



Nancy Folbre is Emeritus Professor of Economics at the University of Massachusetts Amherst and Director of the Program on Gender and Care Work at the Political Economy Research Institute. Her research explores the interface between political economy and feminist theory, with a particular emphasis on the value of unpaid care work.

Introduction

The unpaid time that people devote to the care of family, friends and neighbours clearly contributes to economic living standards, social well-being and the development of human capabilities. The rapid proliferation of nationally representative time-use surveys has revealed the quantitative dimensions of unpaid care and the disproportionate burden it places on women in countries at all levels of development. It is difficult to estimate the market value of non-market work, and it is important to remember that not all of its contributions *can* be measured in market terms. Estimates of its monetary value, however, like efforts to estimate the value of unpriced environmental assets and services, can provide important insights. They can show that market transactions represent only a subset of all the goods and services we rely upon, even when the value of those goods and services is measured in purely monetary terms. In this sense, they can turn the logic of the market against itself, demonstrating its reliance on non-market services.

Towards new accounting frameworks

The imputation of market value to non-market work implies at least some substitutability between unpaid and paid work. This substitutability is demonstrably limited, but nonetheless quite extensive. Indeed, growth in market output partly reflects shifts from unmeasured to measured work, as families move from activities aimed at directly meeting their own needs to greater participation in labour and commodity markets. Women's rapid entrance into paid employment in many countries is one important aspect of this larger trend. Reluctance to explore the dimensions of these shifts in monetary terms distorts our understanding of economic growth, living standards and the development of human capabilities. The analogy with environmental accounting is striking: The depletion of unpriced resources and disruption of valuable ecological services are also omitted from conventional measures of income and consumption, including gross domestic product (GDP).

Widespread dissatisfaction with conventional measures of economic well-being motivated the Human Development Index, and today, other multidimensional measures such as the Genuine Progress Indicator, the Happy Planet Index and Gross National Happiness also receive considerable attention.¹ In this context, it may seem retrograde to devote time and energy to monetary estimates that would lead to revisions of measured GDP. But it is a mistake to view these alternative measures

¹ For more information on the Genuine Progress Indicator, see http://rprogress.org/sustainability_indicators/ genuine_progress_indicator.htm; on the Happy Planet Index, www.happyplanetindex.org/; on Gross National Happiness, www.gnh-movement.org/.

as substitutes to rather than complements to revised GDP, because they have different purposes. Monetary estimates of the value of goods and services produced can never provide a complete picture of human well-being. Nonetheless, such monetary estimates can provide a common denominator for analysis of the relationship between economic inputs and outputs.

Failure to measure the contribution of uncounted inputs exaggerates the overall efficiency as well as the overall output of the market economy. In the long run, valuation efforts could contribute to the construction of social accounting matrices estimating the total value of inputs into developmental outcomes such as health and education, with important policy implications. Figure 1 illustrates how efforts at market valuation can be situated within a larger framework, clarifying the need to provide a variety of accounting measures. Each row in the figure represents a different set of inputs, and each column a different set of outputs. Conventional GDP (with some exceptions that are briefly discussed later) falls into the upper-left cell, defined in terms of purchased inputs and market outputs. The value of non-market labour inputs, the topic of this essay, provides a basis for an estimate of the value of its output, which can be added into—or considered alongside of— conventional GDP.² But valuation efforts need not stop there. Filling in items in column 1 relevant to measures of goods and services produced will also make it easier to move towards columns 2 and 3 with more detailed consideration of the costs of enhancing social well-being and improving human capabilities.

	Outputs		
	Monetary value of goods and services produced	Utility or happiness	Capabilities and other social indicators of intrinsic
Inputs	(1)	(2)	value (3)
Market exchanges of labour and commodities	Current national accounts*	Subjective measures of impact of market income and market work	
Non-market work and intra-family transfers	Valuation of non-market work and intra-family income transfers	Subjective measures of impact of non-market activities and transfers	Human capabilities such as health, education and opportunities for self-
Natural assets and ecological services	Depreciation and replacement cost estimates	Subjective measures of environmental values (based on contingent valuation or revealed preferences)	realization.

Figure 1. Situating valuation exercises in a larger context

* With partial exceptions for imputations for subsistence production, owner-occupied housing, finance and some 'satellite' accounts.

 $^{^2}$ Exploration of intra-family income transfers is beyond the scope of this paper. For further discussion, see Folbre 2015.

Principles of valuation

Ideally, a valuation exercise would separately estimate the market value of both unpriced inputs and outputs. The limited availability of data, however, leads to widespread reliance on input valuation. In order to estimate the value of unpaid services in the home—a labour input into household production—one can ask what it would cost to purchase replacement services on an hourly basis (adjusted as much as possible for quality) in the market, and multiply that wage rate times the number of hours of unpaid work. For instance, if a woman works an average of three hours a day preparing meals for family members, and the cost of hiring someone to prepare meals is \$1 an hour, the value of her time would be \$3 per day. Multiplying by 365 days in the year yields an annual estimate. This is the most common method of valuation, and the basis for the estimates provided here.³

An alternative approach to labour input valuation applies an opportunity cost measure—asking what the person engaging in unpaid work could have earned in the labour market if they had allocated their time to that activity instead. This exercise provides a measure of how individuals aiming to maximize their own utility might allocate their time between different activities, including leisure. While this approach is relevant to assessments of the cost that individuals may pay for specializing in unpaid work, it is not consistent with national accounting principles, which typically ignore the utility or satisfaction a person enjoys in favour of market prices. Further, this approach has the odd effect of valuing the household work with a wage based on a very different type of activity. If a woman could earn \$10 an hour in the labour market, and spends three hours a day preparing meals for family members, it would value her average daily contribution at \$30, though there is little evidence that she is a better cook than a woman who earns a lower wage.

An output-based approach to valuation of meal preparation would ask what it would cost a family to purchase meals of comparable quality in a restaurant. By subtracting the cost of all other inputs, including raw materials and equipment, one can then arrive at a measure of the value of the labour input. For instance, if a family would pay \$6 a day for three meals away from home, and non-labour costs of producing meals at home (ingredients, fuel, use of cook stove, etc.) were \$2, the labour inputs could be valued at the difference between the two, or \$4 a day.

As suggested in figure 1, however, there are unpriced outputs as well as unpriced inputs in household production. It may well be that the preparation of family meals contributes to higher nutritional standards, and also greater family interaction and socialization of children. In this case,

³ For more discussion of this approach, see Abraham and Mackie 2005.

the 'output' is not just the meals themselves. Even if it is difficult to assign a monetary value to that output, it is still useful to have an approximation of the input values, if only because it renders the costs of developing human capabilities more visible.

Empirical challenges

Partly as a result of UN resolutions insisting on improving the visibility of women's unpaid work, many countries have begun administering nationally representative time-use surveys asking individuals to recall their activities on the previous day. In the first decade of the 21st century, more than 87 such surveys were conducted, more than the total in the entire 20th century. The results show that in virtually every country, women undertake a disproportionate share of all non-market work, and also tend to work longer hours overall than men do. These results are surprisingly robust and consistent, revealing systematic variation across households based not just on gender but also on household size and composition, and hours of non-market work. In other words, time devoted to unpaid work is not idiosyncratic, based on the moods and whims of those who provide it. It is carefully structured to meet routine family needs, especially needs for the care of children, the elderly and those suffering from disability or illness.

Time-use surveys provide an indispensable tool for replacement-cost estimates of the market value of unpaid work. Several cautionary notes are in order, however. First, time-use surveys were primarily designed to measure explicit activities such as meal preparation, house-cleaning or feeding a child. They often fail to capture supervisory or on-call responsibilities that constrain time allocation to more productive tasks. For instance, few parents would leave an infant or a small child completely unattended, even if that child were taking a nap. Similarly, providing care for an adult suffering from a serious illness, such as HIV/AIDS, is a constant responsibility that may require only periodic *activities*. Analysis of time-use surveys that explicitly aim to capture such responsibilities, which are not merely 'secondary activities', shows that they are indeed time-consuming. Valuation of time devoted to 'on-call care' even at a very low replacement wage rate has a large impact on valuation of total non-market work (e.g., Suh and Folbre, forthcoming).

Second, few time-use surveys include all adult members of the household. Many, like the American Time Use Survey, survey only one randomly selected adult. While surveys of this type can be used to construct approximate measures of the total value of non-market work, they do not allow for straightforward measurement of the value of unpaid work across different types of households, even though such micro-level valuation could provide important insights into inequality in living standards. For instance, consider two families of six, each with two adults and four children and a market income of \$20,000. In one family, both adults are employed full-time in the market, earning

\$10,000 each. In the second family, one adult is employed full-time, earning \$20,000, while the other works full-time in the home, providing family care. Valuation of non-market work would likely show that the second family has a higher standard of living.

Third, few time-use surveys are combined with surveys of consumer expenditures, household assets or child health, making it difficult to move beyond the labour-input replacement cost valuation approach. Every effort should be made to improve collection of the types of data required to apply more sophisticated valuation methods, which could be accomplished through the development of more systematic and unified household surveys.

A world of approximation

Critics of valuation sometimes argue that the conceptual and empirical problems described above render the exercise largely meaningless, and might contaminate existing national income accounts with imprecise estimates. But current national income accounting procedures already assign a value to non-market work—a value of zero. It's hard to imagine a more misleading estimate. Furthermore, the current system of national accounts includes approximations that are at least, if not more, tenuous than replacement cost valuations based on time-use survey data.

For instance, national statistical offices typically estimate the value of owner-occupied housing by asking what it would cost a family to pay rent for comparable housing, based on data describing local housing markets. If this imputation was not made, an increase in home-ownership would have the effect of lowering market output, because rent is an important component of national income. Is it really more difficult to estimate the value of unpaid services in the home than to estimate the value of housing services? Not when detailed time-use data are available.

Another common objection is that unpaid work often has much greater personal and emotional value than any market replacement. This is absolutely true. But it is also true that people often place a much greater value on their home than what might be suggested by the level of imputed rent. A replacement-cost valuation is not intended or designed to capture such intangibles, which is precisely why other measures, such as those described in figure 1, should be simultaneously pursued.

The current System of National Accounts that guides most national statistical offices stipulates that the value of household services is beyond the 'production boundary'. The value of goods produced for own consumption, however—including grains, vegetables, milk, water and firewood collected for own consumption—lies within that boundary. In principle, the value of what is often termed 'subsistence production' should be included in measures of household and national income. Yet it is by no means clear that all countries do an adequate job of estimating the value of such goods.

Further, virtually all ignore the value of a good with medically proven benefits for infants—breast milk, even though its value can be estimated rather easily from health survey data on the number of nursing mothers in a population. Detailed calculations for Australia, for instance, suggest that it amounts to almost 1 percent of conventionally measured GDP (Smith and Ingham 2005). The policy implications are disturbing: Increased purchases of infant formula increase a nation's GDP even as they displace the nutritionally superior alternative.

Another problematic imputation, mandated by the European Economic Community, requires national statistical offices to estimate the value of illegal transactions involving drugs and prostitution, even though very little reliable data on such transactions is available. Controversies also surround new procedures for valuing the contribution of the financial sector of the economy, which imply that higher loan interest rates are associated with greater services—even though the proliferation of high-risk, high-rate loans contributed to the financial crisis of 2008 (Coyle 2014). Valuation of non-market work is on especially solid methodological ground compared to these recent revisions.

Existing valuations of non-market work

Valuation efforts, often inserted into 'satellite accounts' that revolve around the conventional estimates, have gradually been gaining ground in national income accounting. Notable efforts include Duncan Ironmonger's estimates of gross household output in Australia (1989), estimates of expanded GDP in the United States by Landefeld et al. (2000 and 2009) and Bridgman et al. (2012), and, for Organisation for Economic Co-operation and Development (OECD) countries, Giannelli et al. (2010) and Miranda (2011). Macro-level estimates are now available for at least six Latin American countries, Chile, El Salvador, Guatemala, Mexico, Nicaragua and Uruguay, and two African countries, South Africa and Tunisia (Durán and Milosavljevic 2012, UNECA 2012).

The relative amount of time devoted to unpaid work varies less than might be expected across countries, perhaps because the demands of both subsistence production and wage employment are great in low-income areas of the world. For instance, a study of data from the Harmonized European Time Use Survey in 15 European countries in the first decade of the 21st century included a wide range of levels of development, from the most affluent (Norway and Sweden) to the least affluent (Bulgaria and Estonia). Yet the amount of time that women between ages 25 and 60 devoted to non-market work varied relatively little (Folbre and Yoon 2008). Because the total magnitude of non-market work is typically about the same as that of market work, but valued at a replacement wage that is typically below the median, the market value of non-market work usually represents about a third of GDP as conventionally measured (Miranda 2011).

Variations by level of GDP per capita are smaller than might be expected. In the Latin American countries for which estimates are available for various years in the first decade of the 21st century, the replacement cost valuation for Guatemala is estimated at between 26 percent and 34 percent of official GDP, and at 32 percent in El Salvador. But the percentage in Chile—a country that is relatively prosperous—is 26 percent, higher than in Nicaragua at 23 percent (Durán and Milosavljevic 2012, p. 12).

The OECD published estimates of household production in 27 countries in 2008, using a replacement cost approach (Ahmad and Koh 2011). As figure 2 shows, the value of household production as a share of GDP varies considerably across countries, but is above 35 percent in several countries generally considered affluent—Australia, New Zealand and Japan—and below 20 percent in Mexico and the Republic of Korea, countries with lower GDP. While these findings may reflect differences in survey design, international differences in public policies, especially those relevant to women's participation in paid employment and/or subsistence agricultural production, also exert an influence.



Figure 2. Value of household production relative to conventional GDP in 2008 (replacement cost estimates)

Source: Ahmad and Koh 2011.

Another interesting international comparison converts both GDP and extended GDP (the sum of conventional GDP plus the value of household production) to US dollars per capita, adjusting for differences in purchasing power, and indexing both measures to the United States. As can be seen from table 1, measures of extended GDP per capita relative to the United States are higher for virtually all countries than conventional GDP (Norway is an exception). Yet the effects are small and do little to alter the ranking among countries. In other words, adding an estimate of the value of household production to conventional measures of GDP does not greatly reduce the difference

between less developed and more developed countries. The heterogeneity among countries at similar levels of GDP invites further research.

Table 1. GDP per capita and extended GDP per capita indexed to values for the United States, 2008 (adjusted for purchasing power parity)

	GDP index	Extended GDP index
Australia	0.83	0.88
Austria	0.85	0.88
Belgium	0.79	0.82
Canada	0.83	0.86
China	0.13	0.19
Denmark	0.84	0.87
Estonia	0.46	0.55
Finland	0.81	0.83
France	0.73	0.76
Germany	0.79	0.84
Hungary	0.44	0.53
Ireland	0.91	0.92
Italy	0.71	0.77
Japan	0.72	0.73
Mexico	0.33	0.41
Netherlands	0.91	0.94
New Zealand	0.62	0.69
Norway	1.29	1.22
Poland	0.39	0.48
Portugal	0.53	0.63
Republic of Korea	0.57	0.59
Slovenia	0.62	0.70
Spain	0.71	0.75
Sweden	0.84	0.88
Turkey	0.32	0.41
United Kingdom	0.78	0.82
United States	1.00	1.00

Source: Ahmad and Koh 2011.

Policy implications

Many productive activities that affect family living standards are ignored because they do not take the form of market exchange, creating the impression that the growth of market output reflects the

growth of total output. Recent comments by International Monetary Fund director Christine Lagarde offer a telling example. She recently publicized estimates of GDP foregone by many developing countries as a result of restrictions on women's employment (Talley 2015). These estimates did not include any effort to value the reduction in non-market work that typically result from increased employment. One can agree wholeheartedly with Lagarde's critique of policies that limit women's choices, but disagree with the implication that women make no economic contributions outside the market. Indeed, her rhetorical emphasis on the economic 'irrationality' of restrictions on women's employment deflects attention from the ways in which such restrictions help guarantee an inexpensive albeit exploitative supply of family care.

Studies that assign a market value to specific types of non-market care work are few and far between. They clearly demonstrate, however, that unpaid care provides a substitute for social welfare spending. A recent analysis of time-use data in the Republic of Korea shows that the value of family care provision for children and elderly far exceeds state spending on these age groups (Yoon 2014). Likewise, studies of home-based care for HIV/AIDS in Botswana estimated the value of services per caregiver at about \$5,000 per year, a number that would substantially increase estimates of total spending on health care if it were included (Mmopelwa et al. 2012). These studies illustrate a point Diane Elson has long emphasized: Cuts in public spending often redistribute care costs to those who can least afford to pay (Elson 2012).

The conceptual bias against valuation of family contributions has coloured discussions of many other important public policy issues. For instance, most discussions of growing inequality are framed in terms of market income. Empirical research strongly suggests that valuation of non-market work has an equalizing effect on extended income and consumption (Aslaksen and Koren 1996, Frick et al. 2009, Frazis and Stewart 2011, Folbre et al. 2013). But as women's participation in paid employment has increased in affluent countries, the relative size of this equalizing effect has diminished. Further, both urbanization and the rise of single-member households have probably reduced substitutability between home-produced and market-purchased goods. Those who live in urban areas can't grow their own food; those who must work full-time to support their children cannot stay home to care for those children themselves. As a result, inequality in living standards may have increased even more than suggested by purely market standards.

In developing countries, where women spend a large portion of their time tending to family needs, investments in basic infrastructure such as electricity, gas and plumbing could significantly improve their overall productivity. The payoff to public investments in such infrastructure is understated when the value of non-market work, including family care of young children, is not explicitly factored in (Agénor and Agénor 2014, Fontana and Elson 2014).

In countries with high levels of female employment, a number of work/family policies such as paid family leaves and reduction of penalties for part-time work can help both women and men balance competing demands. The advantages of such policies are typically couched in terms of social rather than economic policy, with brief mention of potential increases in female employment or higher fertility (OECD 2011). Yet the failure to implement institutional changes that make nonmarket and market work more compatible also lowers the efficiency of the economy as a whole, making it difficult for families to allocate their time efficiently.

Accounting for time devoted to family care also bears on many dimensions of economic justice. In the United States, as elsewhere, gender differences in lifetime earnings are closely related to economic penalties associated with motherhood. These penalties vary significantly across countries, largely reflecting differences in public policy (Harkness and Waldfogel 2003, Budig et al. 2012). The high incidence of non-marriage and divorce weakens mothers' claims on the earnings of a partner with higher market earnings. In many countries, increases in women's earnings relative to men have been countervailed by increases in the likelihood that they will receive little support from the father of their children (Folbre 2006). In many countries, retirement security in old age is based primarily on individual earnings and marital status, putting single mothers and those divorced before gaining eligibility for marriage-based benefits at serious risk of poverty in old age.

In conclusion

The growth in GDP that is often held forth as the goal of development partly reflects shifts from unmeasured to measured flows of goods and services. More sustained efforts to estimate the value of non-market work could yield a more accurate picture of changes in consumption and inequality in living standards. As the examples above suggest, concerns that valuation efforts will make poor countries 'seem richer' relative to affluent countries are misplaced.

Precisely because substitutability between market and non-market work is limited, a full accounting also requires attention to its effects on subjective measures of well-being (such as happiness) and more objective outcomes of intangible monetary value (such as human capabilities). Efforts to improve our estimates of the total value of goods and services produced should not displace attention to other measures. On the contrary, it should improve our understanding of all important dimensions of economic success.

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