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Income and Time Poverty: Definitions, Thresholds and Tradeoffs

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Abstract

A full understanding of economic deprivation requires attention to money income, the value of unpaid household services, and leisure. These concepts can be defined either in terms of subjective utility or measurable consumption, and much depends on how they are theorized. Paradigmatic differences lead to divergent methods for imputing the market value of non-market work, with important consequences for definitions of household income and time poverty. Efforts to define thresholds and tradeoffs between time and money in material, rather than utility-based terms, represent an important step forward, but require more careful empirical specification and improved survey design. Most analyses of time and income poverty focus on possible deficits resulting from inadequate time for unpaid household services after specifying a minimum requirement for leisure time. However, replacement cost valuation of unpaid household services can have the opposite effect, lifting some families out of poverty.

1. Introduction

Measures of bidimensional income and time poverty typically reveal compound inequalities based on gender (Vickery 1977; Zacharias 2011; Dorn et al. 2021). Women often face a double burden of paid and unpaid work that improves household living standards but reduces their leisure time. Quantification of this burden, however, is highly sensitive to definitions of work, leisure, and income, all somewhat contested concepts in economic theory. Neoclassical theory generally defines work as an activity that delivers increased income or consumption, but no intrinsic benefits,

contrasted with leisure, a source of direct utility or intrinsic satisfaction. The more pragmatic approach typically applied by many economists and time-use researchers avoids assumptions regarding subjective experience, defining work as any activity that someone else could, in principle, be paid to perform (Folbre 2009, 2021). Leisure is often defined implicitly as activities other than work, but sometimes distinguished from necessary self-care, time for personal maintenance such as sleeping and eating.

Household income (and poverty lines) have been conventionally defined in entirely market-based terms (earnings plus non-labor income plus monetary transfers), ignoring the value of unpaid work. However, this definition has recently been challenged by empirical attention to the implicit income (and consumption) generated by unpaid household services (as well as in-kind public services). Methods of imputing market value vary considerably. Neoclassical models of time allocation based on joint utility maximization generally assume substitutability between purchased and own-produced services in utility space, applying opportunity-cost measures of valuation that do not distinguish between the value of unpaid work and the value of leisure. More pragmatic replacement cost approaches apply a different logic, asking how much it would cost to hire a market substitute of comparable quality for unpaid services provided. Both approaches are typically applied with linear estimates that simply multiply a specific hourly wage rate times hours of non-market work.

By contrast, most measures of income and time poverty rely heavily on thresholds that presume limited substitutability between money and time and impute a monetary value to only a portion of the time that households devote to unpaid work. In this paper we argue that typical assumptions regarding thresholds are problematic. Time devoted to unpaid work increases household

consumption, and some minimum threshold is probably required. However, relatively little empirical research has explored its specification. Also, several influential approaches to time and income poverty argue that households must meet a higher minimum threshold for unpaid work time in order to achieve an acceptable living standard at the monetary poverty line—in effect, the monetary poverty line should be raised for these households, because they require more money to compensate for the lack of adequate time for unpaid work. However, these approaches do not assign any monetary value to unpaid work beyond the second threshold. This asymmetry seems problematic: failure to reach the threshold increases poverty, but ability to exceed the threshold does not mitigate poverty. If such thresholds exist, it is not clear how they should be empirically specified, posing a challenge for efforts to examine the impact of unpaid work on household living standards.

In this paper, we defend efforts to explore the impact of unpaid work on household living standards but argue that more attention needs to be devoted to definitions, thresholds, and tradeoffs. Empirical analysis of the distribution of time devoted to unpaid work and leisure time -and impact of all these on household expenditures—could improve measures of time/income poverty.

2. Public Policy and Economic Theory

A brief consideration of U.S. policy debates regarding eligibility for public assistance motivates the need to reconsider ways of defining poverty. Neoclassical economic theory has little to offer here, because it rules interpersonal comparisons of subjective well-being out of order. Public policies are influenced more by classical economic reasoning based on the costs of subsistence and basic human needs. The difficulty of clearly defining material needs helps explain a relative lack of consensus in the development of poverty measures that take unpaid work and leisure time, as well

as market income and the value of public services, into account (Williams et al. 2016). Yet unpaid work is clearly relevant to standards of need.

2.1. Welfare Reform and Poverty in the U.S.

This relevance was dramatized in 1996, when the U.S. welfare system was revamped to intensify paid work requirements for eligibility for public assistance. At the time, the unemployment rate was relatively low, and new rules nudged many single mothers into paid employment. Assessed in terms of improvements in market income, the program benefited many. A closer look, however, showed that gains in market income were often countervailed by loss of benefits, increased taxes, and work-related costs, such as transportation and childcare. The disposable market income of single parent families in the lowest quintile decreased, with many falling into extreme poverty (Zedlewski 2002).

The U.S. Census Bureau recognized the need to develop a broader measure of poverty, and in 2011, began publishing a Supplemental Poverty Measure (SPM) that is distinct from the official (and still widely applied) poverty thresholds. The SPM broadens the definition of income to include valuation of in-kind benefits (such as food and housing subsidies) and tax benefits (such as the Earned Income Tax Credit). It replaces estimates of need based on the cost of a minimal food basket with empirical estimates of typical expenditures on basic goods. It also nods to the value of unpaid work by recognizing work-related expenses, such as childcare in households in which both parents are employed. On the other hand, it does not assign any direct value to non-market work or consider total hours of work or leisure.

Evidence that some economists are mindful of the impact of unpaid household services and leisure time on living standards is indicated by a comprehensive analysis of changes in the

consumption, income and well-being of single mother headed families in the U.S. since the 1996 reforms (Meyer and Sullivan 2008). Analyzing trends in time-use as well as consumption between 1993 and 2003, they find that increases in market work led to significant reductions in non-market time, reporting that single mothers in the bottom half of the consumption distribution who valued their non-market time at more than \$3 per hour were worse off after the reforms than before (2008:2237).[1] Meyer and Sullivan define non-market time as the sum of unpaid housework and shopping, and place time devoted to childcare, along with leisure and education, in the category of non-work.[2] Their definitions reflect neoclassical emphasis on individual choices to maximize subjective well-being, or utility.

2.2 Utility Maximization

The neoclassical model of household production developed by Reuben Gronau (1973, 1980) and Gary Becker (1993) is theoretically stylized, based on the assumption that individuals allocate their time among these competing uses according to their preferences, relative prices and incomes. Utility maximization is subject only to very general constraints in a one-period model: the total amount of time available cannot exceed 24 hours, and household expenditures cannot exceed household income.

In Gary Becker's *Treatise on the Family* (1993), household production activities are an input into joint subjective utility of the family household. They provide personal benefits that can be assigned an economic value based on their opportunity cost—the market wages foregone by allocating time to other uses. As a result, time devoted to leisure has the same imputed value as time devoted to unpaid work. Since men generally earn higher wages than women do, their non-market work and leisure time are worth more on an hourly basis.

The neoclassical definition of "full income" is generally represented by the sum of utilities provided by all activities, valued at the market wage. Because it is a measure of subjective utility, it is not comparable with market income, and offers no clues for poverty thresholds. The earlier work of Reuben Gronau (1973, 1980) considers the contribution of unpaid work to measures of Gross Domestic Product (GDP) and questions the exclusive use of opportunity cost as a method of imputation. Becker, on the other hand, largely avoids any discussion of household production as a contribution to Gross Domestic Product or to the material living standards of family households.

In textbook microeconomics, work is typically defined as an activity that delivers no intrinsic benefits, motivated only by the desire to obtain the resulting products or services. Leisure is defined as the exact opposite—an activity that delivers intrinsic or process benefits. Since childcare is generally considered a source of intrinsic satisfaction, this distinction provides the rationale for designating childcare as "nonwork." As in Meyer's and Sullivan's (2008) analysis, this matters little if all non-market hours are treated the same, whether they are housework, childcare, education, or leisure and if they are valued by a designated opportunity cost based on an actual or imputed market wage.

2.2. The Cost of Producing Labor Power

The neoclassical emphasis on utility maximization in the household contrasts sharply with classical attention to the actual costs of producing future workers, even if the classical economists largely ignored the contribution of unpaid household services to this process of reproduction (Folbre 2010). Early interest in measuring poverty arose primarily from concern that families might lack sufficient income to successfully raise healthy children, a concern voiced even today (National Academies of Sciences 2019). The negative effects of poverty and inequality on adult mental and

physical health are also tangible (Wilkinson and Picket 2020). These are issues of material well-being, not subjective satisfaction.

The conventional U.S. poverty lines, derived from earlier estimates of the amount of money required to meet basic caloric requirements, reflect this pragmatic concern with the costs of producing, developing, and maintaining human capabilities. This concern is also evident in Margaret Reid's 1934 classic, *The Economics of Household Production*, which defined work as any activity that someone else could, in principle, be paid to perform. This definition leads to a very different counterfactual form of valuation: if someone proves unwilling or unable to perform unpaid work, what would it cost to replace them? This principle differs fundamentally from opportunity cost valuation because it is based not on the costs an unpaid family care provider might forego (their actual or potential market wage) but on what it would cost to maintain the consumption of the care recipient should the family care provider be unable or unwilling to contribute to it (the market wage of someone who could provide services of comparable quality for pay).

Many economists have departed from neoclassical reasoning in endorsing this replacement cost approach to the valuation of unpaid household services (Kendrick 1979; Eisner 1989; National Research Council 2005). Time-use surveys asking respondents to report their level of subjective satisfaction while performing specific activities have validated this departure: respondents often report as much satisfaction from paid work as from childcare (Juster et al. 1981; Robinson and Godbey 1997; Fisher 2010). Nor is enjoyment the main motivation for engaging in childcare; mothers in the U.S. devote far more time to it than fathers, but, perhaps as a result, report enjoying it less (Connelly and Kimmel 2015; see also Musick et al. 2016).

Emphasis on objective living conditions, rather than subjective well-being, does not imply

absence of rational calculation. Rather, it suggests that individual preferences may be heavily influenced by social norms and that factors other than market income or the total number of hours in a day may constrain individual decisions. While everyone is "free to choose" within certain limits, those limits vary considerably by gender as well as across households with different levels of wealth, access to income and education, membership in social networks, and privileges of citizenship. Material needs themselves represent constraints rather than preferences: people require minimal levels of caloric intake and time for sleep for effective daily functioning, and time for family care is a basic requirement of social reproduction. Thresholds may reflect relative, rather than absolute needs. Some scholars argue that participation in market work above and beyond the hours required to surpass poverty-level income should be considered "discretionary" (Goodin et al. 2005). A growing literature on multidimensional poverty speaks to the complexity of basic needs, yet seldom includes attention to the value of unpaid work or minimum standards of leisure (Alkire et al. 2015).

3. Time and Income Poverty

Most approaches to time and income poverty focus on explicitly measurable thresholds, rather than subjective utility (for an exception, see Merz and Rathjen 2014). These thresholds can be defined in absolute terms (as with the standard U.S. poverty line) or in relative terms, as a percentage of a median level (as with the U.S. Supplemental Poverty Measure and many European countries). In either case, definitional issues set the basic parameters, along with assumptions regarding limited substitutability between consumption expenditures and unpaid household services. We focus here on research that explicitly recognizes the contribution of unpaid work to material living standards, rejecting exclusive reliance on market income (Vickery 1977; Douthitt 2000; Zacharias 2011; Zacharias et al. 2012). This research highlights the distinction between

unpaid work and leisure and confronts the difficulty of assigning a market value to unpaid work, while treating leisure as an activity that can only be measured in hours, rather than converted to a dollar value.

3.1. Basic Definitional and Measurement Issues

A simple bivariate approach is visualized in Figure 1. Bidimensional poverty can be defined either by the union of the two areas under the thresholds (M_o and T_0) or by their intersection (Alkire and Foster 2011; Bourguignon and Chakravarty 2003; Atkinson 2003). In either case, the two thresholds imply that a basic minimum threshold of each is required. Minimum amounts of time may be required for self-care, leisure, paid work and unpaid work.
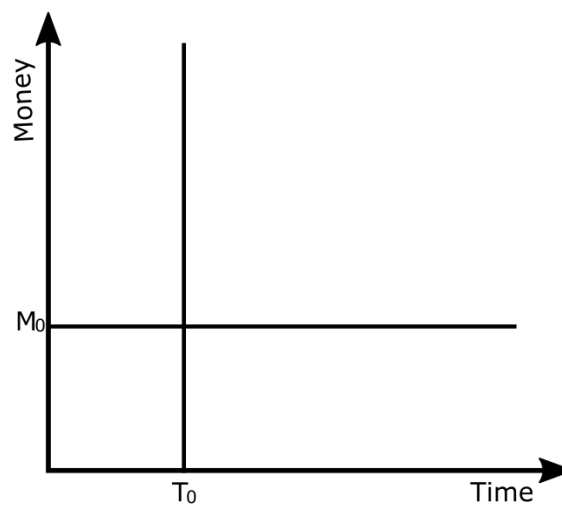

Figure 1: Dual Thresholds: Intersection vs. Union Approach

Definitions of leisure vary. Most broadly, leisure is sometimes defined as all activities outside market and non-market work, such as sleep, personal care, and time devoted to education. Most narrowly, it is sometimes restricted to activities that survey respondents designate as

"enjoyable" or "discretionary" (subjective definitions consistent with neoclassical reasoning) (Williams et al. 2016). Time-use researchers typically rely on a list of specific activities informed by social norms, but categorical distinctions are often fuzzy. For instance, participation in sports can be a form of self-care and/or a form of recreation comparable to playing a video game. There is more consensus around basic thresholds for self-care (such as an average 8 hours of sleep for adults) than for psychological needs for "time-off" (Williams et al. 2016).

Historically, time-use surveys have treated family time devoted to childcare separately from housework, and some economists argue that it is more akin to leisure than to work (Kimmel and Connelly 2007). Furthermore, the need to supervise or be "on call" for young children (as well as for family members experiencing illness or disability) is a significant constraint on time allocation that is not captured by surveys that ask respondents to report time in specific "activities." Even when respondents are asked to report "passive care" their responses fall short of plausible levels of constraint (UN Women 2021). The American Time Use Survey, conducted annually since 2003, asks respondents living in household with a child under the age of 13 to report if such a child was "in your care." Acknowledgement of the value of this supervisory time, which often overlaps with many specific activities, has large implications for the valuation of unpaid family work (Suh and Folbre 2016).

Defining leisure in terms that include time devoted to unpaid household work (or lumping the two together) is particularly problematic because unpaid household services contribute to household consumption and increase extended income (the sum of market income, including transfers and the imputed value of unpaid household services). This implies that there is some substitutability between expenditures based on market income and goods and services provided by

unpaid household services. In other words, money can buy time, and time can save money. This complicates the traditional economic emphasis on a market labor/leisure tradeoff: an additional hour of market labor can generate income that increases leisure by enabling purchase of substitutes for unpaid family services such as meals at home or family care.

Leisure is experienced by individuals, while the value of unpaid household services is often shared with other household members, increasing their potential consumption. Individuals deciding how to allocate their time may well take its opportunity cost into consideration, but this opportunity cost cannot simply be conflated with their actual or potential market wage, because it also includes the opportunity cost of reducing unpaid household services, which — if considered a material contribution to the household rather than simply a source of personal utility — is not equivalent to the market wage. This complexity suggests that leisure (however defined) should be denominated in hours, rather than converted to some money equivalent.

Regardless of the way leisure is defined, recognition of the potential contribution of unpaid household work to living standards alters the appropriate definition of household income, raising questions regarding the imputation of its market value. A simple approach applying replacement cost logic applies time-use survey data, multiplying hours of unpaid household work by a quality-adjusted replacement wage. This is somewhat problematic on the household level, since most time-use surveys collect data for only one or two days, and little is known about whether such snapshots are representative of annual time-use. Considerable evidence suggests that standard time-diary measures understate the constraints of supervisory childcare (Folbre 2021; UN Women 2021). Nonetheless, even a crude approximation of the contribution that unpaid household work makes to household living standards is better than the assumption that such work contributes nothing.

Another measurement issue concerns the assumption of linear valuation—that every hour devoted to unpaid household work is of equal value. It seems likely that households prioritize their most important tasks, and that time devoted to unpaid household services is subject to diminishing marginal productivity. The simple counterfactual question on which replacement cost valuation is based, "Could someone else be paid, in principle, to undertake this task?" does not imply that household members would *actually pay* for it, especially if they lack the resources to do so. In particular, households facing subsistence constraints may engage in any productive activity they can find, even if its marginal productivity is close to zero and far below the wage they could potentially earn if employment were available.

Complex issues of joint production come into play. For instance, a household member may stay home to provide personal care (including being "on call") for a young child or an adult suffering illness or disability because a market substitute lacks the necessary emotional connections and person-specific skills. A replacement cost valuation undershoots the value of this contribution. Once constrained in this way, a caregiver may make many small contributions to household living standards (e.g. putting clothes in the washing machine, or food to cook on the stove) that are more likely to be captured by conventional time-use surveys focused on specific activities.

Conversion of household income to individual consumption poses additional complications. Economies of scale within households and the relative needs of adults and children may differ between expenditures of money and unpaid work time (Folbre et al. 2017). Household consumption is not necessarily distributed equally. Individuals living in households above an income poverty threshold may receive such a small share that they experience individual income poverty (Klasen and Lahoti, 2021). Because women generally have less control over money income than men, they

are particularly vulnerable in this respect. All these issues are further illustrated by consideration of important efforts to define bivariate income and time poverty.

3.2. Approaches to Bivariate Income and Time Poverty

Efforts to operationalize this concept fall into two categories: 1) reliance on market income, ignoring the productive contribution of unpaid work, treating time devoted to unpaid household work only as a reduction in time available for leisure or 2) attention to a minimum threshold of unpaid work necessary to escape poverty at the monetary income line, assuming that a necessary personal care/leisure level has been met.[3] Both approaches typically cite an early paper on time poverty by Claire Vickery (1977), a critique of the failure of U.S. money income poverty thresholds to acknowledge time constraints.

Examples of the first approach include an analysis of Ghanaian data that defines leisure as all time remaining after time devoted to market work and unpaid household work (Bardasi and Wodon 2010). The authors define access to market-based consumption (closely related to income) on the household level, and total hours of work on the individual level. By this account, an individual is time-poor if they work more than 1.5 times more than the weekly median time for paid and unpaid work (which they estimate at 70.5 hours per week) and they are consumption-poor if they live in a household with consumption expenditures below the country's consumption-based poverty line. This approach essentially ignores the extent to which unpaid household services invisibly augment household consumption above and beyond monetary expenditures. Another example is an analysis of Mexican data by Dorn et al. (2021), which examines the codependence of money income and leisure time using copula regression.

Vickery emphasizes the minimum amount of time necessary for the unpaid household

services needed to convert purchased commodities (e.g., food) into consumable items (e.g., a meal), after basic needs for leisure and personal care are met. In other words, she adheres to the monetary income-based poverty line but treats an unpaid labor time threshold as a constraint that must be satisfied to lift households above this poverty line. She observes that U.S. poverty thresholds were derived from calculations based on the amount of money income necessary to provide a minimum food standard set by the U.S. Department of Agriculture (the "Thrifty Food Plan"), which assumes purchases of items such as dried beans, rice, and other food items that require up to two hours a day of preparation, far more time than most American women (much less men) spend on average (Carlson 2021).

This minimum nutritional standard is multiplied by 3 on the (now quite outdated) presumption that food expenditures represent about 1/3 of family budgets. While Vickery's analysis predates the paid work requirements imposed in 1994 (see earlier discussion), these requirements increased the risk that a single-parent household would lack sufficient time for the unpaid work necessary to make ends meet at the money income poverty line. Indeed, single parents trying to compensate by earning additional market income could lose eligibility for public assistance (Albelda 2011).

Vickery illustrates her critique with time budget data collected by Kathryn Walker in 1967 in a small (and nationally unrepresentative) sample of 1400 households, estimating the average amount of time devoted to personal care, leisure, and unpaid household services in households of differing compositions of adults and children. She also assumes that those employed spend 49 hours per week in combined employment and employment-related travel (Vickery 1977: Appendix A). She specifies a basic threshold for the individual time necessary for sleep, rest, eating, personal care,

and leisure at 81 hours per week (1977:32). Remaining time determines the hours available for total (paid and unpaid) work, from which hours of paid work are subtracted to arrive at time available for unpaid household services. Total household time available for paid work and unpaid household services is represented by point T_m in Figure 2.

Figure 2 conveys Vickery's argument that every household requires a minimal quantity of time devoted to unpaid household services (T_1) to escape deprivation at the market income poverty line (M_0). Likewise, every household requires a minimum level of market income (M_0), no matter how much time they devote to unpaid household services. Households with unpaid work time below T_0 are time-poor, those with money income below M_0 are money poor, and all those below the line DBAC are experiencing one, the other, or both. She argues that many single-mother households with money income above the poverty line but available time to the left of T_1 should be counted as poor but are not.

To the left of point T_0, the true income poverty threshold should be the horizontal portion of the line M_1. This extra money income can compensate for the shortfall in unpaid work time. As time devoted to unpaid services increases from T_0, to T_1, the amount of money income required to compensate for the shortfall declines; in this range unpaid household services provide substitutes for purchased services at initially steep rate that declines, due to the diminishing marginal productivity of unpaid work (the line between B and A is convex to the origin). This graphical analysis represents no substitutability of income for own-produced services up to T_0 (because a certain threshold of unpaid time must be reached) declining substitutability up to T_1, and no substitutability past point T_1 (because a certain threshold of money income, M_0, must be maintained
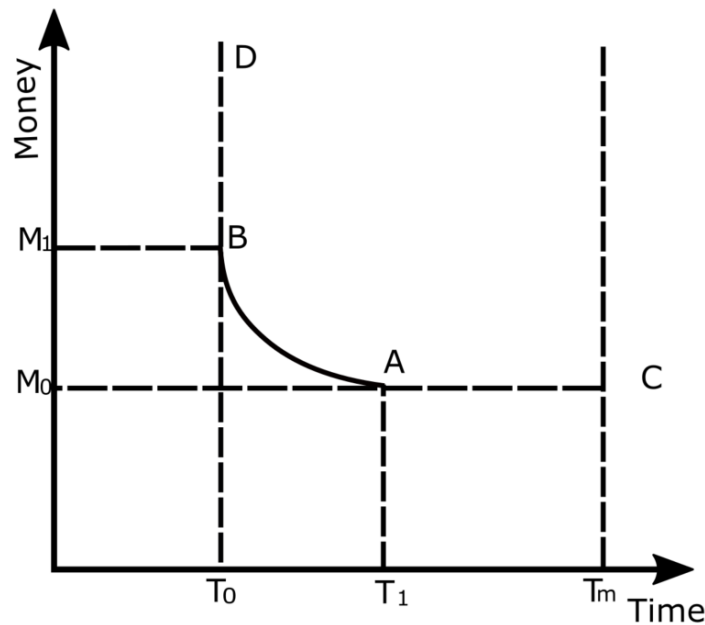
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Figure 2. Poverty Thresholds Hypothesized by Vickery (1977)

Vickery emphasizes that single parent households have less total adult available time than two-adult households and are therefore particularly likely to fall below T_1, experiencing significant deprivation even if their market income exceeds the conventional poverty line. She defines a "critical wage" as one that allows adults to earn sufficient money to reach at least the official poverty line while having sufficient time to devote to meeting their personal needs and the household's unpaid work requirement (Vickery 1977:36). Her formulation anticipates research on minimum family budgets and "living wages," which have gradually come to include childcare costs as a necessary expense for families with young children (Fisher 2020). These approaches have essentially dropped the issue of adequate unpaid work time in favor of a higher monetary income or wage standard.

Vickery's basic theoretical approach remains appealing because it emphasizes the contribution that unpaid household services make to living standards, and calls attention to

differences among households in the availability of time for such services. However, it suffers from several conceptual limitations. It does not explore gender differences in time devoted to unpaid household services, assuming that men are just as "available" as women are for this task, which is not necessarily the case. Men are consumers as well as producers of unpaid household services, and it is their net (not their total) contribution that is relevant to household time budgets (Douthitt 2000). Vickery also takes leisure as a given, ignoring issues of gender inequality in this dimension of time allocation.

Another important conceptual issue concerns the threshold, T_1, beyond which unpaid household services no longer provide a boost to household living standards. This threshold implies an inconsistent asymmetry: If the household income poverty line should be moved up for households with less than a minimum threshold of unpaid work time, should it not be moved down for households with considerably more than the threshold necessary to escape poverty? If the value of unpaid household services has implications for poverty thresholds, surely it is also relevant to the larger issue of inequality in family living standards.

Vickery's specifications of empirical parameters are also weak. Her estimates of necessary hours of unpaid work are largely based on averages for single-earner households with non-employed homemakers. Yet most income poverty measures are based on some percentage (such as 50% or 60%) of an average or median value, on the presumption that there is a significant difference between "necessary" and "average." Indeed, in her updated application of Vickery's approach using data from the national 1985 time-use survey conducted by John Robinson, Robin Douthitt finds that a relatively small proportion of married or single-parent women successfully meet Vickery's specified standard for minimum time devoted to unpaid work (Douthitt 2000:12).

Overall, empirical tests of Vickery's reasoning yield mixed results. An analysis based on Canadian data supports Vickery's claim that single mothers are especially likely to live in poverty as a result of insufficient time for unpaid household work (Harvey and Mukhopadhyway 2007), while a more recent analysis for the U.S. (Kalenkoski et al. 2011) rejects the argument that single mothers devote less time to unpaid work or have less leisure than married mothers (perhaps as a result of increases in married women's labor force participation or because husbands demand more unpaid work than they supply).

Zacharias (2011) and Antonopoulos et al. (2017) apply a variant of Vickery's approach to a variety of low-income countries, with results that are not directly comparable to hers for the U.S. Their Levy Institute Measure of Time and Income Poverty (LIMTIP) calculates household income poverty lines by monetizing the total household time deficit, multiplying it by a replacement cost, such as the average hourly wage of domestic workers. Their addition of individual time deficits based on failure to achieve minimum time for personal care and leisure captures an important dimension of gender inequality within households.

In this approach, the minimum levels of time required for unpaid household services (on the household level) and personal care and leisure (on individual levels) are described as social norms but are typically operationalized by taking average values from time-use surveys. Presented in graphical form, the LIMTIP approach differs from Vickery's analysis primarily in that it allows for more substitutability in the range in which unpaid work is below the required amount (see Figure 3). We depict the tradeoff here as linear because this approach does not address the possible declining marginal productivity of unpaid work in this range. The black line defines the poverty threshold line. T_0 defines the threshold of non-substitutable unpaid household services. The

area between T_0 and T_1 describes the household time deficit for unpaid services, which is reduced by a replacement cost estimate only up to point T_1 (often operationalized as the cost of a domestic servant). As in Vickery's analysis, any level of unpaid household services over the level is essentially not substitutable for market income: Some households are unable to compensate for a loss of unpaid household work below the basic requirement, but no households are able to benefit from unpaid household work above the basic requirement indicated by the red line. The red line is an illustration of our critique. It represents the area up to which extra time for unpaid work can substitute monetary income and thus benefit living standards. M_0 indicates the minimum of non-substitutable monetary income and T_2 the amount of time up to which unpaid work and income are substitutable.

In Figure 3, money represents extended income—the sum of household market income and the replacement cost of household services. Time refers to individual time for unpaid work.
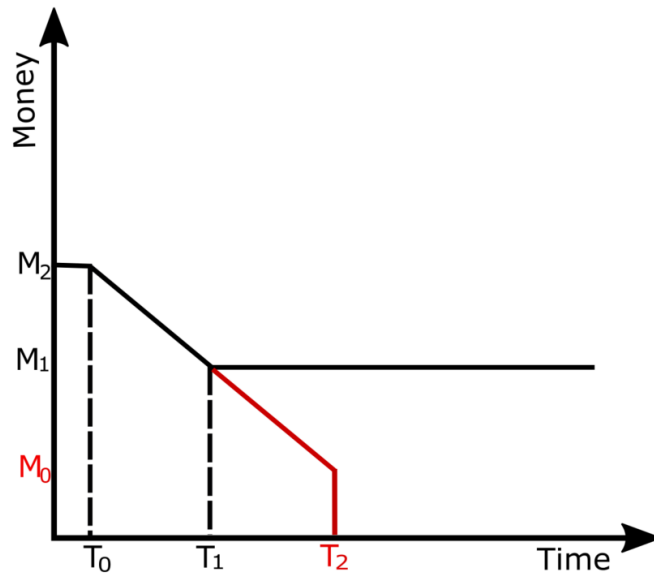

Figure 3: Poverty Thresholds Hypothesized in LIMTIP Approach

To illustrate the issue of extended income and the possible benefits of unpaid work for living standards let us represent three examples: 1) one family that is above the income poverty level but lacks time for their necessary unpaid work responsibilities, 2) one family that is below the income poverty threshold but has extra time for unpaid work beyond the necessary level and 3) one family with unemployed adults that engages only in unpaid work. Family 1 exceeds the possible maximum of time for paid work and thus has a deficit in time for unpaid work – they are to the left of T_1 in Figure 3. . This family has to substitute their lack of time for unpaid work with paid market substitutes. Therefore, their need for monetary income rises above M_1, as in Figure 3. Family 2 works less paid hours and has thus more time available for unpaid work, and lies to the right of T_1. This family should be able to substitute unpaid services for market purchases, but it is still considered poor because its money income is below M_1. Yet it is above the level of M_o—the threshold of money income that is unsubstitutable. This is the asymmetry we reject—in principle, a lower monetary poverty line should apply in these circumstances.

At the other extreme, ignoring threshold effects and counting the entire imputed value of unpaid work as extended income can be misleading. If family money income is below M_1 but above M_0, family members may experience declining marginal productivity (consistent with the convex tradeoff between B and A pictured by Vickery in Figure 2). Indeed, they may continue to engage in unpaid work as long as its marginal productivity is above zero, far past the point at which they would pay for any replacement. If unpaid work tasks are not very productive, valuing them at the replacement cost exaggerates their contribution. For example, the adults in family 3 volunteer full-time for a community garden in return for a share of the food produced. They continue working as

long as they believe it will generate any additional food for them to eat. Valuing this work at replacement cost would greatly exaggerate the contribution to their living standards.

In sum, the basic approach pioneered by Vickery has stimulated valuable research on a definition of poverty thresholds that takes the value of unpaid household services into account. It differs substantially from a more general replacement cost approach in which the imputed value of unpaid work is added to market income and defined as extended income (distinct from the neoclassical concept of full income, which includes the value of leisure (Suh and Folbre 2012). In principle, a poverty line could be set in terms of a minimum level of extended income, assuming continuous and linear substitutability between money income and the imputed value of time devoted to unpaid work. However, this definition ignores the emphasis on thresholds and limited tradeoffs central to Vickery's approach.

Furthermore, an extended-income definition of household-level poverty requires supplementation by measurement of individual access to personal care and leisure. Imagine that 20% of the population lives in households with inadequate material resources, and 20% suffer from inadequate levels of personal care/leisure time. Are they the same individuals, suffering compound inadequacies, or are they entirely different groups, experiencing different kinds of deprivation? One analysis of U.S. data suggests that individuals living in lower-income households enjoy more leisure than more highly educated and affluent individuals, though here again, much depends on how leisure is defined (Aguiar and Hurst 2007).

More importantly, the thresholds on which Vickery-style estimates are based lack strong empirical grounding. They often represent a kind of "back of the envelope" standard based on population means rather than systematic inquiry into thresholds of necessity. As Harvey and

Mukhopadhyway put it, "it is important to establish better estimates for the relevant time allocation norms required" and "attention needs to be given to understanding the time-purchase curve" (Harvey and Mukhopadhyway 2007:75). The theoretical issues at stake suggest a specific research and data-collection agenda with important policy implications.

4. Research and Policy Implications

Many of the empirical difficulties of defining time and income poverty grow out of a history of segregation between time-use surveys and economic surveys designed to collect information on household capital, consumer durables, and expenditures. This segregation partly reflects neoclassical emphasis on the generation of utility rather than material consumption. An opportunity cost-based measure of the value of unpaid household services implies that it can be equated with the market value of completely different work under completely different conditions. If all non-market time, including leisure, is valued at opportunity cost, there is no need to distinguish between household leisure and household work.

This does not imply that opportunity cost is irrelevant. Any individual making time allocation decisions should consider counterfactual alternatives. These alternatives, however, will be based on personal preferences as well as productivity. For instance, a lawyer who enjoys taking a break from her desk may choose to paint her living room, even at the cost of reducing billable hours of legal services. She might willingly sacrifice the difference between what she could earn and what a professional painter would charge. However, if this lawyer has a roommate who is willing to share the total costs of painting the living room, that roommate is not likely to agree to a price based on the lawyer's opportunity cost. Assuming the lawyer is a relatively good painter, a replacement cost estimate—what a professional painter would charge—is a better counterfactual,

not only for the roommate, but also for society as a whole. It is a measure of social value rather than some combination of social value and individual utility or consumer surplus (National Research Council 2005).

While replacement cost comes closer to capturing the specificity of household tasks, it fails to capture actual contributions to household consumption. Unpaid household services often entail joint production, such as supervising children while preparing meals, and, more importantly, engaging in social interaction and partnership with others. The substitutability of personal services is limited. For instance, even families that rely heavily on purchased childcare services seldom utilize them more than 40 hours per week. Why raise children if you are not going to spend a significant amount of time caring for them? Even families who purchase care services for an elderly, sick, or disabled family member typically devote time to organizing, managing, and supplementing such care. Family/friend/neighbor care often requires temporal flexibility (including being "on call") rather than some set number of hours per day.

Household production is largely limited to a relatively small set of services, because households lack the capital and skills to produce many goods for their own consumption. Many of the items that households purchase are non-substitutable. Very few households can produce their own food, build, heat or repair their own homes, or rely on self-produced transportation and communication devices. The two biggest opportunities for substitution are production of own meals rather than eating out (though own meals increasingly consist of pre-prepared components) and care of dependent family members. As a result, involuntary employment, such as that induced by the Great Recession, leads to relatively small increases in unpaid household work, especially among men (Aguiar and Hurst 2013; Berik and Kongar 2013). Family households that are income and

employment-constrained may engage in very low-productivity activities (as in raising subsistence crops in agricultural settings) simply because they have no other options. Alternatively, they may engage in leisure because they lack access to sufficient opportunities for productive non-market work.

Vickery's approach is based on a summation of the available time of all household members, but the actual consumption of household services is a non-linear function of the number of adults. Many unpaid household services are characterized by significant economies of scale, especially for meal preparation and childcare (Folbre et al. 2017). Research shows that the marginal time cost of a second child is lower than that of a first, a finding validated by reports from the online platform care.com comparing the cost of out-of-home childcare with the cost of an in-home nanny; the first option is extremely cost-effective with one child, but just barely with two children.[4] Zacharias et al. (2012) address this issue to some extent by calculating multiple thresholds based on household structure.

The household economies of scale built into conventional equivalence scales are based on estimates of household expenditures, and probably differ significantly from those based on time devoted to unpaid work (Folbre et al. 2017). Further, most economists would agree that unpaid services are characterized by diminishing marginal productivity at some point. The most pressing household tasks generally take priority, and, holding other factors such as household size constant, some tasks become unnecessary as well as tiresome. Social norms of household hygiene and tidiness are susceptible to change.

These are all reasons why more empirical analysis of unpaid household services could strengthen efforts to operationalize time and income poverty. Four particularly important directions

for research include 1) disaggregation of unpaid work into subcategories such as childcare, cooking, shopping, housework, and household management 2) looking beyond specific activities to responsibilities for supervision of dependent household members that constrain time allocation 3) greater attention to patterns of variation-- all else equal, a relatively low standard deviations in time devoted to specific activities suggests less discretion and more constraint. 4) estimates of the elasticity of specific uses of time with respect to individual wages and family income, indicators of both discretion and substitutability.

Issues of survey design and administration also invite attention. The addition of a module to the American Time Use Survey asking for reports of subjective well-being during specific activities offers new ways of thinking about individual motivation. In 2017, the Panel Survey of Income Dynamics (PSID) added a question regarding time devoted to childcare to a questionnaire that already included basic information on household expenditures as well as time devoted to household tasks. The PSID now represents one of the few data sets available that includes information on both household expenditures and time-use. A preliminary analysis of this data shows that overall time devoted to unpaid work varies little with household income, but purchases of childcare services are associated with declines in unpaid time devoted to childcare (Gautham and Folbre, 2022). The Bureau of Labor Statistics has recently commissioned an effort to statistically match data from the American Time Use Survey with data from the Consumer Expenditures Survey, which should be complete by the end of 2022.This synthetic data set promises greater insights into the substitutability of market income and unpaid household services.

New statistical methodologies also represent an important avenue for improvement. The copula, a joint cumulative distribution function, can effectively measure dependence between

different dimensions of both material and subjective well-being (Decancq, 2014). Its usefulness for examining the relationship between market income and leisure time has been demonstrated with Mexican data (Dorn et al. 2021). Qualitative research could also enrich consideration of income and time poverty. Discussions of income thresholds sometimes invoke responses to subjective questions such as "How much income do you think a family of four needs to reach the poverty line?" Focus group discussion of the tradeoffs between market income and other dimensions of well-being could be similarly relevant. Recent policy debates in the U.S. suggest that tensions between paid employment and time to care for and spend time with family and friends are more salient than concerns about housework.

All these directions for research are relevant to efforts to set minimum wages, develop improved work/family policies, better understand inequality in living standards, and analyze the impact of more flexible working arrangements that emerged during the first two years of the Covid-19 pandemic. The quantity of hours devoted to different activities may matter less than the temporal resilience that could be enhanced by improved coordination of public services and sharing of household responsibilities. Future research on the relationship between time use and family living standards could help improve both material and subjective well-being.

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Notes

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[1] By way of comparison, the federal minimum wage in 2003 was $5.15. Information accessed February 17, 2022 at https://www.bls.gov/cps/minwage2003.htm

[2] For a detailed discussion of the tendency among economists and some time use researchers to exclude childcare from non-market work, see Folbre 2022.

[3] Note that the "discretionary time" approach of Goodin et al. (2005) falls into an entirely separate category that is beyond the scope of this paper.

[4] See "This is how much child care costs in 2021" at care.com, accessed March 21, 2022 at https://www.care.com/c/how-much-does-child-care-cost/#:~:text=Overall%2C%20the%20average%20child%20care,up%20from%20%24177%2Fweek