

# **Nonmarket Accounts: An Essential Element**

**(Draft)**

Barbara M. Fraumeni  
Professor and Chair of the Ph.D. in Public Policy Program  
Muskie School of Public Service  
University of Southern Maine  
Portland, Maine, USA

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## **Nonmarket Accounts: An Essential Element<sup>1</sup>**

Barbara M. Fraumeni  
Professor and Chair of the Ph.D. in Public Policy Program  
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Although the importance of national market accounts is widely acknowledged, no country gives the same level of prominence to national nonmarket accounts.<sup>2</sup> Without nonmarket accounts our understanding of the economy could be seriously flawed. Nonmarket activities represent the majority of time use for individuals and by most reckonings generate more investment than market activities. Market and nonmarket accounts should be the foundation for examining the sources of economic growth, including changes over time. Nonmarket accounts are particularly important in appreciating the role of women in the economy as on average they spend more time in the nonmarket activities than men. The activities of the poor are also typically more concentrated in the nonmarket sector than the activities of those who are not poor. A consideration of both market and nonmarket activities is critical to achieving Millennium Development Goals.

The nonmarket accounts proposed in this paper would measure the level of economic activity, but would not measure welfare. In this they would be consistent with national market accounts. An important principle of the nonmarket accounts is to maintain

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<sup>1</sup> The views expressed in this paper are the view of the author and do not necessarily represent the views of the Muskie School of Public Service or the University of Southern Maine.

<sup>2</sup> National accounts, or Gross Domestic Product (GDP) accounts, include measures for government and nonprofits which are part of the nonmarket sector.

comparability with national market accounts to the extent possible. This objective is consistent with that espoused in the recent Committee on National Statistics (CNSTAT) panel book on the design of nonmarket accounts.<sup>3</sup>

## **National Market Accounts**

The division between what is included in market accounts vs. nonmarket accounts can be arbitrary. For example, imputations are made in the national market accounts for the value of owner-occupied housing, an important component of nonmarket life, yet no imputations are made for the services of consumer durables. Consumer durables include any durable items used by individuals outside of paid work, such as vehicles, refrigerators, stoves, furniture, and so on.<sup>4</sup> For the U.S., the imputation for owner-occupied housing is large, amounting to about 6 percent of Gross Domestic Product (GDP).<sup>5</sup> According to estimates by Landefeld and Howell (1997), an imputation for consumer durables would amount to approximately 8% of GDP.<sup>6</sup> Although representatives from the U.S and Canada proposed that the issue of consumer durables being included in GDP be debated as part of the ongoing revisions to the international standards for national income accounting, the System of National Accounts, there was

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<sup>3</sup> See Abraham and Mackie (2005), Introduction. This paper relies heavily on this panel book. The author was a member of the panel, the Committee on National Statistics (CNSTAT) Panel to Study the Design of Nonmarket Accounts. Reference will be made to this panel as the CNSTAT panel.

<sup>4</sup> To be considered a consumer durable in the U.S. National and Income and Product Accounts (NIPAs), the item must be expected to last at least three years.

<sup>5</sup> See Moulton (2002), p. 11.

<sup>6</sup> Landefeld & McCulla (2000), p. 301. The estimated percentage of GDP is 5% in 1946 and 8% in 1997.

little support from the representatives from other countries.<sup>7</sup> The logic of including owner-occupied housing, but not consumer durables, is unclear.

The division between what is included in market accounts vs. nonmarket accounts can be misleading as well. Whenever there is a substantial movement of activities between the market and nonmarket sectors, it is unclear how to interpret GDP growth rates. In the U.S., the female labor force participation rate almost doubled between 1950 and 2000.<sup>8</sup> Much of this change simply represents a movement of activities from the nonmarket to the market sector, e.g., notably child care. Should this phenomenon be recorded as an increase in the level of economic activity in the United States as is currently done? The often repeated example representing a movement from the market to the nonmarket sector is of an individual who marries his housekeeper. If the housekeeper wife continues to clean his house, GDP goes down even though the amount of economic activity is the same. On net over the 1950 to 2000 period in the U.S. the impact of movements from/to the nonmarket to the market sector have been to overstate the officially measured rate of growth of GDP.

### **Scope and Fundamental Elements**

What should be the scope of nonmarket accounts? Ideally nonmarket accounts should include all unpaid activities. By contrast, household production accounts only include activities centered in the household which pass the test of the third party rule. The third

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<sup>7</sup> Fraumeni (2005).

<sup>8</sup> Abraham and Mackie (2005), p. 12

party rule states that activities are included under the household production rubric only if another party (the third party) could perform the activity for the individual.<sup>9</sup> Accordingly, household production accounts do not include many important activities, such as formal or informal education, health care, and bearing children.<sup>10</sup> Each of these activities represents human capital formation and is an important determination of the current and future level of economic activity. Because of its wider scope, nonmarket accounts are clearly preferred to household production accounts.

Fundamental elements of these accounts, using the terminology of production, are inputs and outputs, and values and quantities. Inputs and outputs are needed to describe how production occurs as well as what is being produced. Frequently household production accounts include only inputs because of the difficulty of measuring outputs. It is acknowledged that measuring outputs can be more difficult than measuring inputs, but this does not obviate the need for both. The construction of values and quantities (or prices) allows for comparisons across activities, including market activities, and across time. Implicit in the construction of quantities is a potential quality adjustment. For example, does it make a difference to have a child taken care of by a parent instead of someone else? Is a home-cooked meal the same as a meal bought out in a restaurant? In addition, construction of inputs and outputs and values and quantities allows for the computation of productivity. In fact it is my interest in the topic of productivity that led to my interest in nonmarket accounts. One has to ask what questions could be answered

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<sup>9</sup> See Margaret Reid (1934).

<sup>10</sup> Although individuals now sometimes use surrogate mothers to bear their children, the third party criterion is used to exclude the bearing of children from a household production account.

without the fundamental elements I have described; I maintain that the most basic and interesting questions require all of these elements.

### **Time Use**

Key to construction of any nonmarket account is information on time use. Recently, the U.S. Bureau of Labor Statistics initiated the American Time Use Survey (ATUS). For the U.S., the ATUS is one of the basic building blocks of nonmarket accounts. Although there are methodological questions connected with the use of this, or indeed any, time use survey, such as how multiple activities are handled and response rates, these will not be dealt with in this paper.

### **Input Values and Quantities**

The most central problem to coming up with values for nonmarket activities is that nonmarket activities do not involve monetary transactions. Take the example of education. An individual enrolled in a private school pays tuition, which is reflected in the market accounts, but there is no direct monetary measure of the value of her time (the input) or the value of what her time produces (the output). Indirect and proxy monetary measures are available, but all alternative measures each have at least some shortcomings.

On the input side for labor inputs there are a couple of commonly used valuation methods, all which use market wage proxies: the generalist approach, the specialist approach, and the opportunity cost approach. The generalist approach uses the wage of someone who could be hired to perform all the activities you perform. The specialist approach uses the wage of different specialists who specialize in performing each of the activities you perform, e.g., a plumber's wage for plumbing, a child care provider's wage for child care, and so on. By definition neither the generalist nor specialist approach could be used for an activity which does not meet the third party criterion. The opportunity cost approach uses the wage you earn (or could earn) if you engage in paid work. All suffer from the shortcoming that in practice average, rather than marginal, wages are employed. Because of declining marginal productivity, or effectiveness in performing a task at some point, an average wage can overstate the value of time.

The CNSTAT panel recommended in some cases a productivity-adjusted replacement wage, in other cases an opportunity cost wage, to value input time.<sup>11</sup> A productivity-adjusted wage is recommended for household production time, time spent by parents educating their children, and volunteer time. A productivity-adjusted replacement wage is a specialist wage adjusted to reflect the fact that an individual may be better or worse at performing the activity than a specialist. An opportunity cost wage is recommended for times spent in education by students and time spent in health maintenance or improvement. Opportunity wages should net out the consumption or enjoyment value of the activity.

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<sup>11</sup> Abraham and Mackie (2005). Recommendations were made for nonmarket accounts for household production, education, health, and nonprofits.

There is a challenge in using either wage approach. For the replacement wage, the challenge is in determining what the productivity adjustment should be. For the opportunity cost wage the challenge is netting out the consumption or enjoyment value of the activity.

Once the nominal dollar value of a labor activity is determined, it is relatively straightforward to estimate the associated quantity using an index number formula. For example, a translog (Thornquist) index can be formed as weighted index of logarithmic growth rates of time spent in that activity. In a translog index, the weights are nominal dollar shares of the value of the sub activity of the activity for which an index is being formed.

Nonlabor inputs to nonmarket activities need to be included in nonmarket accounts. These include capital services (including those arising from consumer durables), energy, materials, and other services. There is a rich literature which describes how to estimate capital services. As noted earlier, ideally nonmarket accounts which include these nonlabor inputs should be constructed in such a way to allow direct comparison with market accounts. In this context this means that any inputs to nonmarket activities which appear in market accounts should be isolated to allow the analyst to subtract these inputs from the market accounts. This avoids double-counting. Owner-occupied housing in dollar terms is the largest value for which this treatment is needed.

Market price proxies can convert nominal output values to quantities and aggregation can be performed with an index number formula.

### **Output Values and Quantities or Prices**

How output values might be determined varies according to which activity is valued. In this paper, the focus will be on three set of accounts described in the CNSTAT panel book: household production, education accounts, and health accounts.<sup>12</sup>

In a household production account, typically market price proxies are available. For example, the price for a commercially laundered pair of pants could be used to value the same service performed in the home. As always, the question is whether the two outputs are identical: is the quality of the service provided by the commercial laundry the same as the quality of the service provided by the home laundry? The Office for National Statistics of the United Kingdom uses a market proxy output approach.<sup>13</sup>

For education, several possible methodologies to value output could be adopted. These include a test score approach, an incremental earnings approach, and a housing approach. In each case, a challenge is to isolate the impact of students (and parent time helping) from the impact of schools.<sup>14 15</sup> With a test score approach, quantity measures are

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<sup>12</sup> Abraham and Mackie (2005).

<sup>13</sup> Holloway, Short, and Tamplin (2002).

<sup>14</sup> Government and nonprofit sectors are included in national accounts, even though these sectors are nonmarket sectors. This paper will in the main ignore these sectors, except to note that the treatment of these sectors in national accounts is not the same as an account for each of these sectors. For example, volunteer time is not valued in the national accounts and government provision of housing is undervalued as the net return to government capital is assumed to be zero.

assumed to grow at the same rate as test scores which measure knowledge level. With an incremental earnings approach either the impact of education on annual, or lifetime, earnings can be used as the basis for the growth rates in the output measure. The Murnane, et al. (1995) study is one of several which have related test scores to earnings. Jorgenson and Fraumeni (1989, 1992) have used the impact of an additional year of education completed on the present value of lifetime earnings. The housing value approach looks at the differences in prices paid for homes to infer the price paid for student achievement. Black (1999) looks at the values of houses that are in different school districts. These houses are otherwise identical with respect to neighborhood and building characteristics.

An individual's health status impacts on their quality of life and on the income that could be earned by them. To measure output via the impact on income earned, a regression approach could be used, see for example Farrell and Fuchs (1982). A second approach is to use quality-adjusted life expectancy measures (QALY) and a dollar value of a life without a health-related quality reduction. Disease state and health impairment approaches have been used in the past to assess health status.<sup>16</sup>

In the CNSTAT panel deliberations, valuation in the health accounts created the most controversy. As a general rule, the panel recommended the use of marginal, rather than

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<sup>15</sup> There are parallels between attempts to come up with independent-of-input output measures for government functions and attempts to come up with the same for nonmarket education and health accounts. In the first case the impact of government has to be removed from the output measure; in the latter case the impact of individual actions has to be removed from the output measure. For a discussion of how to measure the government education function, see Fraumeni, Reinsdorf, Robinson and Williams (2005) and Christian and Fraumeni (2005).

<sup>16</sup> See Chapter 6 of Abraham and Mackie (2005).

total valuation.<sup>17</sup> Marginal valuation is used in market accounts as it is a marginal price that is paid in the market. The panel was concerned that marginal valuations might be inappropriate in measuring output in nonmarket health accounts. For example, in the case of drugs marginal valuation would not necessarily reflect the impact of drugs on an individual's quality-adjusted life expectancy. Accordingly, the panel allowed for the use of total valuation, which includes consumer surplus, in the health accounts.

An index number formula could be used again to estimate quantities. For example, if a translog index is used to estimate the quantity of health output, the growth rates in quality-adjusted lifetimes can be weighted by value of life shares.

### **Input Value Equaling Output Value**

A hallmark of national accounts is that the value of inputs will equal the value of outputs. In nonmarket accounts, there is no guarantee, and frequently no expectation, that this will be true. For example, a mother may bake a birthday cake for her child because she enjoys doing it for her child and because she knows that her effort will be taken as a sign of love by the child. The likelihood that the value of the inputs to the cake, including her labor contribution to the production of the cake as measured by her productivity-adjusted wage, will be just equal to the value of a commercially baked cake of similar quality is quite low.

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<sup>17</sup> Abraham and Mackie (2005), p. 36.

## **Human Capital Accounts**

The formation and maintenance of human capital is the core of nonmarket accounts. With nonmarket time, children are born, raised, and nurtured; and individuals undertake informal and formal education, care for their own family and relatives, as well as others, and maintain and improve their health. Environmental conditions and social capital also play a role. Human capital is an important theme of my research. An observer commented on one of my preliminary and never finished research paper, by saying, “To her, everything is investment (in human capital).”<sup>18</sup> The CNSTAT panel book did not elevate human capital to the same level of prominence. For example, bearing children was not included and the chapter on family’s role in the production of human capital is the shortest in the book. A human capital account would be a significant addition to the menu of nonmarket accounts.

## **Conclusion**

To construct a complete set of nonmarket accounts is a heroic effort even for developed countries, so why does this topic belong in a conference discussing goals for all countries? The value of nonmarket activity is significantly larger than the value of market activity; it is probably best measured in terms of multiples of GDP.<sup>19</sup>

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<sup>18</sup> Fraumeni (1998).

<sup>19</sup> Fraumeni (2000).

Acknowledgement of the importance of these activities is a first step towards the long-term goal of constructing them. Only emphasizing the measurement of national market activity ignores the fundamental contribution of nonmarket activities.

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