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Defining and measuring time poverty in South Africa

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ABSTRACT

This study primarily adopted the absolute approach to examine time poverty in South Africa by analysing the 2000 and 2010 Time Use Survey data. The findings indicated that absolute time-poor individuals were predominantly young unmarried female Africans who had incomplete primary education, were inactive in the labour market and resided in bigger-sized households in KwaZulu-Natal and Gauteng. Examining the relationship between money-metric poverty and absolute time poverty, the results showed the proportion of people who were both income- and time-poor decreased whereas the percentage of individuals who were neither income- nor time-poor increased over time. Last, money-metric, multidimensional non-money-metric and absolute time poverty headcount rates all declined between 2000 and 2010, but the extent of decrease was greatest in the first rate.

KEYWORDS

Time poverty; time use survey; Systems of National Accounts

JEL CLASSIFICATIONS

I32; J22

1. Introduction

In the South African economy, the alleviation of high levels of poverty, inequality and unemployment have always been one of the most crucial economic policy objectives since the advent of democracy. Focusing on poverty, various measures have been applied to establish the country's poverty levels and trends, with the money-metric approach being the most conventional one (Leibbrandt & Woolard, 1999; Bhorat et al., 2012).

This approach highlights one poverty dimension (income or expenditure) but poverty is a multidimensional concept which involves a variety of non-income welfare indicators, ranging from low level of education, poor health as well as lack of ownership of assets (e.g. motor vehicles, television, fridge and stove) and poor access to services (e.g. electricity, piped water and frequent refuse removal), to feeling vulnerable, powerless and socially excluded (World Bank, 2001; Chakravarty & D'Ambrosio, 2006; Jayaraj & Subramanian, 2010).

Given the multidimensional nature of poverty, alternative approaches to measure poverty have emerged. For example, an asset index is derived with the aid of statistical techniques such as principal components analysis, multiple correspondence analyses and factor analysis (McKenzie, 2005; Booysen et al., 2008; Bhorat et al., 2014). The Multidimensional Poverty Index (MPI) approach was initiated in 2010 by considering indicators from three dimensions, namely health, education and living standards

(Alkire & Santos, 2010); this MPI approach considers both incidence (i.e. percentage of population that is multidimensionally poor) and intensity (i.e. average proportion of weighted deprivation the person has experienced) of deprivation to measure the extent of multidimensional poverty (Alkire & Foster, 2011a, 2011b; Fransman & Yu, 2019). Despite the emergence of these approaches to examine poverty multidimensionally, one important dimension is still ignored, namely time.

The time dimension should not be overlooked, as some people lack time-saving commodities, which help enhance their access to the market and allow them to provide efficient and productive labour services. Moreover, the lack of time to perform a particular task reduces one's wellbeing, particularly in non-market production, such as production and services of household being a subset of non-market production (Kim, 2015: 237; White, 2016: 219).

One may assume someone who is money-metric poor to have more time available. However, it is not necessarily true if the poor performs time-consuming tasks like collecting water from a distance. Money-metric poor may also spend longer hours commuting to and from the market (due to long distance and inefficient transport system, for example). On the contrary, money-metric non-poor people may also suffer time poverty, because by working excessively long hours to earn higher income, they have less time available for other activities, such as leisure and further education (Orkoh et al., 2020; Ribeiro & Marinho, 2012).

With the availability of both the 2000 and 2010 Time Use Survey (TUS) data conducted by Statistics South Africa, it is surprising that these datasets were hardly analysed over these years to examine time poverty comprehensively. This study aims to fill the existing research gap, by using the abovementioned data to examine the extent of time poverty in South Africa and its relationship (if any) with money-metric poverty.

2. Literature review

2.1. Defining time poverty

Lindskog & Brede (2002) define time-rich as those who have excessive time available (i.e. a need to 'kill' time exists) while time-poor are the ones whose time is a constraint or scarce resource in their daily lives. Historically, the group 'rich in time' is depicted as money-rich (those who possess power and influence politically and economically because of their economic resources and networks; they are also the largest consumers of entertainment) and the group 'poor in time' is assumed to have little or no money (possibilities to change their circumstances were limited).

The second (a broader) approach, shown in [Figure 1](#), examines how individuals allocate their time between work and other activities. Under this approach, time use is divided into the broad categories of market and non-market work. Production of goods and services for the market includes formal and informal work activities, which forms part of Systems of National Accounts (SNA) paid production. Productions (subsistence), reproductive and voluntary work are the main activities of non-market production. Production includes all goods produced for home use (e.g. food and clothing) and forms part of unpaid SNA production. Furthermore, reproductive work (e.g. meals and laundry) and voluntary work (e.g. community work) fall under unpaid non-SNA production.

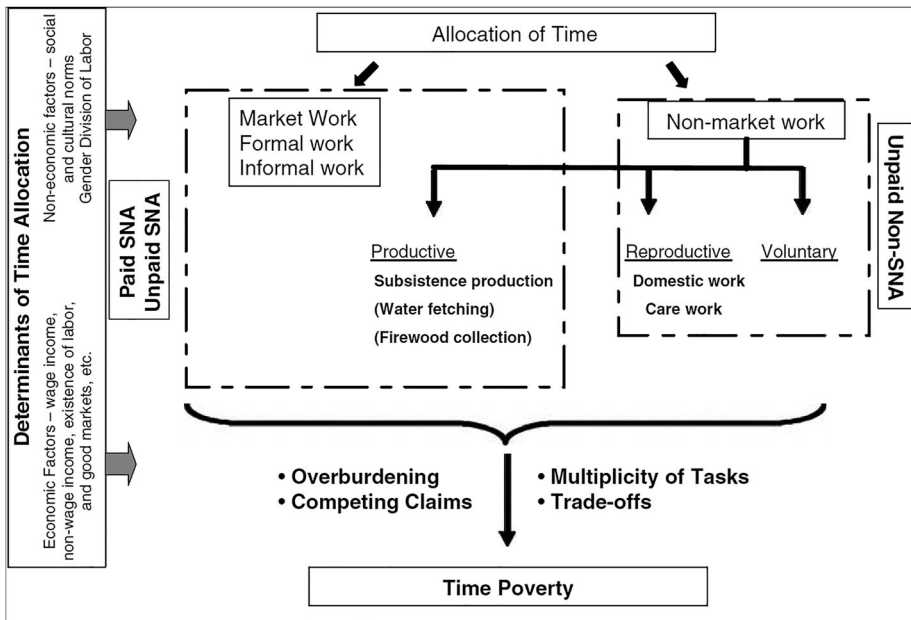


Figure 1. A framework for analysing time use and time poverty. Source: Kes & Swaminathan, 2006: 15.

The allocation of time between market and non-market work determines the type of poverty present (Hamermesh & Pfann, 2005; Blackden & Wodon, 2006; Kes & Swaminathan, 2006; Goodin et al., 2008). If too much time is allocated to paid market work to overcome money-metric poverty, the individual can be time-poor due to the lack of time available for other activities. Conversely, if the individual allocates too much time on non-market activities, they could be income-poor as they have little time left to work in the labour market to earn an adequate income to sustain their living.

Individuals from all income groups can experience time poverty if they allocate a large number of hours to paid work, but the intensity of time poverty increases with less income as they lack the necessary resources to access market substitutes. Thus, they can make decisions which affect the welfare of current and future household members (Kes & Swaminathan, 2006: 17), for example, a child stops attending educational institutions to support the household financially.

2.2. Measuring time poverty

In general, the poverty measures adopt ‘the more the merrier’ approach, where more income, consumption and even assets lead to lower poverty levels. However, time is a fixed resource with only 24 h available per day; as more time is spent on paid and unpaid work, less time is available for other activities such as leisure and rest (Bardasi & Wodon, 2010).

Measures of time poverty can be of both a subjective and objective nature. The former relates to how an individual perceives his/her feelings of time pressure; in contrast, the latter relates to a threshold of time required for leisure, rest or other activities after considering paid work, unpaid work and personal care. With regard to the objective measure

of welfare for the individuals, the more personal time available, the higher their welfare would be (Ravallion, 1992; Booysen et al., 2008). To indicate the burden of time spent on market and non-market activities, one can examine total work time (SNA plus non-SNA less personal services). Another indicator of burden is the ratio of unpaid to paid work: the larger this ratio, the greater the time poverty.

The first measure of time poverty is linked to the Vickery (1977) framework, which estimates the minimum amount of time needed to complete household tasks (i.e. the absolute threshold approach). These estimates are calculated with the usage of unemployed homemakers' average amount of time spent on household tasks. Other measures have considered the thresholds of some percentage (e.g. 50% or 60%) of median personal time (Bardasi & Wodon, 2006; Burchardt, 2010), that is, the relative threshold approach.

From the discussion above, one can see time poverty in terms of absolute or relative standard. Absolute standard takes place where an actual time of an activity is compared to a discretionary time that would be available to perform and complete the activity, for example, actual time taken to clean a house compared to the minimum time required to perform the task. As far as the relative standard is concerned, the thresholds are determined based on the distributions of actual time spent on an activity (e.g. comparing time spent on leisure for individual against 50% median time of leisure for the population investigated).

In contrast, Harvey and Mukhopadhyay (2007) compute a monetary value for the time deficit (i.e. the time deficit approach). This monetary value is used to adjust the working-poor poverty threshold. It acts as a replacement cost to the minimum market wage rate. The assumption underlying this methodology is that paid work time cannot be exchanged for unpaid work time due to its nature, but unpaid work time can be exchanged for paid work time (one-way perfect substitutability).

The Levy Institute Measure of Time and Income Poverty (LIMTIP) measure incorporates the time needed to produce essential household production for survival, with income linked to poverty line. Time deficit occurs when committed time is greater than the number of hours in a week (Kim et al., 2015). Committed time is the sum of required hours of personal care, required hours of household production and actual work hours. Once the time deficit is known, it is valued in terms of income necessary to fill the missing household production with market purchases. This valued time deficit is then added to the income poverty line.

2.3. Review of past empirical studies

Antonopoulos & Memis (2010) is the only local study (using the 2000 TUS) to investigate time poverty by applying the modified Harvey and Mukhopadhyay (2007) time deficit approach (to be discussed later). Individuals were classified into four categories: income-poor and time-poor, not income-poor and time-poor, income-poor and not time-poor, not income-poor and not time-poor. About 10% suffered both income and time poverty, while older female Africans who lived in a single-adult home in former homelands with the presence of at least two children were significantly more likely to experience both types of poverty.

Kizilirmak & Memis (2009) analysed the 2000 TUS data to highlight the unpaid work burden experienced by the money-metric poor, and found women borne the largest

burden. In addition, money-metric poverty was associated with more (less) time spent by women on unpaid (paid) work. One drawback of the study is that it did not explicitly examine time poverty. Nackerdien & Yu (2021) is the most recent South African study using the TUS data (of both 2000 and 2010) but it only investigated time use patterns and completely overlooked time poverty. For the remainder of this section, international studies on time poverty are reviewed.

2.3.1. Absolute threshold approach

Saqib & Arif (2012) examined time poverty in Pakistan. Their main time poverty line was based on 63 h a week (or 10.5 h a day over 6 days of the week) spent on committed SNA and extended SNA activities (SNA and extended SNA), along with lower and upper bound time poverty lines being set at nine and 12 h per day respectively. For all poverty lines, females were found to be significantly more likely than males to be time-poor.

Ribeiro & Marinho (2012) conducted time poverty analysis in Brazil, by comparing an individual's total work hours (sum of paid work, unpaid work and commuting time) against the absolute time poverty line of 64 h a week. In urban areas, the shares of time-poor males and females were 12.1% and 30.7%, respectively (20.2% overall). The corresponding proportions were 11.7% and 25.8% (17.1% overall) in rural areas. As was the case with female adults, girls were more likely to be time-poor than boys in all regions.

Arora (2015) used the absolute time poverty line of 12 h per day to investigate time poverty in rural areas of Mozambique, and found that women were associated with greater time poverty likelihood (49.5%, compared to only 8.3% for men). The econometric analysis revealed that men were almost 50% less likely to be time-poor, while time poverty probability increased significantly with increase of household size.

2.3.2. Relative threshold approach

Bardasi & Wodon (2006) derived two relative time poverty lines to examine time poverty in Guinea: a lower threshold of 1.5 times the median working hours and a higher threshold of two times the median working hours, i.e. 70.5 and 94 h per week respectively. Using the lower threshold, the authors found that 18.8% of individuals were time-poor women living in rural areas were more likely to be time-poor, while residence in urban areas led to greater time poverty likelihood for men. Highly similar findings were observed using the higher threshold. The authors' follow-up study in 2010 considered an even lower bounded time poverty line of 50 h, and found time poverty probability was significantly higher for lowly educated, married females from the older age cohorts.

Gammage (2006) also constructed the time poverty lines at 1.5 and two times the median total hours worked. The empirical findings indicated that females experienced greater time poverty likelihood than males (33% versus 15%); this probability was also greater for people who spoke an indigenous language at home or lived in urban areas. On the other hand, Lawson (2008) used the same relative poverty lines adopted by Bardasi & Wodon (2006) to examine time poverty in Lesotho, and found that people aged 25–44 years without post-secondary education and came from female-headed households were significantly more likely to be time-poor. Moreover, female rural residents spent longer time to travel to health centres and primary schools, and hence they suffered greater time poverty likelihood. Saqib & Arif (2012) also used the same poverty

lines, and found that older female individuals who were married and employed, did not have post-Matric qualifications, lived in urban areas and had children under seven years in the households were associated with greater time poverty rate.

Moving on to other studies, Chatzitheochari & Arber (2012) investigated what happened in the United Kingdom by setting the relative poverty line at 60% of median free time (residual after removing paid work, unpaid work and personal care). The authors found that female time poverty likelihood exceeded that of males by almost six percentage points (25.2% versus 19.4%). Merz & Rathjen (2014a) investigated time poverty in Germany, setting the poverty line at 60% of the median personal leisure time (or 186 min), and found that 47.4% people were distinguished as relative time-poor. A later study by the same authors (2014b) classified someone as time-poor if his/her genuine leisure time lied below 60% of the median personal genuine time. The authors found that women were more likely to suffer all three types of poverty under study (income, non-income and time poverty). In addition, time poverty probability increased per child (especially those under six years).

Kalenkoski et al. (2011) conducted a multivariate regression analysis with the American Time Use Survey data, by determining variables which correlated with discretionary time (free time available after removing necessary activities like sleep and committed activities like paid and unpaid work) and time poverty likelihood. Using the time poverty line of 60% of the median discretionary time for various subgroups, the authors found an additional child to a household decreased discretionary time available and thus increased the probability of time poverty. The factor which influenced time poverty and discretionary time most was paid work. Relating income poverty and time poverty, the authors found that only 2.2% of all individuals in the weighted sample were both time- and income-poor. Interestingly, 18.6% of income-poor were also time-poor, and 21.1% of those not income-poor were time-poor.

As far as the two most recent studies on relative time poverty are concerned, Noh and Kim (2015) defined an individual as time-poor if their total working time exceeds 150% of the median total working time. Examining time poverty in Korea, time poverty rate increased for both genders between 2004 and 2009, but this rate remained higher for females (2004: 22.4%; 2009: 23.0%) compared to males (2004: 11.4%; 2009: 13.6%). Finally, Orkoh et al. (2020) examined three waves of the Ghana Living Standard Survey data in 1998–2013 by using the same two poverty lines adopted by Bardasi & Wodon (2006). The empirical findings indicated the following people were associated with significantly greater time poverty rate: those with low educational attainment, men who were income-poor or consumption-poor, females who were consumption-poor, as well as people from larger-sized households.

2.3.3. Time deficit approach

Harvey & Mukhopadhyay (2007) constructed a time-adjusted poverty line by calculating money equivalents to time deficits to examine time poverty in Canada. Time deficit is present when an individual's paid work time exceeds the time available for work and leisure less the minimum time for household tasks and free time. Upon analysing both single- and dual-parent households with children, the authors found that single-parent suffered time deficits compared to dual-parent households.

The two Antonopoulos et al. (2012a, 2012b) studies on Argentina, Chile and Mexico also calculated income-poverty lines adjusted for time-deficits (the values for their poverty thresholds was unfortunately not clearly revealed in the study). There were about 5–9% (Argentina 5%, Chile 7% and Mexico 9%) hidden poor (of the total population) excluded by the official income-poor measures of these countries. The majority of the hidden poor existed in households with at least one employed member where total household income was not enough to compensate for time deficits (i.e. they were working-poor households). In Argentina, 3% of the population was both income- and time-poor; the corresponding shares were 6% in Chile and 15% in Mexico.

Table A1 in Appendix A summarises the key findings of the three groups of international time poverty studies.

3. Methods and data

3.1. Poverty lines

The money-metric poverty line used in this study is based on the costs of basics needs (CBN) methodology introduced by Ravallion (1994), by estimating the cost of food needed for adequate nutrition and essential non-food items. The Statistics South Africa (2015) most recent calculation of the CBN consumption basket was based on the 2010/2011 Income and Expenditure Survey data. The lower bound CBN poverty line of R689 (in 2016 December prices) is employed.

Moreover, a multidimensional non-income socio-economic status (SES) index is derived using the principal components analysis (PCA) approach¹, by considering 11 non-income welfare indicators: dwelling type, energy source for cooking, water source, washing machine, vacuum cleaner, refrigerator, television, radio, car, clock as well as landline or cellular telephone ownership. The SES index at the 40th percentile in 2000 is identified as the multidimensional non-money-metric poverty line in 2000 (i.e. a relative approach is used), before this index value is used again as the poverty line in 2010.

Regarding the absolute time poverty line in this study, for adults aged 15 years or above, it is constructed based on the Basic Conditions of Employment Act which limits work to no more than 45 h per week (9 h per day) and mean non-SNA time for adults (approximately three hours per day in both waves of TUS). Therefore, the derived poverty line of 12 h is similar to two past international studies listed in Table A1. The derived poverty line of 5.5 (4.0 + 1.5) hours caters for children who are not allowed to work in the South African labour market and is similar to Ribeiro & Marinho (2012) who also used learning time instead of work time for children, and found learning time to be 20 h per week (or four hours per day in a five-day school week).

Once the individuals' absolute time and income poverty status are derived, four groups of individuals are identified: (1): Income-poor and time-poor (most deprived group); (2): Income-poor but not time-poor; (3): Not income-poor but time-poor; (4): Not income poor and not time-poor (least deprived group).

¹Detailed mathematical explanation of the PCA method falls beyond the scope of this study, but can be referred to Vyas & Kumaranayake (2006), Van der Berg et al. (2003) and Vermaak (2008).

Lastly, time poverty estimates using the relative approach and time deficit approach are only briefly discussed in this study. For detailed explanation on how the time poverty lines were derived with these two approaches, refer to Appendix B.²

3.2. Data

The 2000 and 2010 TUS datasets are analysed in this study. The main aim of the TUS is to capture information on time spent on paid and unpaid labour activities (information on personal characteristics and household-level non-income welfare was also captured). A maximum of two randomly selected members from each household took part in the survey. In 2000, 14 317 people from 8 252 households participated in the TUS, whereas the corresponding numbers in 2010 were 39 018 individuals and 22 484 households. In weighted terms, the number of participants was 25.69 million in 2000 and 39.88 million in 2010.

The time use data is organised according to SNA categories, as shown in Table A2. The recall time-diary approach was adopted before the participants were asked to report their activities for a continuous 24-hour period in 30-minute intervals, starting from 4am the day prior the interview until 4am on the interview day. Lastly, if the person is involved in more than one activity simultaneously, an equal share of time is allocated to each activity (e.g. if the participant works, eats and socialises with his colleagues in a 30-minute period, it is assumed 10 min are spent on each activity).

4. Empirical findings

For the remainder of the study, these abbreviations are used to represent each approach:

- Method [1]: Money-metric poverty approach.
- Method [2]: Non-money-metric multidimensional poverty approach.
- Method [3]: Time poverty, absolute approach.
- Method [4a]: Time poverty, relative approach – 60% of median free time.
- Method [4b]: Time poverty, relative approach – 1.5 times median work hours.
- Method [4c]: Time poverty, relative approach – two times median work hours.
- Method [5]: Time poverty, time deficit approach.

Unless stated otherwise, the primary focus is the results derived from the absolute time poverty method [3], as well as the relationship (if any) between money-metric poverty and absolute time poverty. Moreover, as the general profile of the weighted sample (shown in Table A3) was already explained comprehensively by Nackerdien & Yu (2021), the poverty estimates are discussed immediately from this point onwards.

First of all, Figure 2 shows the poverty headcount rates derived in each approach, and the results differ across the methods. Method [1] resulted in the highest headcount rate amongst all methods (but also the greatest decline between 2000 and 2010 – by nearly 20 percentage points). Method [2] also resulted in relatively more rapid decline in poverty

²The comparison of time poverty estimates using the absolute, relative and time deficit approaches requires another study of its own; thus, in this study, the focus is absolute time poverty, and Figure 2 only briefly shows the time poverty rates across the three approaches in 2000 and 2010.

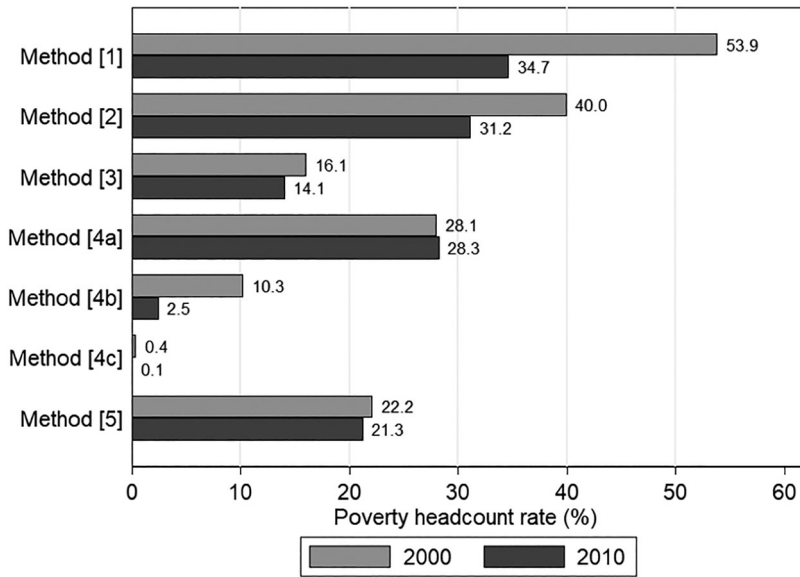


Figure 2. Poverty headcount rate (%) in each poverty approach.

rate (dropping by nearly nine percentage points), while absolute time poverty rate (i.e. method [3]) declined slightly from 16.1% to 14.1%. Furthermore, the decrease in money-metric, non-money-metric and time poverty rates (except method [4a], the only method which resulted in an increase of headcount rate from 2000 to 2010, albeit negligently) infers that the population suffered less money-metric, non-money multidimensional and time poverty during the 10-year period.

Table 1 shows the poverty headcount ratios in the first three approaches by various personal characteristics. In methods [1] and [2], unemployed or inactive young African individuals aged 10–24 years with low educational attainment, coming from households with a large number of members (with presence of children) residing in Eastern Cape, KwaZulu-Natal and Limpopo provinces were associated with greater money-metric poverty and non-money-metric multidimensional poverty. These results in general are in line with what was found in the abundant South African studies on these two types of poverty.

The absolute time poverty measures (method [3]) provided fewer similarities as observed for method [1] and [2]. Quite noticeably, individuals from the 10–14 years age cohort had the highest absolute time poverty rate. Moreover, absolute time poverty rates were quite similar by race, i.e. there was no strong indication that Africans suffered much greater time poverty rate as what happened in money-metric and non-money-metric poverty.

As far as time poverty rates by educational attainment are concerned, method [3] resulted in the highest estimates for those with incomplete primary education. This result is not surprising, as it is possible that those with low levels of education are associated with inferior non-income welfare in their residence and hence take longer time to perform certain activities such as collecting water and travelling to the nearest grocery stores.

Table 1. Poverty headcount rates in each approach, by various personal characteristics (%).

	2000 TUS			2010 TUS		
	[1]	[2]	[3]	[1]	[2]	[3]
<u>All</u>						
All	53.86	39.99	16.14	34.72	31.21	14.15
<u>Age cohort</u>						
10–14 years	69.13	44.99	60.84	48.00	34.09	52.99
15–24 years	64.21	43.55	2.17	43.94	35.58	3.21
25–34 years	42.00	36.69	10.47	29.68	33.29	12.82
35–44 years	41.22	33.60	9.36	26.17	27.13	13.22
45–54 years	44.63	35.07	10.60	28.60	25.11	10.23
55–64 years	50.38	38.69	5.42	28.59	26.31	6.01
65 + years	47.59	43.31	1.28	25.09	26.29	1.60
<u>Gender</u>						
Male	52.34	40.30	15.63	33.27	31.70	14.57
Female	55.20	39.71	16.58	36.08	30.76	13.75
<u>Race</u>						
African	66.45	50.67	16.84	42.33	39.12	14.66
Coloured	18.98	3.01	17.33	16.78	7.32	13.32
Indian/Asian	28.39	13.93	14.20	4.03	0.23	13.40
White	1.31	0.72	12.85	0.78	0.44	11.16
<u>Province</u>						
Western Cape	23.62	13.52	14.44	15.08	9.27	15.42
Eastern Cape	67.43	60.67	15.53	44.68	50.59	11.58
Northern Cape	46.02	33.42	20.14	33.20	22.74	15.44
Free State	58.04	40.27	12.15	36.07	22.20	13.25
KwaZulu-Natal	63.36	47.75	16.68	42.88	39.69	16.78
North West	62.78	41.90	17.53	36.57	31.91	11.61
Gauteng	37.72	23.44	14.79	19.85	18.12	14.50
Mpumalanga	54.90	31.49	17.49	39.93	28.48	17.16
Limpopo	63.99	54.02	19.42	52.91	48.59	9.78
<u>Educational attainment</u>						
None	70.74	64.27	5.70	49.91	59.07	4.13
Incomplete primary	70.47	55.48	31.82	49.42	44.31	28.78
Incomplete secondary	55.26	38.53	10.89	38.91	33.77	10.05
Matric	30.40	16.24	7.45	19.52	17.13	12.33
Post-Matric	12.65	7.32	9.74	4.85	4.52	11.32
Other/unspecified	56.88	40.15	14.88	19.23	11.64	12.86
<u>Marital status</u>						
Unmarried	64.24	43.58	21.67	42.80	34.40	17.15
Married/live together	36.99	33.54	9.03	21.55	25.68	11.30
Widowed/divorced	48.89	40.56	5.96	32.34	31.59	5.16
<u>Labour market status</u>						
Employed	41.94	35.41	13.82	16.88	24.51	18.87
Unemployed	63.99	40.09	1.87	49.35	33.36	2.83
Not economically active	62.80	43.98	20.28	44.03	35.11	12.58
<u>SES quintile</u>						
Quintile1	80.55	100.00	18.77	56.96	100.00	13.67
Quintile2	73.42	99.29	17.69	50.03	51.36	14.72
Quintile3	60.96	0.00	16.69	38.38	0.00	14.71
Quintile4	46.71	0.00	13.95	20.71	0.00	14.45
Quintile5	5.82	0.00	13.53	5.13	0.00	13.15
<u>Real per capita income quintile</u>						
Quintile1	100.00	63.86	19.19	100.00	52.39	12.76
Quintile2	100.00	51.35	16.33	69.58	42.13	14.22
Quintile3	68.95	51.18	14.54	0.00	32.87	13.43
Quintile4	0.00	24.42	15.41	0.00	19.47	15.83
Quintile5	0.00	5.41	14.50	0.00	6.47	14.91
<u>Household size</u>						
One person	29.91	47.18	12.80	14.39	48.96	15.43
Two persons	17.07	37.88	10.87	16.38	33.31	12.45
Three persons	41.98	36.89	16.39	31.80	26.57	15.50

(Continued)

Table 1. Continued.

	2000 TUS			2010 TUS		
	[1]	[2]	[3]	[1]	[2]	[3]
Four to five persons	59.92	38.30	16.29	37.34	27.06	13.50
More than five persons	84.92	44.09	20.13	61.02	34.04	15.10
<u>Number of children 0–17 years in the household</u>						
None	55.35	40.95	18.88	34.99	31.40	15.29
One child	48.19	36.26	7.94	32.56	29.30	11.01
Two children	44.05	32.55	10.93	29.82	28.31	12.90
Three children	48.20	37.63	9.77	40.25	35.65	11.19
More than three children	78.99	57.56	11.62	52.77	43.08	11.03

The results by province are somewhat mixed, even though there was an indication that absolute time poverty rate was slightly higher in Northern Cape and Limpopo in 2000, as well as KwaZulu-Natal in 2010. Looking at other results by person-level characteristics, unmarried people suffered much greater absolute time poverty rate (it is possible that they spent longer time to perform numerous tasks alone). Also, absolute time poverty rate was the highest amongst the inactive in 2000 (20.28%) but rather the employed in 2010 (18.87%).

Individuals coming from greater-sized households were associated with greater absolute time poverty. This result in general aligns with the international empirical studies reviewed earlier (e.g. Gammage, 2006, Saqib & Arif, 2012; Merz & Rathjen, 2014b). Lastly, absolute time poverty rate was the highest amongst people who came from households without the presence of any children aged 0–17 years.

Table 2 provides a detailed breakdown on the profile of the poor in each method for both waves of data, and again we first examine the results derived from methods [1] and [2] before proceeding to investigate the results associated with absolute time poverty method [3]. Focusing on the first two methods, the money-metric and non-money-metric poor share very similarly characteristics: young female Africans living in the Eastern Cape, KwaZulu-Natal and Limpopo provinces. These poor people were also lowly educated (without Matric), unmarried and inactive in the labour market, coming from households with at least four members total.

Moving on to the profile of the absolute time-poor, they shared common characteristics as the money-metric and non-money-poor to some extent. First, the absolute time-poor were predominantly youth individuals (10–24 years). Next, females accounted for the majority of time poor. This finding aligns with the absolute time poverty international literature reviewed earlier. With regard to results by race, although Africans were still the most dominant ethnicity group, there was some indication that the white share (2000: 9.4%; 2010: 8.0%) was greater when compared to methods [1] and [2], most likely because the white employed worked excessively longer hours. Moving on to the profile of time poor by province of residence, the bulk of absolute time-poor resided in Gauteng and KwaZulu-Natal.

Whilst those without Matric accounted for the majority of absolute time-poor, with the incomplete primary share being the most dominant (2000: 57.75%; 2010: 41.45%). In addition, the unmarried represented most of the time-poor. Furthermore, whilst the economically inactive represented the majority of absolute time-poor in both 2000 (62.12%) and 2010 (51.06%), the 2010 employed share (47.56%) could not be overlooked.

Table 2. Profile of the poor, by various personal characteristics (%).

	2000 TUS			2010 TUS		
	[1]	[2]	[3]	[1]	[2]	[3]
<u>Age cohort</u>						
10–14 years	22.82	20.00	67.14	18.01	14.23	48.79
15–24 years	32.44	29.64	3.66	32.59	29.36	5.85
25–34 years	14.94	17.58	12.44	18.44	23.01	19.54
35–44 years	11.03	12.11	8.36	11.44	13.20	14.19
45–54 years	7.40	7.84	5.84	8.79	8.58	7.71
55–64 years	5.75	5.94	2.06	6.19	6.34	3.19
65 + years	5.62	6.89	0.50	4.54	5.29	0.71
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Gender</u>						
Male	45.46	47.15	45.35	46.24	49.01	49.70
Female	54.54	52.85	54.65	53.76	50.99	50.30
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Race</u>						
African	93.80	96.34	79.29	95.05	97.70	80.78
Coloured	1.06	0.23	3.23	4.39	2.13	8.57
Indian/Asian	4.77	3.15	7.98	0.32	0.02	2.64
White	0.29	0.21	9.40	0.23	0.14	8.01
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Province</u>						
Western Cape	4.44	3.42	9.08	4.56	3.12	11.44
Eastern Cape	18.68	22.64	14.36	17.06	21.50	10.86
Northern Cape	1.78	1.74	2.59	2.18	1.66	2.49
Free State	7.18	6.71	5.01	5.99	4.10	5.40
KwaZulu-Natal	24.36	24.73	21.39	25.89	26.66	24.86
North West	9.82	8.83	9.11	6.62	6.43	5.16
Gauteng	13.19	11.04	17.27	13.21	13.42	23.69
Mpumalanga	6.82	5.27	7.23	8.31	6.59	8.76
Limpopo	13.74	15.62	13.96	16.18	16.53	7.34
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Educational attainment</u>						
None	10.83	13.25	2.91	6.77	8.92	1.38
Incomplete primary	38.33	40.65	57.75	29.00	28.92	41.45
Incomplete secondary	42.19	39.62	27.75	52.08	50.28	33.02
Matric	5.67	4.08	4.64	10.68	10.43	16.57
Post-Matric	2.56	2.00	6.58	1.27	1.32	7.27
Other/unspecified	0.42	0.40	0.37	0.19	0.13	0.31
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Marital status</u>						
Unmarried	69.45	63.48	78.20	71.05	63.53	69.87
Married/live together	23.01	28.10	18.73	20.99	27.82	27.01
Widowed/divorced	7.54	8.42	3.06	7.96	8.65	3.12
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Labour market status</u>						
Employed	33.70	38.33	37.03	17.33	28.00	47.56
Unemployed	8.66	7.31	0.85	9.83	7.39	1.38
Not economically active	57.64	54.36	62.12	72.84	64.61	51.06
	100.00	100.00	100.00	100.00	100.00	100.00
<u>SES quintile</u>						
Quintile1	30.22	50.54	23.51	32.82	64.10	19.33
Quintile2	27.15	49.46	21.79	31.44	35.90	22.70
Quintile3	22.78	0.00	20.82	21.57	0.00	20.30
Quintile4	17.77	0.00	17.71	11.25	0.00	19.27
Quintile5	2.08	0.00	16.17	2.92	0.00	18.40
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Real per capita income quintile</u>						
Quintile1	46.30	39.83	29.59	64.23	37.43	20.11
Quintile2	28.10	19.43	15.30	35.77	24.10	17.94
Quintile3	25.60	25.60	18.04	0.00	23.16	20.88

(Continued)

Table 2. Continued.

	2000 TUS			2010 TUS		
	[1]	[2]	[3]	[1]	[2]	[3]
Quintile4	0.00	12.51	19.58	0.00	11.18	20.05
Quintile5	0.00	2.63	17.49	0.00	4.13	21.02
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Household size</u>						
One person	3.54	7.52	5.05	3.21	12.15	8.45
Two persons	5.30	15.84	11.26	9.39	21.24	17.52
Three persons	13.93	16.49	18.19	18.45	17.15	22.08
Four to five persons	37.99	32.71	34.47	35.97	28.99	31.92
More than five persons	39.24	27.45	31.04	32.98	20.47	20.03
	100.00	100.00	100.00	100.00	100.00	100.00
<u>Number of children 0–17 years in the household</u>						
None	72.46	72.22	82.52	68.99	68.87	74.02
One child	11.06	11.21	6.05	13.98	13.99	11.61
Two children	7.54	7.51	6.26	8.84	9.34	9.39
Three children	4.16	4.37	2.82	4.63	4.57	3.16
More than three children	4.78	4.69	2.35	3.56	3.23	1.83
	100.00	100.00	100.00	100.00	100.00	100.00

Table 3. Relationship between money-metric poverty and time poverty absolute approach, row totals.

	TUS 2000		
	Income not poor	Income poor	Total
Time not poor	46.99	53.01	100.00
Time poor	41.99	58.01	100.00
Total	46.18	53.82	100.00
	TUS 2010		
	Income not poor	Income poor	Total
Time not poor	64.76	35.24	100.00
Time poor	68.44	31.56	100.00
Total	65.28	34.72	100.00

The latter result is most likely once again attributed to the fact that some employed spent too much time working in the labour market as mentioned earlier. Lastly, the majority of absolute time-poor individuals came from households with at least four members as well as households without children.

We now proceed to the 2×2 matrices which examine the relationship between money-metric poverty and absolute time poverty, and the results are encouraging, because approximately 58% of the absolute time-poor were also income-poor in 2000, as shown in Table 3. This share dropped by almost 27 percentage points to 31.56% in 2010.

Figure 3 also show the results of the 2×2 matrices, but this time the cell totals are shown and expressed as pie charts. In all three figures, the share of people who were both income- and absolute time-poor decreased (2000: 9.36%: 2010: 4.46%), whereas the percentage of individuals who were neither time- nor income-poor increased over time (from 39.41% to 55.60%).

4. Conclusion

This is the first South African study that comprehensively examined both the 2000 and 2010 waves of TUS data to investigate time poverty by adopting all three (absolute,

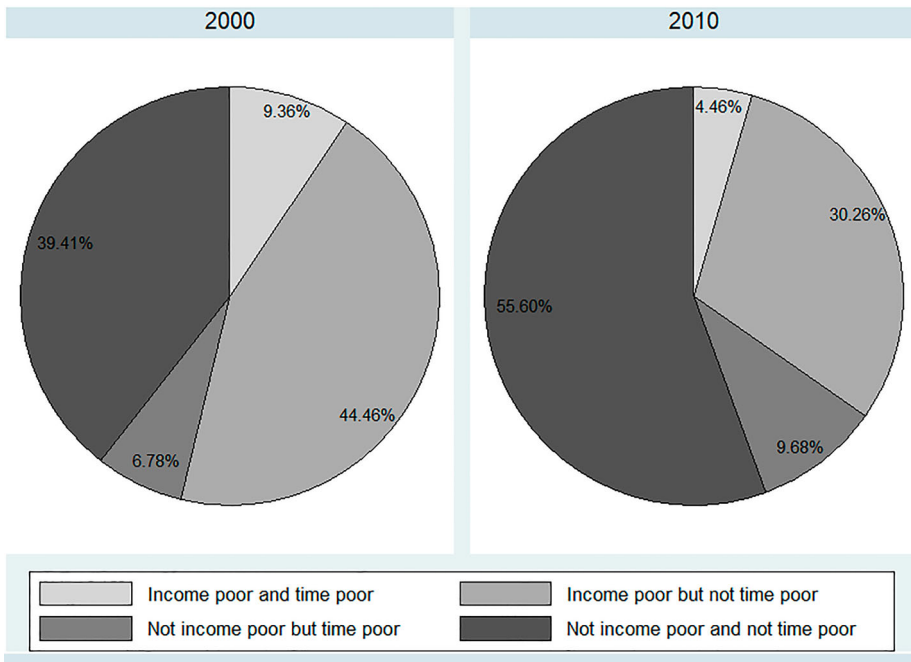


Figure 3. Relationship between money-metric poverty and time poverty absolute approach.

relative and time deficit) approaches, with specific focus on absolute time poverty and its relationship with money-metric poverty. The empirical findings showed that the absolute time-poor people were predominantly young unmarried African individuals from Gauteng and KwaZulu-Natal coming from households with at least four members. These absolute time-poor people were also lowly educated (incomplete primary education) and inactive in the labour market, although there was some indication that a larger proportion of time-poor in 2020 was represented by employed (who might have worked too long hours). Furthermore, the proportion of people who were classified as both money-metric and absolute time-poor decreased between 2000 and 2010.

More empirical analysis can still be conducted on time poverty, such as investigating the profile of people who were defined as time-poor in all three approaches, deeper comparison between the three types of time poverty, as well as multivariate econometric analysis on poverty likelihood in each approach (e.g. simple probit and multivariate probit regressions). However, all these investigations would require a different study to be conducted. Nonetheless, the empirical findings derived in this study are a good start to understand the state of the South African time poverty (as well as its difference from money-metric and non-money-metric poverty) in 2000 and 2010. Last, it is hoped that Statistics South Africa will soon conduct another round of TUS, so that it is possible to examine longer-term trends on time poverty in the country.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix

Appendix A: Supplementary information

Table A1. Summary of time poverty lines adopted in the three main approaches.

Study	Time poverty line
(1) Absolute approach	
Saqib & Arif (2012)	63 h a week on committed activities (SNA and extended SNA). Converted to hours a day with bounds: Lower bound: 9 work hours a day Middle bound: 10.5 work hours a day Upper bound: 12 work hours a day
Ribeiro & Marinho (2012)	64 h a week on paid work, unpaid work and commuting time
Arora (2015)	12 h per day on total work time on primary activities
(2) Relative approach	
Bardasi & Wodon (2006)	Lower bound: 1.5 times the median weekly work hours Upper bound: 2 times the median weekly work hours
Lawson (2008)	Lower bound: 1.5 times the median weekly work hours Upper bound: 2 times the median weekly work hours
Bardasi & Wodon (2010)	50 h per week on work 1.5 times the median weekly work hours
Gammage (2006)	Lower bound: 1.5 times the median weekly work hours Upper bound: 2 times the median weekly work hours
Kalenkoski <i>et al.</i> (2011)	60% of the median discretionary time
Chatzitheochari & Arber (2012)	60% the median free time (residual after removing paid work, unpaid work and personal care)
Saqib & Arif (2012)	Lower bound: 1.5 times the median weekly work hours Upper bound: 2 times the median weekly work hours
Metz & Rathjen (2014a)	60% of median personal leisure time
Metz & Rathjen (2014b)	60% of median personal genuine time
Noh and Kim (2015)	150% of median total work time
Orkoh <i>et al.</i> (2020)	Lower bound: 1.5 times the median contracted (paid and unpaid) work hours Upper bound: 2 times the median contracted (paid and unpaid) work hours
(3) Time deficit approach	
Harvey & Mukhopadhyay (2007)	An individual's paid work time exceeds the time available for work and leisure less the minimum time for household tasks and free time.
Antonopoulos <i>et al.</i> (2012a & 2012b)	An individual's paid work time exceeds the time available for work and leisure less the minimum time for household tasks and free time (with some modifications from the 2007 Harvey & Mukhopadhyay approach).

Table A2. System of National Accounts (SNA) Classification.

Category	Sub-category
SNA production	[1]: Work in establishments [2]: Primary production not for establishments [3]: Other production of goods and services not for establishments
Non-SNA production	[4]: Household maintenance [5]: Care of persons in the household [6]: Community service to non-household members
Non-productive	[7]: Learning [8]: Social and cultural [9]: Mass media use [10]: Personal care

Source: Adapted from Statistics South Africa, 2001.

Table A3. General profile of the weighted sample (%).

		TUS 2000	TUS 2010
Age cohort	10–14 yrs	17.78	13.03
	15–24 yrs	27.21	25.75
	25–34 yrs	19.16	21.57
	35–44 yrs	14.41	15.18
	45–54 yrs	8.93	10.67
	55–64 yrs	6.14	7.52
Gender	65 + yrs	6.36	6.28
	Male	46.78	48.26
Population group	Female	53.22	51.74
	African	76.03	77.96
	Coloured	3.01	9.09
Province	Indian/Asian	9.05	2.79
	White	11.78	10.15
	Western Cape	10.12	10.49
	Eastern Cape	14.92	13.26
	Northern Cape	2.08	2.28
	Free State	6.66	5.76
Highest educational attainment	KwaZulu-Natal	20.71	20.96
	North West	8.42	6.29
	Gauteng	18.83	23.11
	Mpumalanga	6.69	7.23
	Limpopo	11.56	10.62
	None	8.24	4.71
	Incomplete primary	29.30	20.38
	Incomplete secondary	41.12	46.47
	Matric	10.04	19.00
	Post-Matric	10.90	9.09
Marital status	Other/Unspecified	0.40	0.34
	Unmarried	58.21	57.64
	Married/live together	33.49	33.81
Labour market status	Widowed/divorced	8.30	8.55
	Employed	43.28	35.65
	Unemployed	7.29	6.92
Household size	Not economically active	49.43	57.43
	One person	6.37	7.74
	Two persons	16.72	19.90
	Three persons	17.88	20.15
	Four to five persons	34.15	33.44
	More than five persons	24.89	18.77
	<i>Mean (number of members)</i>	3.55	3.36
Number of children aged 0–17 years in the household	None	70.51	68.46
	One child	12.36	14.91
	Two children	9.22	10.29
	Three children	4.64	4.00
	More than three children	3.26	2.34
	<i>Mean (number of children)</i>	0.58	0.57

Source: Nackerdien & Yu, 2021.

Appendix B: Derivation of relative and time-deficit time poverty lines

Three relative poverty lines are constructed (see Table B1). The first one is based on the work of Kalenkoski et al. (2011), Chatzitheochari & Arber (2012) and Metz & Rathjen (2014a, 2014b), using 60% times the median discretionary (free) time. Free time is derived as the residual (leftover time) after contracted time, committed time and personal care (selfcare) are removed from the 24 h available in a day. Contracted time includes paid work in adults or education in children, whereas committed time considers unpaid work or non-SNA production. An individual whose free time falls below 60% of median free time is classified as relative time-poor. For adults, the poverty lines are 198 and 162 min for 2000 and 2010 respectively, while for children it is 198 min for both years.

Table B1. The three relative time poverty lines adopted in the study.

	TUS 2000 – adults	TUS 2010 – adults
Median free time of adults	330 min	270 min
Median work hours of adult employed	330 min	510 min
Median non-SNA time of adults	120 min	120 min
60% of median free time of adults	$330 \times 0.6 = 198$ min	$270 \times 0.6 = 162$ min
1.5 \times median	$(330 + 120) \times 1.5 = 675$ min	$(510 + 120) \times 1.5 = 945$ min
2 \times median	$(330 + 120) \times 2 = 900$ min	$(510 + 120) \times 2 = 1\ 260$ min
	TUS 2000 – children	TUS 2010 – children
Median free time of children	330 min	330 min
Median learning time of children	330 min	300 min
Non-SNA median time of children	45 min	45 min
60% of median free time of children	$330 \times 0.6 = 198$ min	$330 \times 0.6 = 198$ min
1.5 \times median	$(330 + 45) \times 1.5 = 562.5$ min	$(300 + 45) \times 1.5 = 517.5$ min
2 \times median	$(330 + 45) \times 2 = 750$ min	$(300 + 45) \times 2 = 690$ min

The second and third relative poverty lines are derived by following the approach of Bardasi & Wodon (2006), Lawson (2008) and Saqib & Arif (2012), by calculating 1.5 or 2.0 times the median weekly work hours (paid work and unpaid hours in the case of adults; but learning time in the case of children), respectively. Any individual found to have worked more weekly hours than the derived poverty cut-offs is regarded as time-poor. In this study, we rather look at daily but not weekly median work hours given the nature of the TUS data (to be discussed later); for adults, using 1.5 times median daily work hours, the cut-offs are 675 and 945 min in 2000 and 2010 respectively; using two times the median daily work hours, the thresholds are 900 and 1 260 min respectively. For children 10–14 years who were not legally eligible to work, relative poverty lines are derived by firstly summing their median learning and non-SNA median time, before multiplying by 1.5 and 2 respectively to derive each relative time poverty line, as shown in the last few rows of Table 1.

For the time deficit approach, the methods applied by Harvey & Mukhopadhyay (2007) and Antonopoulos & Memis (2010) are adopted with some modifications, by taking into consideration three main categories: personal necessary time (X), paid work (Y), unpaid work (Z). X is the sum of median values of leisure, sleep and necessary care (see Table B2 for their derived values using the TUS data). Time allocated for SNA and non-SNA (T_m) are then derived: It is the residual time left after X is subtracted from the total time available in a day.

Next, the required unpaid hours (T_l) are derived. The estimation is only conducted for 2010 (see Table B3) as the Antonopoulos & Memis (2010) results (using the 2000 TUS data) are simply adopted for 2000. Finally, a comparison is drawn between T_m and T_l . In the case of adults, if SNA work hours exceeds the difference ($T_m - T_l$), this adult experiences a time deficit (i.e. an individual works longer hours than what is available) and suffers time poverty. For children 10–14 years, learning time (instead of SNA work time) is compared to the difference between T_m and T_l ; if learning time exceeds this ($T_m - T_l$) difference, the child is distinguished as time-poor.

Table B2. Working hours (T_m) calculations (in minutes) in the time deficit approach.

	TUS 2000	TUS 2010
(1): Leisure	230	165
(2): Sleep	540	510
(3): Necessary care	105	120
T_m [1440 min – (1) – (2) – (3)]	565	645

Table B3. Required unpaid hours (T_1) (in minutes) in the time deficit approach.

TUS 2000 (based on 2010 Antonopoulos & Memis results)			
	0 child	1 child	2 + children
1 adult	154.02	228.73	234.88
2 adults	155.03	225.78	202.68
3 + adults	113.19	249.85	199.74
TUS 2010			
	0 child	1 child	2 + children
1 adult	161.07	228.11	239.36
2 adults	164.93	216.03	195.07
3 + adults	128.89	213.40	217.04