures of affect at particular points in time, or time accounts designed to track the hours spent in pleasant or unpleasant activities, as proposed by Krueger (2009).

It is easy to see in principle how information about subjective well-being could be useful for policy evaluation. For example, in deciding whether it is worthwhile to build a new bridge, it might be important to know how the bridge would affect the amount of time drivers spend in traffic as opposed to doing other more enjoyable things. There has been considerable discussion in the United Kingdom about using subjective measures for policy assessment and the Office for National Statistics (ONS) has made notable investments in this approach. It remains unclear, however, whether the development of subjective measures—and especially the development of broad aggregate measures of well-being—will in fact have the desired effect of changing the way that policy officials make their decisions.

The experience of the ONS with developing an experimental satellite account for household production in the early twenty-first century may be illuminating. The impetus for the development of this account was the recognition that there is a great deal of nonmarketed production that is omitted from the conventional economic accounts. The ONS put a fair amount of work into developing estimates of the value of nonmarketed output produced by households, and the estimates showed the value of household production to be sizable as compared to conventionally measured GDP (see Holloway, Short, and Tamplin [2002] for details). Despite the high quality of the work to produce the experimental account, however, there turned out to be no real demand for the estimates, and the exercise has not been repeated.

The jury is still out, I think, on whether the aggregate measures of well-being currently being developed by various statistical agencies will fare better. Like the ONS household production estimates, the aggregate well-being measures are intellectually interesting, but it is less clear how they might be used to guide day-to-day policy decisions.

## 2.6 Conclusion

Our existing economic accounts have many users, but exist primarily to serve the public policy process. Similarly, I would argue, the opportunities and potential rewards for the development of expanded economic accounts are greatest in those spheres where there is a compelling public policy interest in the information that would be produced. There are good arguments, I believe, for the development of satellite accounts for education and for health. Policymakers care a great deal about the magnitude of our investments in these forms of human capital and about the performance of the education and health sectors. Further, data being developed to meet immediate policy needs should help to inform the construction of such satellite accounts. The same may be true with respect to improved measurement of government more generally. A key test for the broader measures of welfare and well-being that have received so much discussion in recent years will be whether they prove to be not only intellectually interesting but also useful for policy purposes.

## References

- Abraham, Katharine G. 2010. "Accounting for Investments in Human Capital." *Survey of Current Business* June:42–53.
- Abraham, Katharine G., and Christopher Mackie, eds. 2005. *Beyond the Market: Designing Nonmarket Accounts for the United States*. Washington, DC: National Academies Press.
- . 2006. "A Framework for Nonmarket Accounting." In *A New Architecture for the US National Accounts*, Studies in Income and Wealth, vol. 66, edited by Dale W. Jorgenson, J. Steven Landefeld, and William D. Nordhaus, 161–92. Chicago: University of Chicago Press.
- Aizcorbe, Ana M., Eli B. Liebman, David M. Cutler, and Allison B. Rosen. 2012. "Household Consumption Expenditures for Medical Care: An Alternative Presentation." *Survey of Current Business* 92 (6): 34–48.
- Aizcorbe, Ana M., Carol E. Moylan, and Carol A. Robbins. 2009. "Toward Better Measurement of Innovation and Intangibles." *Survey of Current Business* 89 (1): 10–23.
- Atkinson, Tony. 2005. "Measurement of Government Output and Productivity for the National Accounts." In *Atkinson Review: Final Report*. United Kingdom: Palgrave Macmillan.
- Berndt, Ernst R., Susan H. Busch, and Richard G. Frank. 2001. "Treatment Price Indexes for Acute Phase Major Depression." In *Medical Care Output and Productivity*, edited by David M. Cutler and Ernst R. Berndt, 463–508. Chicago: University of Chicago Press.
- Bradley, Ralph, Elaine Cardenas, Daniel H. Ginsburg, Lyubov Rozental, and Frankie Velez. 2010. "Producing Disease-Based Price Indexes." *Monthly Labor Review* 133 (February): 20–8.

- Bureau of Economic Analysis. 2013. "Preview of the 2013 Comprehensive Revision of the National Income and Product Accounts: Changes in Definitions and Presentations." *Survey of Current Business* 93 (3): 13–39.
- College Board. 2012. *Trends in College Pricing*. College Board Advocacy and Policy Center, Trends in Higher Education Series. <http://trends.collegeboard.org/college-pricing>.
- Corrado, Carol, Charles Hulten, and Daniel Sichel. 2005. "Measuring Capital and Technology: An Expanded Framework." In *Measuring Capital in the New Economy*, Studies in Income and Wealth, vol. 65, edited by C. Corrado, J. Haltiwanger, and D. Sichel, 11–46. Chicago: University of Chicago Press.
- . 2006. "Intangible Capital and Economic Growth." NBER Working Paper no. 11948, Cambridge, MA.
- Cutler, David M., Mark B. McClellan, Joseph P. Newhouse, and Dahlia K. Remler. 2001. "Pricing Heart Attack Treatments." In *Medical Care Output and Productivity*, edited by David M. Cutler and Ernst R. Berndt, 306–62. Chicago: University of Chicago Press.
- Daley, William M. 1999. "Press Conference Announcing the Commerce Department's Achievements of the Century." Secretary, US Department of Commerce. December 7.
- Eisner, Robert. 1985. "The Total Incomes System of Accounts." *Survey of Current Business* 65 (1): 24–48.
- . 1988. "Extended Accounts for National Income and Product." *Journal of Economic Literature* 26 (2): 1611–94.
- . 1989. *The Total Incomes System of Accounts*. Chicago: University of Chicago Press.
- European Commission. 2001. *Handbook on Price and Volume Measures in National Accounts*. [http://epp.eurostat.ec.europa.eu/portal/page/portal/product\\_details/publication?p\\_product\\_code=KS-41-01-543](http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-41-01-543).
- Holloway, Sue, Sandra Short, and Sarah Tamplin. 2002. *Household Satellite Account (Experimental) Methodology*. London: UK Office for National Statistics.
- Jorgenson, Dale W., and Barbara M. Fraumeni. 1989. "The Accumulation of Human and Nonhuman Capital." In *The Measurement of Saving, Investment, and Wealth*, edited by Robert E. Lipsey and Helen Stone Tice, 227–81. Chicago: University of Chicago Press.
- . 1992a. "Investment in Education and US Economic Growth." *Scandinavian Journal of Economics* 94 (supplement): S51–S70.
- . 1992b. "The Output of the Education Sector." In *Output Measurement in the Service Sectors*, edited by Zvi Griliches, 303–38. Chicago: University of Chicago Press.
- Kendrick, John W. 1976. *The Formation and Stocks of Total Capital*. New York: Columbia University Press.
- Kennedy, Robert F. 1968. "Remarks of Robert F. Kennedy at the University of Kansas." University of Kansas, March 18. <http://www.jfklibrary.org/Research/Research-Aids/Ready-Reference/RFK-Speeches/Remarks-of-Robert-F-Kennedy-at-the-University-of-Kansas-March-18-1968.aspx>.
- Kliff, Sarah. 2012. "What Could Revolutionize Health Care? This Database." *Washington Post*, May 21.
- Krueger, Alan B., ed. 2009. *Measuring the Subjective Well-Being of Nations: National Accounts of Time Use and Well-Being*. Chicago: University of Chicago Press.
- Kuznets, S. 1934. *National Income 1929–1932*. Senate Document No. 124, 73rd Congress, 2nd Session. Washington, DC: US Government Printing Office.
- Liu, Gang. 2011. "Measuring the Stock of Human Capital for Comparative Anal-

- ysis: An Application of the Lifetime Income Approach to Selected Countries.” Working Paper no. 41, Statistics Directorate, Organisation for Economic Co-operation and Development.
- Miller, Patrick B., Denise Love, Emily Sullivan, Jo Porter, and Amy Costello. 2010. “All-Payer Claims Databases: An Overview for Policymakers.” Academy Health and Robert Wood Johnson Foundation. May.
- National Research Council. 2010. *Accounting for Health and Health Care: Approaches to Measuring the Sources and Costs of Their Improvement*, Washington, DC: National Academies Press.
- Nordhaus, W., and J. Tobin. 1972. “Is Growth Obsolete?” In *Economic Research: Retrospect and Prospect, Volume 5, Economic Growth*, 1–80. New York: Columbia University Press.
- Piketty, Thomas, and Emmanuel Saez. 2003. “Income Inequality in the United States, 1913–1998.” *Quarterly Journal of Economics* 118 (1): 1–39.
- Schultz, Theodore W. 1961. “Investment in Human Capital.” *American Economic Review* 51 (1): 1–17.
- Smith, Conal. 2011. “Alternative Measures of Well-Being: The OECD Better Life Initiative.” Unpublished presentation slides. December 2.
- Stiglitz, Joseph E., Amartya Sen, and Jean-Paul Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress*. <http://www.stiglitz-sen-fitoussi.fr/en/index.htm>.
- US Department of the Treasury. 2012. *Statistics of Income 2010, Individual Income Tax Returns*. Publication 1304. Internal Revenue Service. August.
- US Department of the Treasury, and US Department of Education. 2012. *The Economics of Higher Education*. December. Washington, DC.
- Weisbrod, Burton A. 1961. “The Valuation of Human Capital.” *Journal of Political Economy* 69 (5): 425–36.