

ECONOMICS

The Use of Time in Peru: A Scarce and Unvalued Resource in the National Economy

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Conventional measures of economic well-being, such as gross domestic product (GDP) and poverty, do not consider the goods produced within the household or the unpaid work done at home. This study analyzes the quantification of the value added generated within a Peruvian household based on the recalculation of the average wage of domestic workers. It proposes measure that complements monetary poverty by considering the time requirements for household production: the poverty of time. The calculation of this time shows that 43.7 percent of the population in 2010 was poor, that is, 12.62 percentage points above the official poverty rate. Thus, the vulnerability of 12.62 percent of the population is hidden when the conventional measure of poverty is used, which does not consider the time poverty of the people.

Las medidas convencionales de bienestar económico, como el Producto Bruto Interno (PBI) y la pobreza, no consideran la producción de bienes dentro del hogar o el trabajo doméstico no remunerado. En este estudio cuantificamos el valor agregado generado dentro de un hogar peruano usando como base el salario promedio de trabajadores del hogar. Asimismo, proponemos una medida complementaria a la pobreza monetaria: la pobreza de tiempo. Esta última toma en consideración los requerimientos de tiempo para el trabajo reproductivo dentro del hogar. Los cálculos para la pobreza de tiempo muestran que el 43.7 por ciento de la población peruana era pobre en el 2010. Esta cifra está 12.62 puntos porcentuales por encima de la tasa oficial de pobreza, lo que nos lleva a concluir que la vulnerabilidad de un 12.62 por ciento de la población se encuentra oculta cuando consideramos únicamente la medición monetaria de la pobreza.

Conventional measures of gross domestic product (GDP), from the perspective of either costs or income, do not consider goods produced within houses or unpaid domestic work at home. These activities play an important role in the economy as they provide household consumption and contribute to the development of human capital and the welfare of the household members. For instance, children can assimilate the education they receive and take advantage of it because of the appropriate nutrition and care that they get.

Because there are different activities people usually perform at home (cooking, cleaning, babysitting, and elder care), not including them in the traditional GDP calculation may underestimate the production of a country and its economic evolution.¹ That means, for instance, that a person who cares for elderly people outside their household contributes to GDP, but they do not if they perform the same service for a household member. Therefore, this prevents suitable designs for necessary policy interventions to enhance economic and social development.

Another indicator that can also be underestimated by not recognizing household activities is poverty. The estimation of the poverty line that uses the cost of basic needs considers households to be poor whose income level is below that line. The method of unsatisfied basic needs consists of the measurements of living conditions that uses some indicators such as the quality of housing, access to education and health, crowding,

¹ When discussing GDP and well-being, it is important to make clear that GDP construction was not meant to measure well-being in a broad sense. In this regard, many nuances of welfare, such as labor conditions or access to health and education, may be excluded from discussion.

and others at a minimum level. This method considers that a household is poor if its indicators fall below the minimum level (Damián 2003; OECD 1992). Many authors have studied the relation between the time allocations for paid and unpaid activities and the measurement of poverty under both approaches. However, there is suggestive evidence that none of them describes a household's standard of living accurately; instead, they undervalue it because they omit the possibility of replacing time spent at home with time working in the labor market.

This difference represents an important limitation in the measurements of the GDP because it implicitly supposes that all households and people have sufficient time to attend to the daily needs of domestic production. In other words, GDP does not measure the level and quality of life of an individual, because it does not consider the time needed for household activities, paid work, human capital development, recreation, and more (Damián 2003). The importance of time allocation derives from the fact that the welfare of an individual not only depends on their income or consumption level but also on their freedom to be able to enjoy their consumption.

Furthermore, not all household members are affected in a similar way by the invisibility of domestic work and time restrictions. In Peru, the results of the National Time Use Survey (Encuesta Nacional de Uso del Tiempo, ENUT) show that women spend more time—70 percent of the total hours declared—on household activities. This proportion increases to 80 percent for the women who cook and care for disabled family members and, in general, for those tasks that have more intensive hours of reproductive work, defined as work at home that strengthens or allows other productive work (in the labor market) or increases well-being in general. Consequently, women are confronted with a greater time deficit, which leads to the sacrifice of activities linked to their own care, such as leisure and professional development.

As a result, reproductive activities provide important information for both the value of national production and the estimation of the main social indicators. By excluding both calculations, the contribution of reproductive activities, especially of women, to household economies is underestimated, and these measures do not consider the real dimension and magnitude of poverty. Beltrán and Lavado (2013, 2014) estimate the value associated with the time spent on household activities in Peru with different approaches: the opportunity cost and the cost of replacement. The results show that the GDP of households (GDPH) in 2010 local currency represents between 24 percent and 31 percent of GDP, depending on the method of calculation used.

In this article, we develop the recovery of unpaid domestic work as a complementary alternative to the official measure of poverty. Our alternative considers the time needed for the production of daily activities at home, analyzes both methods to assess households' welfare, and exposes the main vulnerabilities. The results can differ according to the social and demographic characteristics of each household and its members, because not all of them face the same deficits of time or use the same number of hours on unpaid activities. Therefore, the economic recovery depends on location and gender or whether members are more than sixty-five years old or are physically disabled. We clarify the vulnerable situations that households face that constrain their time for domestic production.

This background sets up the idea of time poverty: a measurement complementary to monetary poverty that considers the time a household needs for production. The study contributes a comparison of Peruvian findings with those estimated for Mexico, Chile, and Argentina, which are representative benchmarks of the region. Furthermore, this study aims at identifying vulnerable populations in terms of time poverty. Making these groups more visible allows for public and private interventions to adequately focus their efforts on reducing poverty levels and increasing the well-being of families.

A Conceptual Framework: Time Poverty

One of the most common methods for measuring poverty is to compare household consumption or expenses with the minimum amount of money necessary for purchasing a basic basket of goods and services that fully satisfies the nutritional requirements and other basic needs of household members (INEI 2014). Under this approach, an individual is income poor if their household income or expenses per capita are lower than the minimum necessary for surviving, which is called the poverty line. The estimations make two essential assumptions in relation to the time that families spend day-to-day. The first is that in achieving any given standard of living, households dedicate a certain minimum necessary amount of time on the production of goods and services at home. The second is that all households have this required time available (Zacharias, Antonopoulos, and Masterson 2012).

The implications of these assumptions can be distinguished when comparing two households whose income is not enough to purchase the fixed basket of consumption goods available in the market. Under

this conventional approach, these households are considered to be poor. However, one of them could have additional time that may be used as a replacement for domestic work in the labor market to earn money and rise above poverty status. Although both households are considered income poor, the one that can replace the goods from the market with goods from domestic production is less vulnerable than the one where its members do not have enough time to make this trade.

Therefore, the conventional measurements of poverty may not accurately describe the household's living standards when they omit these vulnerabilities and the hours needed for household activities (Damián 2003). These measurements underestimate household poverty levels and hide time allocation differences: we may think that either women or adults are those that face a greater time deficit to satisfy a minimum standard of living.

In this section, we introduce the concept of time poverty, which identifies those that cannot fulfill the sum of the minimum required time that the individual has to spend on activities such as personal care, domestic production, work, and leisure activities within the total hours in a week. Through this alternative conceptual framework, this study uses the definition of poverty from the Levy Institute Measure of Time and Income Poverty (from now on, LIMTIP) that recognizes a household as income poor if its income is less than its new threshold adjusted by the requirements of time. Moreover, it differentiates income-poor individuals from those who are time poor.

Following, Zacharías, Antonopoulos, and Masterson (2012), we address the time deficit of an individual i in a household j that is denoted as X_{ij} . As shown in equation (1), we define X_{ij} as the total hours in a week (168) minus the minimum required time for personal care and nonsubstitutable household activities (M) (the minimum amount of time that the household members need to spend on managing the household), the time dedicated to substitutable household production (R_j),² and the time spent on income-generating activities (L_{ij}). A negative value of X_{ij} indicates a time deficit while a positive value indicates a time surplus.

$$X_{ij} = 168 - M - a_{ij}R_j - L_{ij} \quad (1)$$

The idea behind the requirements of minimum time, M , is to establish the threshold of necessary time that a person has to surpass to satisfy their needs. This is analogous to the mechanism of the basic basket of consumption goods required for the assessment of poverty.

Because there are disparities in the division of tasks within the home (e.g., women may perform more reproductive activities than men), the parameter a_{ij} is meant to capture them. Specifically, it is the share of time an individual i uses out of the total time their household needs to spend on domestic production to survive at the poverty line.

To find the time deficit for each household, the next step is to add the time deficits of the individuals that have showed a deficit.

$$X_j = \sum_{i=1}^n \min(0, X_{ij}) \quad (2)$$

Equation (2) points out that the deficit of an individual in the household cannot be compensated for by the time surplus of another member of the same household. For instance, in a family where the mother has a time deficit because she has a full-time job in the labor market and also performs the major part of housework, and the father has a time surplus because he participates very little in household activities, the addition of the deficit and the surplus is equivalent to thinking that the father changes his behavior and collaborates with the tasks at home to relieve the time deficit of his wife. This assumption is not included in this assessment.

Finally, if $X_j < 0$, households do not have enough time to perform daily activities and production because of working hours that exceed the time needed. In addition, to consider the time deficit of households in the measurement of poverty, the adjustment of the threshold of household income level by this time deficit is necessary:

$$Y_j^o = \bar{y} - \min(0, X_j) \rho \quad (3)$$

² R_j is defined on the basis of subsistence needs consistent with the poverty level of household j . This time average includes the travel time used by an individual every time they perform an activity.

where Y_j^o denotes the new threshold adjusted by the deficit of time, \bar{Y} becomes the standard threshold, and p is the unit replacement cost of household production. Although there are many approaches for estimating this last parameter, the study uses a conservative estimate that is calculated as the average hourly wage of a domestic worker,³ as in Zacharias, Antonopoulos, and Masterson (2012) for Argentina, Chile, and Mexico. As described in Beltrán and Lavado (2014), we refer to this method as the generalized replacement cost in which p is equal to 3.28 Peruvian currency PEN (1.15 USD) in 2010. We employ data from the National Household Survey of 2010 to estimate this parameter, exploiting the fact that we can identify the domestic employees in the survey and their income and hours worked. Considering equation (4), it follows that if a household does not have a time deficit, its standard and adjusted thresholds are equal.

In favor of this background and among the possible values that solve equation (4), the Levy Institute recognizes as income poor every individual that belongs to an income-poor LIMTIP household and as time poor those individuals who deal with time deficits. According to the LIMTIP scheme, individuals are classified into the following four categories: income poor and time poor, income poor but not time poor, not income poor but time poor, and neither income poor nor time poor.

Calculating Poverty in Peru

The previous section stated that to calculate the adjusted poverty line, data about wages and expenses need to be collected. We get these data from the Peruvian National Household Survey 2010 (Encuesta Nacional de Hogares, ENAHO). For time allocation, we get the data from the National Time Use Survey 2010 (Encuesta Nacional de Uso del Tiempo, ENUT).⁴ Ideally, both sets of covariates are needed within the same database and for the same individuals; however, this kind of data arrangement is unavailable. Therefore, we need to synthetically match information from one source to the other. For this purpose, we estimate the best expenditure model that replicates more accurately the official poverty rate in 2010 (30.7 percent) in each database, which is in essence an application of Zacharias, Antonopoulos, and Masterson (2012). We start by modeling the household expenditure in the ENAHO as a function of the members' socioeconomic characteristics and the household's dwelling conditions. The best expenditure model, which possesses strong explanatory power (as indicated by an R-squared of 0.85), estimates that 29.9 percent of Peruvian households are poor, which is close to the official rate (30.7 percent). With the estimated parameters of this first step, we proceed to calculate the poverty rate with the ENUT that contains data on the same covariates used in the first-step expenditure model; using ENUT, we find a poverty rate of 31.0 percent, which is a strong validation of our model. With this last step, we now have information on monetary poverty and time allocation in the same database and can now perform the calculations of the adjusted poverty lines.

Time Deficit in Peru

The aim of this study is to address time deficit results for Peru, so we obtain the minimum weekly hours for personal care activities and other nonsubstitutable household practices. Following Zacharias, Antonopoulos, and Masterson (2012) and using the ENUT, **Table 1** shows the means of both groups in Peru. As the ENUT is representative by geographic area, these can be different, and the results presented below show that rural requirements are greater than their urban counterparts.

Both parameters—weekly hours for the minimum necessary leisure time and other nonsubstitutable household activities (M)—are not the mean value because, for all the countries, the needs are greater than twenty hours. Instead, the literature suggests following Vickery (1977), who argues that a person needs at least two hours per day for the first activity and one hour for the second one.

The minimum weekly hours required for substitutable household productive activities (R_j) is that amount of time that families with at least one unemployed member need to be around the poverty line.⁵ In contrast to Zacharias, Antonopoulos, and Masterson (2012), we do not compute the averages of the twelve subgroups of reference according to the number of adults and children in each home, but rather the average of weekly

³ Less conservative procedures usually use the wage of specialized workers dedicated to household-related services. In this sense, this type of approaches considers a basket of household services and the hourly wage of the specialized worker dedicated to those services (e.g., a plumber, a dishwasher, or an electrician). Further details and discussion can be found in Beltrán and Lavado (2014).

⁴ Data retrieved from the database of the Instituto Nacional de Estadísticas e Informática (INEI), "Características de la vivienda y del hogar, y de los miembros del hogar."

⁵ For the Peruvian case, consider "people around the poverty line" as those whose income are higher than -0.05 standard deviation of the official line and lower than $+0.05$ standard deviation of the same one.

Table 1: Thresholds of personal care and nonsubstitutable household activities in weekly hours in Peru (National Time Use Survey 2010).

	Urban	Rural
Personal care	83	92
Sleeping	53	58
Eating and drinking	8	11
Hygiene and clothing	5	4
Resting	3	5
Minimum necessary leisure time	14	14
Nonreplaceable activities	7	7
Total	90	99

hours that differ by size (number of members) and geographic area. **Figure 1** shows that for households with more members who need more time, R_j is greater if they live in rural areas.

Once we get both parameters, M and R_j , the next step consists of calculating the real proportion of substitutable amount of time each person uses for household activities (denoted by a_{ij}). This parameter captures the differences in the division of these tasks among family members. In general, men have lower participation, largely because of the time they devote to paid activities (Beltrán and Lavado 2013). On average, the percentage of substitutable household chores a Peruvian man performs weekly is 23.5 percent while women perform 47.8 percent, which is more than double. In Chile, Argentina, and Mexico women, on average, use 60 percent of their time in these activities.

To calculate the time deficit of each person with equation (2), we subtract time requirements M , $a_{ij}R_j$, and the actual weekly hours of employment.⁶ Therefore, this study finds that 32.98 percent of the working-age population (over fourteen years of age) also has a time deficit. The highest deficit rises to 128 hours and belongs to a man who is thirty-three years old with nonuniversity higher education and works around 100 weekly hours. Even so, women have, on average, a time deficit slightly greater than men: 20.5 hours versus 18 hours.

Adjusted Poverty Line and LIMTIP Poverty

The first step to calculate the time-adjusted poverty line is to monetize the time deficit. According to the methodology, a household's time deficit is the sum of singular deficits as long as they are less than zero; that is, any surplus is not compensated for with these deficits because of the irreplaceable tasks. Once we obtain the deficits, we monetize them by using the generalized cost of replacement unity (Beltrán and Lavado 2014): 3.28 Peruvian currency PEN (1.15 USD). The mean of these monetized deficits rises to 51.6 PEN in 2010. We estimate the Peruvian official poverty line as 260.74 PEN. Given the income to purchase a basic basket varies by province and geographic area, we work with different poverty lines (see **Table 2**).

After deducting the monetized time deficit from the official poverty line, on average, the adjusted poverty line rises to 108 USD (312.24 PEN 2010). Then, the comparison between this new threshold and the monetary consumption per capita yields 43.70 percent of the poor population according to LIMTIP, which means that 14.3 million of people in 2010 do not have enough income to purchase a basic consumption basket. In the cases of Argentina, Chile, and Mexico, the rates have values of 11.1 percent, 17.8 percent, and 50 percent, respectively.

Figure 2 shows that the LIMTIP displays a hidden poverty (household not denominated as poor in the official calculation but by LIMTIP) that rises to 3.7 million of Peruvians, or 12.62 percentage points of the total population in 2010. A single family may be poor but hidden as a result of different scenarios. For instance, anybody could be in that situation if their income is roughly enough to satisfy the minimum consumption and they have a small time deficit. A family with a high income that does not satisfy its elevated time deficit has a different situation. Both scenarios are totally different from those families with little income and a high time deficit.

⁶ In Peru, the ENUT 2010 asks people about their effective weekly hours devoted to work without commuting time; something that does not happen for Argentina, Chile, and Mexico (Zacharias, Antonopoulos, and Masterson 2012).

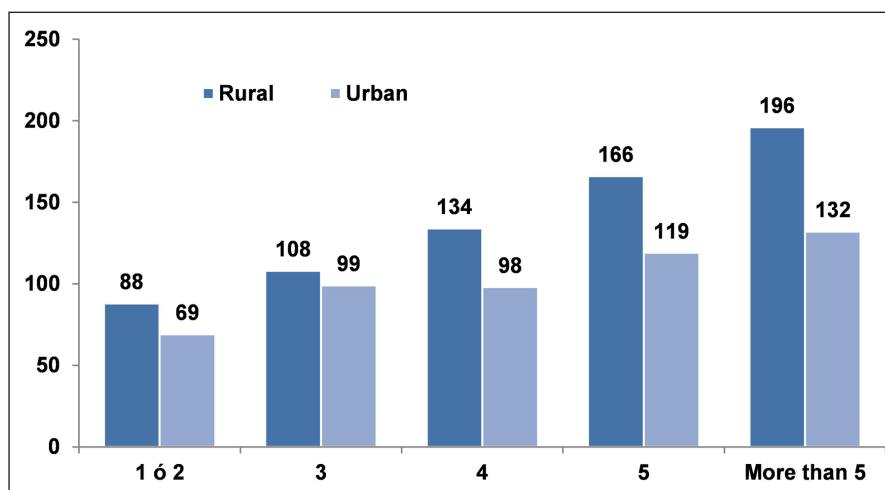


Figure 1: Thresholds of substitutable domestic production in weekly hours (National Time Use Survey 2010).

Table 2: Official poverty line vs. time adjusted poverty line, 2010, by province and geographic area, in Peruvian currency PEN (National Time Use Survey 2010).

Region	Official poverty line		Time-adjusted poverty line	
	Rural	Urban	Rural	Urban
Amazonas	191.8	237.7	283.6	277.9
Áncash	192.7	250.9	258.8	294.9
Apurímac	191.2	227.0	271.7	270.0
Arequipa	196.3	233.2	301.6	283.2
Ayacucho	191.3	228.1	257.6	260.5
Cajamarca	191.7	232.2	234.8	266.1
Callao	*	335.5	*	382.0
Cuzco	191.3	228.0	306.9	299.1
Huancavelica	191.2	227.0	273.9	257.4
Huánuco	191.4	231.5	254.7	259.0
Ica	206.2	262.7	321.5	306.3
Junín	191.5	229.4	259.7	266.3
La Libertad	194.7	259.7	289.7	296.0
Lambayeque	205.7	262.7	264.0	286.7
Lima	198.5	323.7	289.6	367.7
Loreto	192.0	242.4	263.8	298.5
Madre de Dios	192.0	242.4	304.2	296.3
Moquegua	193.7	259.4	333.3	307.7
Pasco	191.5	229.7	277.6	277.4
Piura	202.0	261.5	288.6	298.8
Puno	191.3	227.6	313.0	284.8
San Martín	192.0	242.4	237.7	274.5
Tacna	200.8	257.3	306.9	291.5
Tumbes	207.4	262.7	276.7	293.3
Ucayali	192.0	242.4	328.8	281.5
National average	193.4	281.9	274.3	324.3

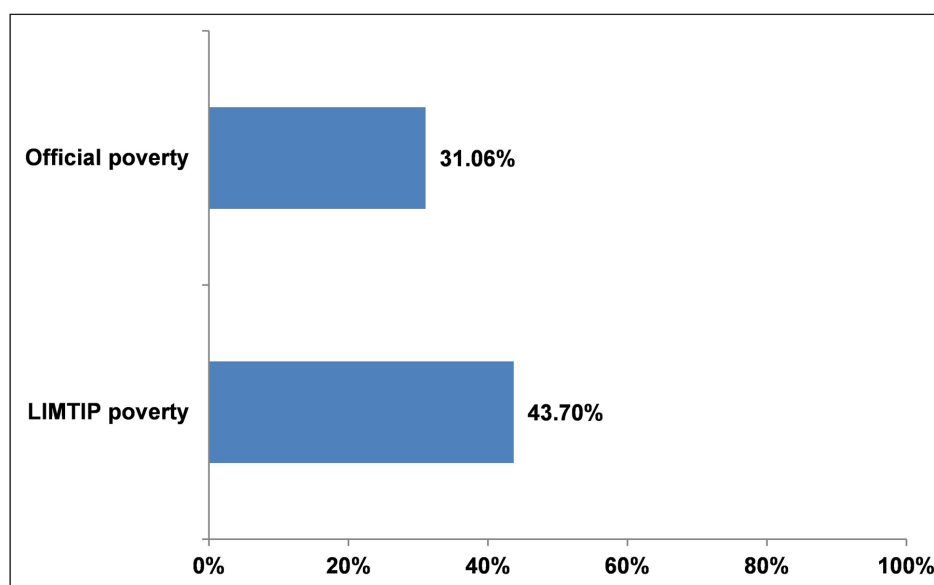


Figure 2: Poverty incidence in households: official vs. LIMTIP (National Time Use Survey 2010).

To identify a pattern in hidden poor households, we examine their average income per capita to find whether a hidden poor family has less monetary income and a greater time deficit than a family above the poverty line. We find that the hidden poor households have an average of 370 PEN (129.8 USD) income per capita and thirteen hours of time deficit, while the no-income poor have 553 PEN (194.0 USD) and only six hours of a deficit.⁷

After comparing our results against those studied by Zacharias, Antonopoulos, and Masterson (2012), we can conclude that Peru has the highest hidden poverty, by percentage. This is because the time deficit among Peruvian households is greater and because of the cost-of-replacement method implemented by Beltrán and Lavado (2014) indicates that the value of every hour is slightly higher in Peru (3.28 PEN or 1.15 USD) than in its regional counterparts, with the exception of Chile.⁸

We calculate four categories proposed by the LIMTIP for each individual. According to this calculation, a person is LIMTIP income poor if they belong to a LIMTIP income poor family and time poor if they have a time deficit. **Figure 3** shows that 16.5 percent of Peruvians in 2010 faced a higher vulnerability because they were both LIMTIP income poor and time poor. What is interesting is that the proportions of LIMTIP nonpoor and time poor are the same; in other words, not only low-income households are vulnerable to a time deficit.

The main criticism of this classification argues that the vulnerability of individuals who are at the same time LIMTIP income poor and time poor might be misrepresented. This category includes individuals whose income is slightly above the poverty line (unofficial income poor) but have a high time deficit. Indeed, these individuals are being overestimated in the most vulnerable category because they are classified in both groups: LIMTIP poor and time poor.

Modified LIMTIP Classification

When we developed the modified LIMTIP classification that uses the official income poverty (OIP) and time poverty (TP), the most vulnerable category, which includes income- and time-poor people at the same time, is more or less 9.71 percent out of the total population of 2010 (see **Figure 4**). **Table 3** shows that the monthly income a person gets in this category and the time deficit associated (17.7 hours) is less than the one calculated for non-income poor people.

In general, as **Table 4** shows, time-poor people work more than people located in other categories. In particular, they perform between three (IP and TP) to ten (not IP but TP) hours more of paid work each week than the average work of forty hours. Moreover, there is evidence that non-income-poor and time-poor people work more than those in any category and, according to **Tables 3** and **4**, the more they work, the more they get paid.

⁷ We find a similar pattern using alternative consumption equivalence scales that in general assign different values to consumption units of the members of the household. For the OECD-modified one, we find that hidden poor households have on average 565 PEN (198 USD) income per consumption unit, while nonpoor ones have an average of 916 PEN (321 USD).

⁸ This calculus considers the total remuneration. Zacharias, Antonopoulos, and Masterson (2012) show that this cost of replacement rises to 1.5 USD in Mexico's urban areas and 1.1 in rural places while in Argentina it is only 0.90 USD. Chile has the highest value at 1.90 USD.

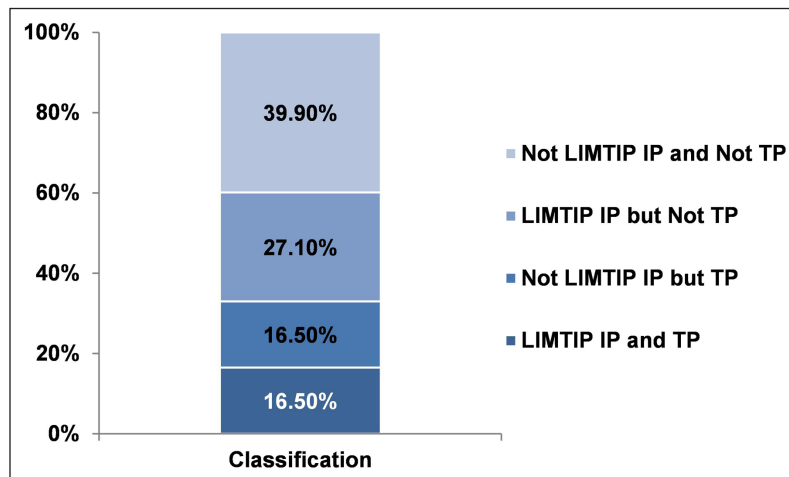


Figure 3: LIMTIP income poverty (IP) vs. time poverty (TP) in individuals (National Time Use Survey 2010).

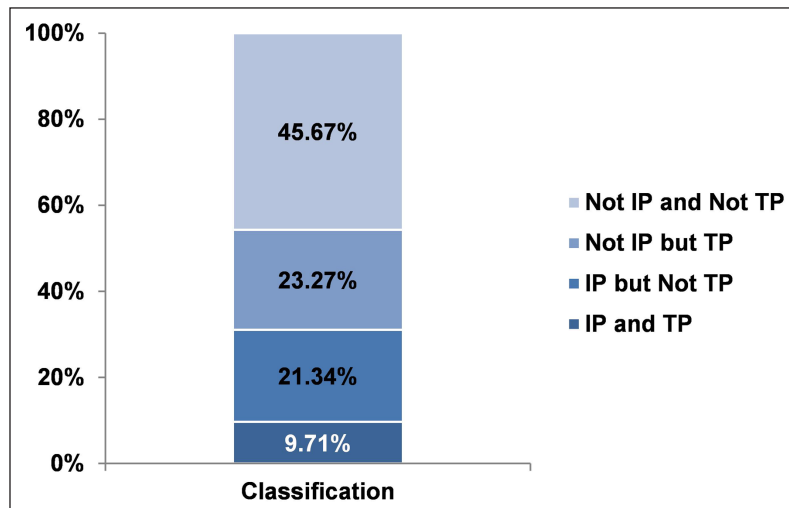


Figure 4: Modified LIMTIP classification in individuals (National Time Use Survey 2010).

Table 3: Monthly income and time deficit by modified LIMTIP (National Time Use Survey 2010).

Classification	Monthly income (PEN)	Time deficit (weekly hours)
IP and TP	157.69	-17.69
IP but not TP	203.56	-
Not IP but TP	632.20	-20.15
Not IP and not TP	512.93	-

Table 4: Modified LIMTIP classification by sociodemographic conditions (National Time Use Survey 2010).

Classification	Paid jobs (weekly hours)	Schooling (years)	% of urban population
IP and TP	43.03	7.76	34.0%
IP but not TP	31.01	10.52	63.0%
Not IP but TP	50.46	12.70	76.4%
Not IP and not TP	36.46	14.06	90.0%

Empirically, 90 percent of people without a time deficit live in urban areas, which indicates that vulnerabilities like time and income poverty are concentrated in rural areas. This predominance can be proved by looking at **Figure 5**, in which more than half of the rural population is income poor and 26.9 percent is time poor. In contrast, having neither time nor income poverty is the main category in urban areas.

Table 4 shows that fewer years of schooling are associated with income- and time-poor people; therefore those in this category should have few possibilities to overcome both poverty situations. From the income poverty side, low qualifications means low income; while the condition of time poverty means people need to work longer hours to have a higher income.

Disaggregating the LIMTIP classification by gender, **Figure 6** illustrates that there are more women than men with some kind of poverty, especially the proportion of women that are income poor and time poor, and the proportion that are only time poor is around 4 percentage points above men.

This proportion stems from the wide time deficit they face that cannot be explained by the paid work they perform. In fact, men's labor hours are generally greater than women's, as seen in **Tables 5** and **6**. Thus, women are time poor because they spend more time in reproductive activities, more than two times the time spent by men.

If we complement the ideas stated before with the fact that women, on average, are less educated than men, we can infer that the opportunities for overcoming this limitation are not very favorable because their fewer education years are a constraint to substituting household activities with paid work. Therefore, women are not able to get an adequate job that allows them to cope with their income and time poverty and that decreases long-term vulnerabilities.

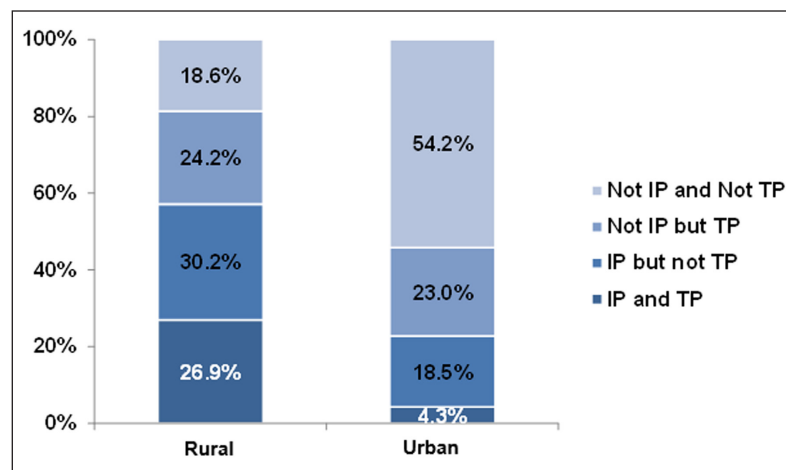


Figure 5: Modified individual LIMTIP classification by geographic area (National Time Use Survey 2010).

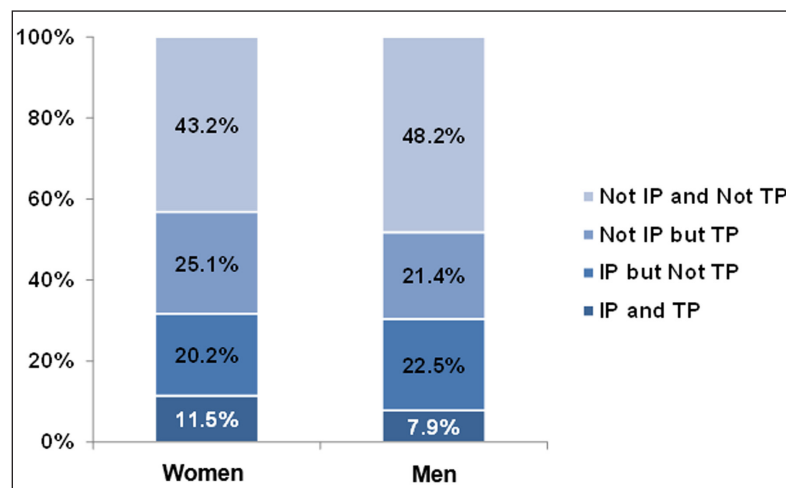


Figure 6: Modified individual LIMTIP classification by gender (National Time Use Survey 2010).

Table 5: Monthly income and time deficit by modified LIMTIP classification and gender (National Time Use Survey 2010).

Classification	Women		Men	
	Monthly income (PEN)	Time deficit (weekly hours)	Monthly income (PEN)	Time deficit (weekly hours)
IP and TP	155.67	-19.78	160.71	-14.57
IP but not TP	195.57	—	210.92	—
Not IP but TP	573.95	-20.84	702.18	-19.32
Not IP and not TP	481.91	—	541.37	—

Table 6: Modified LIMTIP classification by sociodemographic conditions and gender (National Time Use Survey 2010).

Classification	Women				Men			
	Paid jobs (hours per week)	Household activities (hours per week)	Schooling (years)	% of urban population	Paid jobs (hours per week)	Household activities (hours per week)	Schooling (years)	% of urban population
IP and TP	31.38	50.52	7.12	37.39%	53.14	27.12	8.61	28.01%
IP but not TP	9.03	43.10	9.80	67.66%	27.79	18.11	10.87	64.62%
Not IP but TP	37.88	42.69	11.90	75.22%	59.45	19.61	13.30	74.94%
Not IP and not TP	11.00	39.64	13.00	91.34%	31.78	15.96	13.75	89.23%

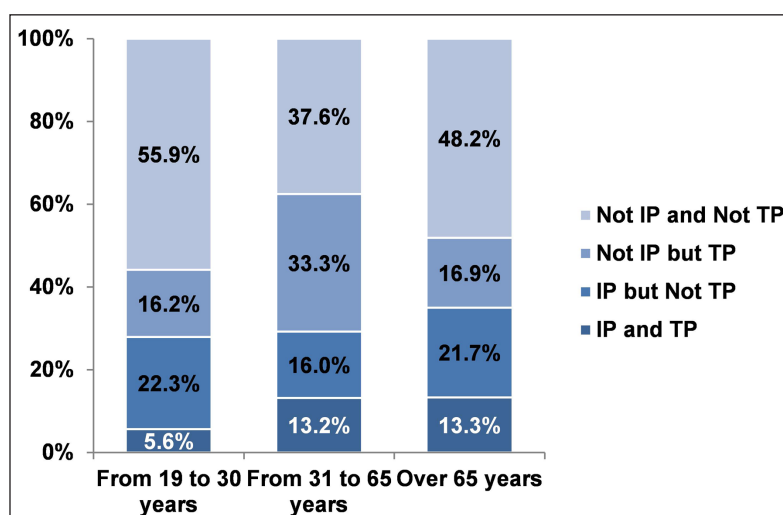


Figure 7: Modified individual LIMTIP classification by age group (National Time Use Survey 2010).

Disparities within the gender variable demonstrate that people over thirty years old but younger than sixty-five deal with all kinds of poverty: according to **Figure 7**, 62.5 percent of this age group. In general, this poverty usually happens because these people split their time between paid work and household chores. The sum of hours this group spends on both activities is greater than the total time of the other ones. A more detailed perspective indicates that the most vulnerable category dedicates two more hours than the youngest group and six more hours than the oldest one (see **Table 7**).

In contrast, the eldest group is worth concern not only because they report the highest time deficit (see **Table 8**) but because they have a significant amount of time allocated to paid work, even when they have been retired for a few years (in particular, those over sixty-five). This situation means that people over the legal retirement age still keep working to avoid poverty.

Table 7: Modified LIMTIP classification by sociodemographic conditions (National Time Use Survey 2010).

		Age 19–30	Age 31–65	Over 65
IP and TP	Paid jobs (hours per week)	44.10	39.51	39.28
	Household activities (hours per week)	36.52	42.97	37.67
	Schooling (years)	11.38	7.61	2.70
	% urban population	37.40%	35.00%	20.90%
IP but not TP	Paid jobs (hours per week)	19.95	25.54	13.70
	Household activities (hours per week)	29.76	35.94	31.53
	Schooling (years)	12.62	9.45	4.36
	% urban population	68.50%	70.10%	63.10%
Not IP but TP	Paid jobs (hours per week)	49.69	48.03	38.34
	Household activities (hours per week)	28.41	33.19	33.99
	Schooling (years)	13.53	12.77	6.73
	% urban population	77.50%	77.00%	50.40%
Not IP and not TP	Paid jobs (hours per week)	23.77	28.39	9.58
	Household activities (hours per week)	24.06	32.69	30.15
	Schooling (years)	14.70	13.65	9.43
	% urban population	92.00%	91.10%	88.70%

Table 8: Monthly income and time deficit by modified LIMTIP classification (National Time Use Survey 2010).

		Age 19–30	Age 31–65	Over 65
IP and TP	Monthly income (PEN)	187.20	156.35	126.89
	Time deficit (weekly hours)	-12.92	-18.03	-24.64
IP but not TP	Monthly income (PEN)	218.26	216.15	160.55
	Time deficit (weekly hours)	–	–	–
Not IP but TP	Monthly income (PEN)	639.48	647.80	466.04
	Time deficit (weekly hours)	-17.57	-20.52	-25.30
Not IP and not TP	Monthly income (PEN)	529.02	563.47	337.59
	Time deficit (weekly hours)	–	–	–

Conclusions and Recommendations

This study develops and analyzes an innovative aspect related to the valuation of unpaid domestic work: an alternative to the official measurement of poverty that considers the required time for household activity production (LIMTIP poverty). This alternative shows that LIMTIP-poor people are 43.7 percent of the total 2010 population, that is, 12.6 percentage points above the official poverty estimated by ENUT 2010 (31.1 percent). In other words, 12.6 percent of the population is hidden from the conventional measurement of poverty. A household can be invisibly poor as a result of different scenarios: for example, a low-income household that has enough to cover basic consumption but has higher time deficits.

The conventional measure of poverty measures individuals' and households' access to a minimum level of income to assure the satisfaction of basic needs. However, this approach omits the minimum requirements of domestic production that are necessary to fulfill these same needs. Thus, both approaches (LIMTIP and the official one) should be analyzed jointly for the evaluation of living standards and vulnerabilities that the population faces, such as some sociodemographic characteristics. As we have shown, time poverty is accentuated according to gender (36.6 percent women vs. 29.3 percent men), geographic domain (51.1 percent rural vs. 27.3 percent urban), and education (LIMTIP poor have on average five years less education than the nonpoor).

In this situation, access to the labor market improves a household's condition if and only if the individual earns enough to cover the existent monetized time deficit and the new one generated by paid work. Considering that seven out of ten people are informal workers in Peru, the mere fact of accessing a job is not a sufficient condition for securing an improvement in welfare, given that most of the jobs are characterized by precarious labor conditions (no access to health insurance or social security) and are considerably underpaid (around 50 percent of all workers receive less than minimum wage, according to the ENAHO). In this environment, women are particularly vulnerable because of their overrepresentation in the informal sector compared to their male peers, the presence of systemic barriers for female self-employment, and the fact they also assume a larger amount of the household reproductive work, which narrows their possibilities to attain better labor conditions (Avolio Alecchi 2020). Therefore, it is urgent that policies aim at delivering public services that allow women to substitute reproductive activities with leisure or resting activities. Part of this substitution may displace household productive activities to domestic workers, so it is essential that policies acknowledge the current social role of domestic workers in Peru, as it is already a vulnerable segment of the population (Pérez and Llanos 2017). Implementation of free childcare centers and nursing homes for elderly people are indispensable to lessen the domestic work of women without exerting further pressure on domestic workers' labor conditions. Similarly, other vulnerable populations should be part of tailored policies that attack their intersection with time and monetary poverty. One such population is elderly people who despite having surpassed the retirement age continue working. For them, the government should develop and provide a social protection system that ensures suitable healthcare and a minimum pension that allows them to cover their basic needs, especially in the case of those who belong to an income-poor group.

Finally, we want to comment on two specific issues for future research in the field. First, it is important to continue efforts of data collection to calculate how these results of time poverty vary across time. The most recent and only National Time Survey in Peru was conducted in 2010, which has left researchers with no way to track time use nationally. For instance, it would be interesting to study if the proportion of time-poor people has been reduced through recent economic growth during the last decade, as happened with monetary poverty. Furthermore, we find that it would be particularly relevant to analyze how time poverty has changed because of the COVID-19 pandemic, which could have induced a significant time allocation into domestic work and caring for children and the elderly. As a recent body of literature discusses (Alon et al. 2020; Collins et al. 2020), during the pandemic women have been charged with more domestic work and, at the same time, have been far more penalized in the labor market by heavier income reductions and a greater probability of losing their jobs. In Peru, gender effects may be even more drastic considering that women already are exposed to a considerable wage gap, precarious labor conditions, and strong gender stereotypes that as a whole present a large economic challenge with potential repercussions far beyond a short-term downfall.

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How to cite this article: Beltrán, Arlette, and Pablo Lavado. 2021. The Use of Time in Peru: A Scarce and Unvalued Resource in the National Economy. *Latin American Research Review* 56(4), pp. 864–876. DOI: <https://doi.org/10.25222/larr.1172>

Submitted: 28 December 2019

Accepted: 01 November 2020

Published: 07 December 2021

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