

# BEYOND THE MARKET

Designing Nonmarket Accounts for the United States



NATIONAL RESEARCH COUNCIL  
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Designing Nonmarket Accounts for the United States

Panel to Study the Design of Nonmarket Accounts

Katharine G. Abraham and Christopher Mackie, Editors

Committee on National Statistics

Division of Behavioral and Social Sciences and Education

NATIONAL RESEARCH COUNCIL  
OF THE NATIONAL ACADEMIES

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## Preface

One of the long-standing goals of the Committee on National Statistics (CNSTAT) is the improvement of economic measurement and the data sources crucial to that measurement. In working toward that goal, recent CNSTAT panels have produced reports on price and cost-of-living indexes, poverty measurement, measurement of the economy's government sector, and the design of environmental and natural resource accounts. The last report in this list, *Nature's Numbers*, focused on goods and services associated with the environment, which are in many cases not transacted in markets and hence not captured in conventional economic accounts. That report did much to set the conceptual stage for this panel's broader study of economic activities that are largely nonmarket in character.

This report is the product of contributions from many individuals. The project was sponsored by the Yale University Program on Nonmarket Accounts which, in turn, was funded by a grant from the Glaser Progress Foundation. The Yale program is directed by William Nordhaus, whose long history of pioneering research in this and related areas—dating back three decades to his work with James Tobin on measures of economic welfare and continuing through his chairing of the *Nature's Numbers* panel—helped to establish the foundations for this panel's work. Dr. Nordhaus, along with Martin Collier of the Glaser Progress Foundation, attended the first meeting and, in articulating their hopes for the study, helped the panel sharpen its vision of their charge. The panel is grateful also to Dan Melnick who served as liaison to the panel for the Yale Program and contributed valuable suggestions and points of clarification along the way.

Many others generously presented material at panel meetings and answered questions from panel members, thereby helping us to develop a broader and



deeper understanding of key methodological and data issues relevant to the construction of nonmarket accounts. The panel especially thanks Steven Landefeld, director of the Bureau of Economic Analysis, who provided insights based on his long experience and extensive knowledge of economic accounting; Diane Herz and Lisa Schwartz, of the Bureau of Labor Statistics, who educated the panel about that agency's important new time-use survey; Thomas Juster, University of Michigan, and Robert Pollak, Washington University, who shared their expertise on conceptual and measurement issues relating to time use and the theory of time allocation; Suzanne Bianchi, who provided tabulations of time-use data and information about the underlying surveys; and Peter Harper, Australian Bureau of Statistics, and Sue Holloway, Office for National Statistics, United Kingdom, who informed the panel about some of the exciting work on nonmarket accounting underway in other countries.

The meetings of the panel also provided many opportunities for the panel members to learn from one another. Each of the panel members contributed indispensable special expertise to the preparation of the panel's final report. Katharine Abraham and Robert Hall wrote the first draft of the report's introduction; Barbara Fraumeni prepared a description of the existing national accounts that makes up part of Chapter 2; Daniel Hamermesh contributed a description of the new American Time Use Survey that also appears in Chapter 2; Nancy Folbre and Daniel Hamermesh prepared the first draft of Chapter 3, on the topic of household production; Nancy Folbre and Robert Michael wrote the initial draft of the material on the role of families in the production of human capital that eventually found its way into Chapter 4 of the panel's final report; Barbara Fraumeni and Alan Krueger took the lead on the preparation of Chapter 5, on accounting for investments in education; David Cutler and Matthew Shapiro provided a first draft of Chapter 6, on accounting for investments in health; and Henry Peskin and Burton Weisbrod worked together on the initial drafts of Chapters 7 and 8, on accounting for the activities of nonprofits and governments and accounting for the environment. All of the report's chapters underwent several rounds of significant revision, reflecting intensive discussion and debate that involved the full panel, but these productive exchanges could not have occurred had individual panel members not taken the lead in preparing the first drafts that served as our starting point.

A special comment is needed about one of our panel members, Barbara Fraumeni, who is the chief economist at the Bureau of Economic Analysis (BEA). Although government employees who are technical experts in their fields may serve on study panels for the National Academies, precautions are taken in such cases to ensure against real or perceived conflicts of interest. In this case, the institution recognized both that this panel might make recommendations directly related to the work of the BEA and that Dr. Fraumeni's unrivaled expertise on national economic accounting in general and the U.S. National Income and Product Accounts in particular would be critical to the panel's work. After careful

consideration of these factors, the institution invited Dr. Fraumeni to serve on the panel.

We also note the contributions of two original panel members, Dora Costa, Massachusetts Institute of Technology, and Daniel Kahneman, Princeton University, who attended meetings early in the panel's 2½ years of work and provided keen insights that helped the panel to chart its course. We are sorry that they were unable to continue as active members.

The panel could not have conducted its work without an excellent and well-managed staff. Andy White was the director of CNSTAT at the time the panel was formed, and we appreciate his support for the panel's work. Project assistants Michael Siri and Marisa Gerstein provided excellent administrative, editorial, and research support. The panel also benefited from the work of Eugenia Grohman and Kirsten Sampson Snyder, both of the Division of Behavioral and Social Sciences and Education, who were responsible for editing the report and overseeing the review process.

The entire panel owes a special debt of gratitude to Christopher Mackie, the panel's study director. During the course of the panel's deliberations, he played an invaluable role in facilitating communication among panel members, drawing the panel's attention to relevant studies that we might otherwise have overlooked, helping to develop the structure for the panel's final report, and directing the panel's attention to gaps and inconsistencies in the discussion of different topics that needed to be addressed. Over the past year, in collaboration with various panel members, he read and reworked each of the report's chapters multiple times, making improvements on each pass and helping to turn an initially disparate set of individual chapter drafts into a more integrated whole, and then shepherded the report through the final review process. For me personally, working with Chris was a great pleasure, and I know I speak for the entire panel in expressing my gratitude to him for his dedicated professionalism, reliable good cheer, and many substantive contributions.

The report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Report Review Committee of the National Research Council (NRC). The purpose of this independent review is to provide candid and critical comments that will assist the institution in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process.

We thank the following individuals for their participation in the review of this report: John C. Bailar, III, Department of Health Studies (emeritus), University of Chicago; Robert Haveman, Department of Economics, University of Wisconsin-Madison; J. Steven Landefeld, Bureau of Economic Analysis, Washington, DC; Arleen Leibowitz, Department of Policy Studies, University of

California, Los Angeles; Robert A. Margo, Department of Economics and History, Vanderbilt University, and Research Associate, National Bureau of Economic Research; Timothy Smeeding, Center for Policy Research, Syracuse University; Frank P. Stafford, Department of Economics, University of Michigan; and Frances Woolley, Department of Economics, Carleton University, Ottawa, Ontario Canada.

Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by Robert A. Pollak, Department of Economics, Washington University, St. Louis, MO, and Joseph P. Newhouse, School of Health Policy and Management, Harvard University. Appointed by the National Research Council, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Katharine G. Abraham, *Chair*  
Panel to Study the Design of Nonmarket Accounts

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# Contents

EXECUTIVE SUMMARY	1
1 INTRODUCTION	9
Background and Overview, 9	
Motivation, 12	
Priorities, Scope, and Objectives, 14	
A Conceptual Framework, 23	
2 ACCOUNTING AND DATA FOUNDATIONS	39
Overview of the National Income and Product Accounts, 40	
Measuring Time Use, 43	
Demographic Data, 52	
Other Data Needs, 54	
3 HOME PRODUCTION	55
The Household as a Factory, 59	
Measuring Inputs, 63	
Valuing Inputs, 68	
Measuring and Valuing Output, 74	
Data Requirements, 76	

4	THE ROLE OF THE FAMILY IN THE PRODUCTION OF HUMAN CAPITAL	79
	Conceptual Framework, 79	
	Defining Human Capital, 81	
	The Human Capital Production Function, 83	
	Family Inputs to the Development of Children's Human Capital, 88	
	Valuing the Time Parents Devote to Children, 91	
5	EDUCATION	93
	Conceptual Framework, 94	
	Measuring and Valuing Inputs, 97	
	Measuring and Valuing Output, 105	
	Other Issues, 116	
6	HEALTH	117
	Conceptual Framework, 119	
	Measuring and Valuing Inputs, 125	
	Measuring and Valuing Health, 131	
	Data Requirements, 140	
7	THE GOVERNMENT AND PRIVATE NONPROFIT SECTORS	141
	Conceptual Framework, 143	
	Volunteer Labor, 146	
	Donated Goods, 153	
	Measuring and Valuing Output, 153	
	Data Requirements, 159	
	Conclusions, 160	
8	THE ENVIRONMENT	163
	Definition and Scope of Coverage, 164	
	Current Accounting Approaches, 169	
	Future Directions, 171	
	A Note on the Social Environment, 175	
	REFERENCES	179
	APPENDIX	
	Biographical Sketches of Panel Members and Staff	195
	INDEX	201

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# BEYOND THE MARKET



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# Executive Summary

## **BACKGROUND AND PANEL CHARGE**

National income and product accounts (NIPAs) are, in most countries, the data source for the most influential measures of overall economic activity. Key benchmarks derived from these accounts—most notably gross domestic product (GDP)—along with other economic data such as price and employment statistics, are widely viewed as indicators of how well a nation is doing.

Nevertheless, since their earliest construction for the United States by Simon Kuznets in the 1930s, concerns have been voiced that the accounts are incomplete. While broadly accepted and precisely estimated, the NIPAs omit a large part of the nation's product. They emphasize market transactions and reveal little about production in the home and other nonmarket settings. Furthermore, in some areas in which activity is organized in markets (e.g., medical care), the existing accounts do not capture key elements (e.g., the social value of medical innovations or unpaid time spent caring for the sick).

Nonmarket accounts would be particularly helpful in improving our understanding of the sources of growth in the economy. Researchers now must supplement data from the national accounts with external estimates of the contributions of research and development, natural resources, and investments in human capital. These limitations of national accounting data reflect the reality that neither economic production nor contributions to social welfare stop at the market's border, but extend to many nonmarket activities. Failure to account for these activities may significantly distort policy makers' sense of economic trends and the desirability of potential policy interventions.



Given that limitations of the NIPAs have long been recognized, why is this report needed at this time? Few would dispute the existence of economically valued nonmarket inputs and outputs. Examples are easy to find: the higher value of a house sold after home improvements are made by the homeowner, the development of attitudes and skills that have value in the marketplace resulting from nurturing that takes place in the family, and so on. Yet, we do not know how to measure or value much of what constitutes nonmarket production.

The Panel to Study the Design of Nonmarket Accounts was charged with evaluating current approaches, determining priorities for areas of coverage, examining data requirements, and suggesting further research to strengthen the knowledge base about nonmarket accounting.

### SCOPE AND PRIORITIES

An overarching question for nonmarket account design is scope—where in the range of economic-related activities to draw the border of inclusion. The panel recommends the development of satellite accounts that cover productive inputs and valuable outputs that are not traded in markets, focusing on areas for which improved accounting would contribute to better policy making and to science. These accounts would provide a framework for examining difficult-to-measure activities that are excluded, or inadequately treated, in the NIPAs. Though one objective of nonmarket accounting is to support alternative aggregate measures of economic performance, satellite accounts are not intended to replace the current national accounts but to exist alongside them. Most of the work proposed by the panel would be conducted on an experimental basis and would not change the way the headline GDP is estimated.

While acknowledging that different users require different kinds of data and that new methods may be developed for valuing outcomes previously considered noneconomic, it is the panel's view that resources should initially be directed toward developing a more complete accounting of the population's productive activities rather than attempting to measure happiness or well-being. Throughout the report, the panel defends this position on practical measurement, as well as conceptual, grounds. Because improving output (and corresponding input) measures is a prerequisite to any vision for an expanded set of accounts, this is where the panel focused its energies.

The potentially valuable areas of nonmarket accounting are at different levels of development with respect to measurement concepts and available data. For that reason, the panel favors a staged approach. In general, the panel emphasizes areas for which new data sources offer opportunities to improve measurement of inputs or outputs, and excludes areas for which the likelihood of developing credible valuation estimates seems especially low. The staged approach allows work to proceed without commitment to a rigid framework, which might be difficult to agree upon across different areas of interest. Experimental methods—

potentially inconsistent with an integrated system—can be pursued in a framework of separate satellite accounts.

A number of productive activities are candidates for inclusion in a set of augmented accounts. Within the set of possibilities that might conceivably be of interest, the panel believes that priority should be given to the development of experimental accounts for areas that incrementally expand coverage of the conventional market accounts. This report focuses on five areas that the panel identified as being among the most promising and to which we would accordingly give high priority: household production, investments in formal education, investments in health, selected nonprofit- and government-sector activities, and environmental assets and services.

***Household Production.*** The value of goods and services produced by households for their own consumption is quite likely large and, therefore, its measurement is essential for estimating a nation's overall level of economic activity. Evidence indicates that including household production as part of a nation's output also alters measured trend growth rates and their fluctuations over the business cycle. Given current knowledge and data, constructing an account for home production represents a logical early phase augmentation to the NIPAs. A major catalyst for this activity—and for prospects of future progress—is the development of time-use surveys, which generate data that are useful for estimating the extent and nature of work done in the home.

***Investments in Formal Education and the Resulting Stock of Skill Capital.*** Although gross domestic product includes expenditures for education, it fails to adequately capture the contribution of related nonmarket activities to future economic growth, the well-being of individuals, and society in general. Because human capital, particularly that arising from education, is such a large component of the capital stock, a separate education account would contain essential data for improving research on investment, capital, and ultimately economic growth as measured by the traditional accounts. An education satellite account would incorporate market factors, as well as introduce experimental measures of nonmarket inputs and outputs. Successful development of an education account will require improved information on student and parent time inputs to schooling and further research on measuring and valuing the impact of education on the population.

***Investments in Health and the Resulting Stock of Health Capital.*** A fully developed health account would enable researchers to estimate the effect that an array of inputs have on the stock of health and the value of associated changes in it. Additionally, measuring health is an important prerequisite for improving estimates of productivity in medical care. There are at least six major inputs into the production of health: medical care provided in market settings; care services provided without payment; time that individuals invest in their own health; consumption of other goods and services (some of which improve health and others of which are harmful) and nonmedical technology and safety devices; research and development; and environmental and “disease state” factors. There are two

outputs of the health sector: the value of health capital, which can be defined as the expected flow of health consumption over the course of a person's remaining life, and the additional income that a healthier population generates.

**Selected Activities of the Government Nonprofit Sectors.** The initial focus of nonprofit-sector accounting should be on developing an account for tax-exempt organizations that are providers of public and charitable goods and services (as opposed to being providers of outputs to their members). The most quantitatively significant nonmarket input into nonprofit production is time, specifically that of volunteer labor. Therefore, construction of these accounts requires data on the number of volunteers and hours worked. The focus of experimental public sector accounting work should be on developing improved measures of output. In fact, full and independent (non-input based) valuation of goods and services is an important goal for comprehensive accounting for both the government and the economy's nonprofit institutions. Fulfilling this goal will entail more basic research.

**Environmental Assets and Services.** Environmental accounting has a long history. This panel is in agreement with the overarching recommendations of *Nature's Numbers* (National Research Council, 1999): Congress should authorize and fund recommencement of work with the ultimate goal of producing a comprehensive set of market and nonmarket environmental accounts. The accounts should focus on changes in values of the stocks of domestic natural resources and, probably more importantly in terms of nonmarket value, externalities associated with air and water pollution.

The areas listed above are substantial components of the economy—and the level of activity associated with each has the potential to change significantly over time—so focusing attention on them should improve our understanding of the nation's total production. Several of these areas overlap with coverage in the NIPAs and therefore may complement existing official statistics or help clarify policy issues based on those official accounts.

**Recommendation 1.1:** The statistical agencies should develop a set of satellite accounts for household production, government and nonprofit organizations, education, health, and the environment. These accounts would provide a more complete picture of the nation's productive activities in these areas.

In addition to the five areas of nonmarket activity identified in this recommendation, the report includes a chapter on the role of the family in human capital development. Though something is known about the magnitude and the value of family inputs to human capital creation, the panel concluded that, given the current state of knowledge and data, it would be impossible to develop a comprehensive human capital investment account. Nonetheless, a fully specified set of nonmarket accounts would include a family care component or a more comprehensive human capital account, so this remains a worthwhile, albeit very long-term, goal. Such an account would formally recognize the investments

families make in preparing children for lives as productive members of society, including the necessary foundation for later investments in formal education and health.

Though the panel considered other kinds of activities as well, we do not claim to have fully documented all areas of nonmarket production that contribute to social or private well-being. On the grounds hinted at above and elucidated further in the report, some other important areas—e.g., safety and security, leisure activities, and the underground economy—receive limited attention. This narrowing of scope notwithstanding, we believe that scholars and policy makers interested in a broad range of nonmarket topics will benefit from the principles laid out in this report.

Even within the set of areas identified here, there are differences in readiness to begin the construction of new satellite accounts. At this time, accounts for household production and the environment would rest on the firmest foundations; indeed, the Bureau of Economic Analysis and other national statistical offices already have done substantial work in these areas. In the remaining areas for which we advocate development efforts—the government and nonprofit sectors, education, and health—further conceptual thinking and new data collection are needed, and we encourage such work.

We acknowledge the difficulty of drawing boundaries between the areas of nonmarket activity we have identified as priorities. Improved health, for example, may result from better medical care, better education that contributes to better individual decisions about diet and exercise, or improved air and water quality. Nonetheless, the panel sees no realistic alternative to considering the different areas of nonmarket activity separately, but nonetheless recognizes the need to delineate the interactions and complementarities among them as the development of supplemental accounts proceeds.

Because the accounts proposed in this report will unavoidably overlap with one another (and with the market accounts), aggregate cost or product values will not be derivable by simply adding these accounts up—there would be extensive double counting. Nonetheless, given the current stage of development of frameworks and data relating to nonmarket activities, independent accounts will likely be more useful than a system that forces the accounting into a framework designed to eliminate overlap. Such a framework would require arbitrary allocation of costs or outputs across accounts.

### CONCEPTUAL ISSUES

Complementing decisions about scope, a conceptual framework must be adopted on which to develop an economic account. For a number of reasons, the panel believes that experimental satellite accounts will be most useful if their structure is as consistent as possible with the NIPAs. Because the national accounts have undergone extensive scrutiny, reflecting a long history of research

and policy use, the underlying principles are well tested and practice shows they can be implemented. Moreover, researchers are interested in developing augmented measures of output that are compatible with GDP. These considerations argue for pursuing an approach that uses dollar prices as the metric for relative value and, wherever possible, values inputs and outputs using analogous observable market transactions. Perhaps most importantly, nonmarket accounts should maintain a double-entry structure in which valuation of inputs to production (such as time) and outputs (such as child care) are based on separate price and quantity information.

**Recommendation 1.3:** Nonmarket accounts should measure the value and quantity of outputs independently from the value and quantity of inputs whenever feasible.

Only with an independent measure of the value of output can we hope to address many of the questions for which nonmarket accounts could be most valuable.

A central issue is how to value inputs and outputs when market prices are absent. Quantitatively, people's time is the most important unmeasured input in nonmarket production.

**Recommendation 1.4:** A replacement cost measure, adjusted for differences in skill and effort between nonmarket and market providers, should be adopted for valuing time inputs devoted to nonmarket production in cases in which someone else could have been hired to perform the work in question. Where this is not the case, an opportunity-cost-based measure, ideally adjusted to account for the intrinsic enjoyment associated with the activity in question, should be used for valuing time devoted to nonmarket production activities.

The report lays out in detail the contexts in which various input valuation approaches are appropriate.

As with the input side, valuation of nonmarket outputs should follow the principle of treating nonmarket goods and services as if they were produced and consumed in markets. Under this approach, the prices of nonmarket goods and services are imputed from a market counterpart. Even for the near-market cases, however, many goods exist for which the degree of replacement comparability—and, hence, substitutability—is not at all clear. More difficult yet are the cases for which a nonmarket good is an asset that has no direct market counterpart and is never sold. These kinds of outputs are prevalent in such areas as education and health and will require application of creative valuation methods.

## DATA ISSUES

In addition to the many conceptual challenges that clutter the path toward construction of nonmarket satellite accounts, another barrier is the limited scope

and quality of data available to support quantification and valuation of nonmarket activities in a way that is even remotely comparable to that which is done for the NIPAs. Fortunately, there is recent progress to report.

The new American Time Use Survey (ATUS) will provide rich information about the most important input to nonmarket production—people’s time.

**Recommendation 2.1:** The American Time Use Survey, which can be used to quantify time inputs into productive nonmarket activity, should underpin the construction of supplemental national accounts for the United States. To serve effectively in this role, the survey should be ongoing and conducted in a methodologically consistent manner over time.

What makes the ATUS particularly valuable for the purpose of creating nonmarket accounts is that its information will be provided year after year.

Despite the tremendous step forward represented by the ATUS and its role as an essential building block for most nonmarket accounts for the United States, there are concerns about its reliability and validity for this purpose. Lower-than-expected response rates—and the possible resulting nonresponse bias—are worrisome. Efforts to assess the extent of biases in survey responses—and, if necessary, to confront that bias by raising response rates or making appropriate adjustments to the estimates—should be a priority.

**Recommendation 2.2:** The Bureau of Labor Statistics should commit resources adequate to improve response rates in the American Time Use Survey and to investigate the effects of lower-than-desirable response rates on survey estimates.

Demographic data go hand in hand with time-use data in laying the foundation for nonmarket accounts: time-use data can be used to answer questions about what individuals with particular characteristics are doing with their time; demographic data describe the distribution of characteristics in the population. Although we recognize that creation of better coordinated demographic data would require significant effort by statistical agencies and other suppliers of data, the development of such data is an important goal.

**Recommendation 2.4:** A consistent and regularly updated demographic database should be assembled as an input to nonmarket accounts. The database should include information on the population by age, sex, school enrollment, years of education and degrees completed, occupation, household structure, immigrant status, employment status and, possibly, other dimensions.

The fact that high-quality demographic data are already collected by the Census Bureau and other agencies improves the feasibility of implementing this recommendation. The American Community Survey also will help advance the effort to produce a more fluid demographic description of the population. Given budget

constraints of the statistical agencies, the demographics database should be built, to the maximum extent possible, using existing data.

Full development of nonmarket accounts also requires further research and data development directed toward defining and measuring output. It is not always obvious what the outputs associated with various nonmarket activities are, especially in such service-oriented areas as education, health, social services, culture and the arts, and recreation. Frequently, in difficult-to-measure sectors, the value of output is not measured directly, but set equal to the aggregate value of the inputs used in its production. Accordingly, little is known about growth, quality improvements, or productivity in these sectors. The data that will be needed to create independent output measures are discussed throughout the report. We offer numerous recommendations on this topic and more generally about the next steps needed in research and data development to advance nonmarket accounting.

# Introduction

## BACKGROUND AND OVERVIEW

Gross domestic product is the nation's most influential measure of overall economic activity and growth. The national income and product accounts (NIPAs) that underlie gross domestic product, together with such other key economic data as price and employment statistics, are widely used as indicators of how well the nation is doing.

Since their earliest construction for the United States by Simon Kuznets in the 1930s (Kuznets, 1934), concerns have been voiced that the national income and product accounts are incomplete. The venerable NIPAs meet rigorous standards and enjoy broad acceptance among data users interested in tracking economic activity. These accounts are, however, primarily market-based and, by design, shed little light on production in the home or in other nonmarket situations. Furthermore, even where activity is organized in markets, important aspects of that activity may be omitted from the NIPAs. In some cases, unpaid time inputs and associated outputs are integral to production processes but, because no market transaction is associated with their provision, they are not reflected in the accounts. One illustration is provided by estimates (LaPlante et al., 2002) suggesting that the value of in-home long-term care services provided by family and friends is greater than the value of similar market-provided services.

In other areas, the output resulting from market-based production may be incorrectly characterized or valued. There is wide agreement, for example, that the output of the education sector properly should be considered investment



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