COUNTING WOMEN'S WORK

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Counting Women's Work South Africa

Counting Women's Work in South Africa:

Estimates of Household Production across the Lifecycle in 2000

Morné Oosthuizen

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Abstract

National Transfer Accounts' (NTA) overt link to the System of National Accounts means that non-market services are rendered invisible in our conventional estimates of the generational economy. This is particularly problematic from the perspective of gender analyses of NTAs, since women allocate more time to producing non-market services than men. Thus, our assessment of the generational economy using gender-disaggregated NTAs may be misleading, particularly with respect to patterns of dependency. This paper applies the National Time Transfer Accounts (NTTA) methodology to South African data for 2000 to integrate estimates of household production into the gender-disaggregated NTAs to derive profiles of total economy production and consumption. The results value household production at 29.8 percent of GDP, while revealing significant gender specialisation in productive activities across the lifecycle. The total consumption of young children is found to be 2.0 to 4.5 times their market consumption, a fact that has important implications in terms of understanding decisions around fertility and for policy aimed at increasing women's economic participation.

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1 Introduction

Globally, there is increasing attention being paid to the effect that population age structures have on national economies. Countries with young populations often look towards the 'promised' benefits of the demographic dividend, while those with older populations may view future population ageing with concern; in truth, though, both sets of countries should recognise both the opportunities and the challenges associated with demographic change.

The National Transfer Accounts (NTA) methodology is well-suited to analysing these economic impacts of demographic change. NTAs map out the flows of resources generated by the activities of production, consumption, sharing and saving across age groups and, with their strong link to national accounts and other macroeconomic aggregates, allows for the analysis of the generational economy.

This overt link to the System of National Accounts (SNA) means that NTAs suffer from the same 'blind spots' as national accounts, one of which is their delineation of the production boundary to exclude non-market services. As a result, these services—such as cooking, cleaning, and care—produced within households are rendered invisible within national accounts and NTAs. This fact is brought into sharp focus when analysing the generational economy by gender with males out-producing females; this often occurs by substantial margins and is often evident across the entire lifecycle.

The reason for this is the specialisation by women in countries around the world in household production activities, while men specialise in market work. The degree of specialisation varies substantially across countries in response to social norms and institutional contexts, but it is always women who spend longer hours in household production. Thus, while the majority of men's time spent in productive activities is visible in national accounting aggregates, this is not necessarily true for women.

This paper employs the National Time Transfer Accounts (NTTA) methodology (Donehower, 2018) to estimate household production across the lifecycle and by gender for South Africa in 2000. Estimates of time spent in these activities are valued and are then combined with gender-specific NTA estimates so as to better understand total production and consumption for males and females across the lifecycle. Importantly, the results shed light on some of the constraints imposed on women's greater economic participation by their obligations within their households.

2 Methodology and Data

2.1 Methodology

2.1.1 National Transfer Accounts and National Time Transfer Accounts

National Time Transfer Accounts (NTTA) builds on the National Transfer Accounts (NTA) methodology, which originated from the work by Lee (1994*a*; 1994*b*). NTAs are used to analyse the generational economy, defined as "the social institutions and economic mechanisms used by each generation or age group to produce, consume, share, and save resources"

(Mason and Lee, 2011*b*, p.7).

National Transfer Accounts are comprised of profiles of economic flows by single-year age cohorts, from age 0 to the very oldest. These flows are important in that they "reflect a fundamental feature of all societies: the economic lifecycle" (Mason and Lee, 2011*a*, p.55). For any individual, inflows must equal outflows and the following identity holds:

$$Y^l + Y^A + \tau^+ = C + \tau^- + S \tag{1}$$

In other words, individuals can receive resource inflows in the form of labour income (Y^l), asset income (Y^A) and transfer inflows (τ^+), and consumption (C), transfers to others (i.e. transfer outflows, τ^-) and savings (S) represent the three ways in which these resources can be used. This identity can be rewritten as:

$$\underbrace{C(x) - Y^l(x)}_{\text{Lifecycle Deficit}} = \underbrace{\underbrace{\tau^+(x) - \tau^-(x)}_{\text{Net Transfers}} + \underbrace{Y^A(x) - S(x)}_{\text{Asset-Based Reallocations}}}_{\text{Age Reallocations}} \tag{2}$$

where x represents a given cohort's age. Consumption, transfers and asset-based reallocation are all further disaggregated into public and private flows, while private transfers are disaggregated into interhousehold and intrahousehold flows. Transfers are flows characterised by a lack of an "explicit qui pro quo", while asset-based reallocations "realize inter-age flows through inter-temporal exchange" (United Nations, 2013).

Full details of the NTA methodology can be found in the NTA Manual (United Nations, 2013) and only a brief overview is presented here. In general, age profiles are constructed on the basis of household survey or administrative data. This data is used to generate the shape of the profile, which represents the mean value of the flow at each age and which is calculated across all members of the cohort, irrespective of whether or not they experience the given flow. For example, the labour income profile is the mean labour income across all individuals in each age cohort, including the unemployed and those who are economically inactive and who therefore have zero labour income. These age profiles are adjusted multiplicatively so that, when weighted by the population structure, they are consistent with aggregate control totals calculated from national accounts and government budget data. For example, when the mean per capita labour income for each cohort is multiplied by the population in that cohort and the products are summed, the total will equal the aggregate control total.

Standard NTAs are, though, likely to systematically underestimate the contribution of women due to their specialisation, relative to men, in household production[1] (Waring, 1999): since household production is not measured in SNA, it is not included in standard NTA flows. There is also a strong lifecycle dimension to non-market household production and unpaid care work (Gershuny, 2003; Hammer et al., 2013), with gender gaps particularly large during

[1]Household production refers to productive activities not resulting in market goods or services and, despite the name, includes activities performed outside the household for non-household members, e.g. care for persons in other households. However, household production is distinct from unpaid family work in household enterprises or farms.

parenthood, although this is also sometimes true at young ages (Motiram and Osberg, 2010).

Growing interest in quantifying household production has promoted the proliferation and increasing harmonisation of time-use surveys and the estimation of satellite accounts in the National Income and Production Accounts (NIPA) for non-market household production. There is now an extensive literature on the valuation of non-market household production and the production of these satellite accounts (see, for example, Abraham and Mackie, 2005; Budlender, 2008; Ironmonger, 1996; Landefeld and McCulla, 2000; Tabatabaei et al., 2013). The NTA work in terms of gender builds on this literature in valuing time spent in household production for individual age cohorts—constructing so-called National Time Transfer Accounts (NTTA)—and incorporating these estimates into gender-disaggregated NTAs. As Donehower and Mejía-Guevara (2013) note, if one of the goals of NTA is to understand dependency, the analysis must move beyond monetary inputs to include essential care and other household production activities.

2.1.2 Constructing Household Production-Related Age Profiles

The objective of NTTA is to estimate patterns of time allocations to productive activities in particular across the lifecycle and by gender. With estimated age profiles of production and consumption of non-market services (i.e. household production), it is then possible to estimate flows of 'time' (and the value of that time) across the lifecycle in a way that is analogous to the flows of transfers within the standard NTA framework. Full details of the NTTA methodology can be found in Donehower (2018).

Comprehensive time-use surveys contain data on a wide variety of activities, both productive and non-productive. The first task is to identify activities that would have been included within GDP had they not been performed within the household. We identify unpaid productive activities as those meeting the "third party criterion". Originally articulated by Reid (1934), the third party criterion defines as 'work' any unpaid activity performed by a household member that a third person could be paid to perform. Within the International Classification of Activities for Time Use Statistics (ICATUS), categories of productive activities that are not included in national income are major groups 4 through 6, namely: household maintenance, management and shopping for own household; care for children, the sick, elderly and disabled for own household; community services; and help to other households.

Time-use surveys typically allow respondents to report doing more than one activity within a given time slot. Depending on the survey, these activities might be performed sequentially within a time slot, or they might be performed simultaneously (i.e. multitasking). Further, in the case of simultaneous activities, surveys may allow respondents to identify which is the primary activity and which are secondary activities. There is, however, substantial variation in the approach taken in different surveys and, as a result, the NTTA approach is to ignore multitasking and to consider only the primary activity. In the case of the South African data, this is not possible. The TUS 2000 does not distinguish between primary and secondary activities; instead, it allows respondents to list up to three activities

performed either simultaneously or sequentially within a 30-minute slot. The result is that it is not possible to select the 'primary' activity. The approach taken in the estimations is to split the 30 minutes between the reported activities: two activities within a given slot are each allocated half of the time (i.e. 15 minutes each in a 30-minute slot), while three activities within a single slot are each allocated one-third of the time (i.e. 10 minutes each).

The NTTA approach (Donehower, 2018, p.20) is to classify the various household production activities into 14 major groups: cleaning; laundry; cooking; household maintenance and repair; lawn and garden care; household management; pet care; travel; purchasing goods and services; childcare; care for adults and elders; travel related to the aforementioned activities; volunteering or other forms of care for community members, including related travel; and fetching wood and water.[2] In the current research, we distinguish between 13 activities, with only lawn and garden care not included due to no respondents indicating any time allocated to this activity.

Four types of age profiles are constructed: production, consumption and transfers (inflows and outflows). The production profile for a given activity is calculated as the time spent on that activity averaged across *all* members of each age cohort. Individuals who do not spend any time in that activity are allocated a zero for the purposes of calculating the mean. For example, the average time spent cleaning by 20 year olds is the value of the cleaning production profile at age 20.

Since consumption of household production is not directly observed in the surveys, it is estimated indirectly. In the case of activities of which all household members are beneficiaries, such as cooking, cleaning and household management, production is allocated equally as consumption to all household members including the producer. In contrast, in the case of activities for which only specific household members are beneficiaries, the approach is to allocate consumption using a regression where the dependent variable is the time spent by respondents in the activity and the independent variables are the number of individuals in the household of relevant ages. For example, in the case of childcare, the independent variables would be the number of household members aged zero, the number aged one, and so on. This approach is similar to that used in the allocation of certain types of consumption in NTA.

Since household production is typically only observed for a subset of household members, a matrix is constructed where each cell represents the average time consumed by individuals of a particular age and gender (the columns) of a given activity produced by individuals of a particular age and gender (the rows). By multiplying the rows by the corresponding population estimates, a matrix of aggregate production and consumption is constructed. Dividing the columns by the corresponding population estimates generates a matrix of average consumption by individuals of a particular age and gender of activities produced by individuals of a particular age and gender. Summing each column (i.e. across producer characteristics)

[2]Fetching wood and water is included within the SNA production boundary in terms of the 2008 SNA and its inclusion here is technically double-counting. However, given that the value of these activities is so poorly estimated when included in GDP, it is argued that the extent of double-counting is reduced. This is further confirmed, in the South African context, by the relatively small aggregate value estimated for this activity.

yields the total consumption of a given activity by individuals by age and gender.

Transfer inflows and outflows are calculated differently depending on the activity in question. For intra-household transfers—where all production and consumption occurs within the household—there are two procedures. In the case of targeted care, such as care of children within the household, the production of the activity is recorded as an outflow, while the consumption is recorded as an inflow. In the case of activities that benefit all members of the household, the time consumed by the producer him- or herself must be excluded from the transfers. Thus, if an individual cleans for one hour in a household of four, he is deemed to consume one-quarter of that production and to transfer three-quarters to the other three household members. In this case, at the household level, production is one hour, consumption is one hour, there is a transfer outflow of 45 minutes and a matching transfer inflow of 45 minutes.

For activities where beneficiaries of the household production are not members of the household (e.g. care of non-household members), the production-consumption matrix described above is used. All production of these activities is designated as transfer outflows and all consumption is designated as transfer inflows.

As in NTA, calculated profiles are smoothed to deal with some of the noise in the data. The key exception is for the consumption and transfer inflows of care time for infants, since smoothing is likely to substantially underestimate their consumption. Once the profiles are smoothed, various checks are implemented to ensure consistency across profiles. Specifically, the checks ensure that total production equals total consumption, that total inter-household inflows equal total inter-household outflows, and that total intra-household inflows equal total intra-household outflows.

2.1.3 Determining the Value of Household Production

Once the age profiles of production, consumption and transfers have been estimated, these need to be valued using an appropriate wage. Valuing time spent in household production is useful in assessing its magnitude relative to, say, GDP; it is also important if these estimates are to be combined with NTA estimates of market production. However, while national accounts values production using the price in the market of the outputs produced (Abraham and Mackie, 2005), this poses substantial challenges for the valuation of non-market production. In particular, since we are dealing with non-market production, none of the outputs have market prices. Determining the value of these services would require additional data on price and quality across activities—data which does not exist in most contexts.

The NTTA approach instead uses the labour input as a basis for valuing household production; it does, however, ignore the value of the capital inputs, potentially resulting in a underestimate of the total value of household production. While valuing labour inputs rather than the outputs of household production may result in a downward bias in the NTTA estimates, it helps avoid issues such as double-counting production that includes purchased and non-purchased inputs (Donehower, 2014).

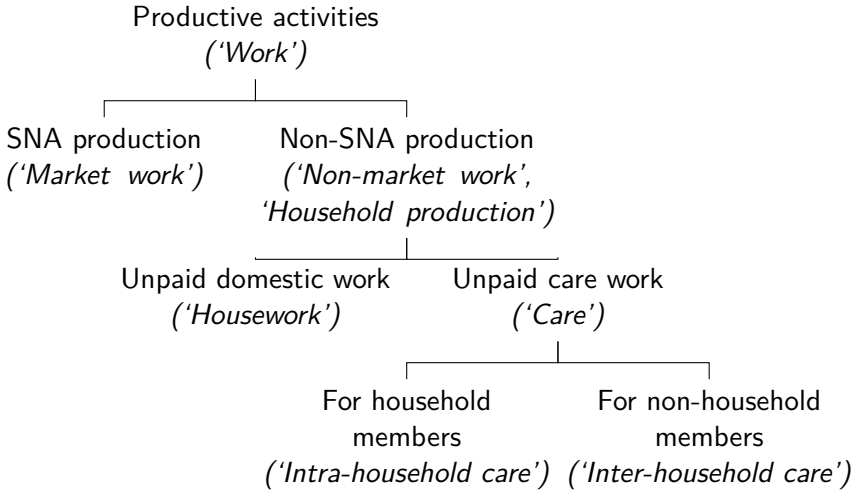
The wage rates used to value time inputs can be estimated in two broad ways: using

a replacement wage or an opportunity cost wage (Abraham and Mackie, 2005; Budlender, 2008). Replacement wages are the answer to the question of what it would cost to hire someone in the market to perform the activity, and there are two approaches to calculating them. The first approach—the generalist replacement approach—assumes that the activity can be performed by someone from a wide range of occupations related household production activities. Thus, the mean wage of workers engaged in the market in a broad range of the activities to be valued is used (e.g. the mean wage of a domestic worker may be used to value time spent on childcare, cleaning and cooking). The second approach—the specialist replacement approach—uses the wage of workers engaged in market activities equivalent to the household production activity being valued. Thus, for example, one might use the mean wage of workers in a variety of cooking-related occupations (e.g. cooks, chefs, caterers) to value time spent cooking for the household. The opportunity cost approach differs from the replacement approach in that it asks what an individual might otherwise have earned in the market instead of spending time in household production activities. For employed individuals, the opportunity cost wage is simply equal to their wage; for those not employed, an opportunity cost wage needs to be imputed on the basis of individual characteristics.

Within NTTA, the preferred methodology is the specialist replacement approach, since the opportunity cost wage rates in most countries tend to be very high—the method imputes skilled inputs not required to complete the task—while the generalist replacement approach is avoided due to the relatively small number of households in most countries that can afford to employ housekeepers (the typical generalist) (Donehower, 2014). Opportunity cost wages are also controversial in that they imply that, for example, an hour of childcare performed by a highly educated parent is more valuable than an hour of childcare performed by a parent with no education.

Before continuing, it is worth spending some time on terminology as there does not seem to be a strong consensus on the meanings of various terms. For this paper, the terminology that will be used is presented in Figure 1.

Figure 1: Types of Work



All activities that meet the third party criterion are productive activities, which are also termed 'work' in this paper. There are two types of work: market work or SNA production, activities that fall within the production boundary of the System of National Accounts (SNA); and non-market work or household production. Household production is also sometimes termed 'unpaid work' or even simply 'care'. Within household production, I distinguish between unpaid domestic work or housework, and unpaid care work, which may involve care for household members (intra-household care) or for members of other households (inter-household care).

2.2 Data

A number of data sources are utilised for this research in order to construct the NTA age profiles of labour income and consumption and the various profiles of household production and consumption.

The Income and Expenditure Survey (IES) 2000, published by Statistics South Africa (2007), is the primary data source for the NTA age profiles. This is a nationally representative household survey, conducted on a five-yearly basis, that asks detailed questions on expenditures at a household level, and incomes at both an individual and a household level. The survey was conducted during October 2000 using the same sample of 30 000 households as the September 2000 Labour Force Survey (LFS). It is possible to link the two surveys and, while the vast majority of observations are matchable across the two datasets, this is not universally true. Version 2 of this dataset is used, which updates the weights based on the 2001 population totals.

The IES is used to construct the labour income and private consumption profiles. For the private consumption of education and health profiles, supplementary data from the Post-Apartheid Labour Market Series (PALMS) (Kerr et al., 2016), the 2002 General Household Survey (GHS) (Statistics South Africa, 2002), and the 1998 Demographic and Health Survey (DHS) (Department of Health and Medical Research Council, 1998) are utilised. From PALMS[3], age profiles are constructed of educational attendance rates by level of education using the September 2000 LFS data; these profiles are used to allocate household educational spending to individual household members. This same data is used to allocate public consumption of education, although neither this survey nor any other contemporaneous nationally representative survey makes this distinction. Total attendance rates by level of education are therefore used to proxy attendance rates for public education institutions. The 2002 GHS data is used to calculate healthcare utilisation rates for the allocation of household spending on healthcare to individual household members. It is also used to calculate public healthcare utilisation rates for the construction of the age profile for public consumption of health. Finally, the 1998 DHS data is used to allocate household-level expenditure on alcohol and tobacco products to household members. Conventionally, this spending is not differentiated from the remaining 'other' expenditure (once education and health have been

[3]PALMS is a harmonised stacked cross-sectional dataset containing more than 50 of Statistics South Africa's household surveys conducted during the post-apartheid period.

allocated), which is allocated to household members using an adult equivalence scale. However, allocating spending on alcohol and tobacco products to all household members does not seem appropriate and, indeed, artificially raises consumption for children in particular; instead, this spending is allocated to household members using estimates of rates of alcohol and tobacco usage.[4]

NTA age profiles are multiplicatively adjusted so that they are consistent with aggregate control totals calculated from national accounts. This data is obtained from the South African Reserve Bank (2018). Aggregate control totals for the various NTA flows are presented in Table 2 in the Appendix.

Estimates of household production are constructed using the 2000 Time Use Survey (TUS), published by Statistics South Africa (2001*b*). The 2000 TUS was South Africa's first nationally representative time-use survey. Fieldwork was conducted in three tranches, in February, June and October 2000. Within surveyed households, details on all respondents were collected within a household roster, while two respondents aged ten years or older were randomly selected from the household to fill out the time-use component of the survey; where there was only one household member eligible to be selected, only that member was selected. The survey made use of a 24-hour diary, divided into 30-minute slots, covering the previous day beginning at 4am. Up to three activities within a slot were recorded. Multiple activities within a slot could be identified as being performed simultaneously or sequentially. Activities were classified according to what was at the time a "trial classification developed by the United Nations Statistics Division" (Statistics South Africa, 2001*a*, p.2), now known as the International Classification of Activities for Time Use Statistics (ICATUS). The 2000 TUS was essentially a pilot survey, realised sample containing 8 564 households and 14 553 respondents (Statistics South Africa, 2001*a*, p.2).

One unique aspect of the South African TUS questionnaires lies in the fact that it specifically prompts respondents, once they have completed the survey, to check whether they had mentioned all childcare performed. If necessary, respondents went back and filled in any missing childcare; any childcare that was filled in during this process was coded slightly differently so that it is possible to differentiate between spontaneously reported childcare and the childcare that was recorded only after the respondent was prompted. This means that the surveys are likely to have captured more childcare than other surveys without the additional prompt.

Specialist wage rates used to value time spent in household production were calculated from the PALMS data, using the September 2000 and March 2001 waves of the LFS. Two waves were chosen so as to increase the sample size, with the March 2001 wave preferred over the March 2000 wave, which was a pilot survey.

All population data utilised in this research is from the 2017 Revision of the *World Population Prospects* (United Nations, 2017). For future population projections, the medium fertility variant is utilised.

[4] As it turns out, this has only a very small impact on the shape of the age profiles.

3 Results

3.1 National Transfer Accounts by Gender

As described above, NTAs describe the patterns of resource flows across generations that arise as individuals produce, consume, share and save. The evolution over the lifecycle of two of these activities—producing and consuming—is described by the NTA flows of labour income and consumption. The upper panel of Figure 2 presents the two flows by age for South Africa in 2000. Standard practice in NTA analysis is to standardise age profiles by dividing all values by the mean labour income of 30 to 49 year olds, considered to be prime working ages.

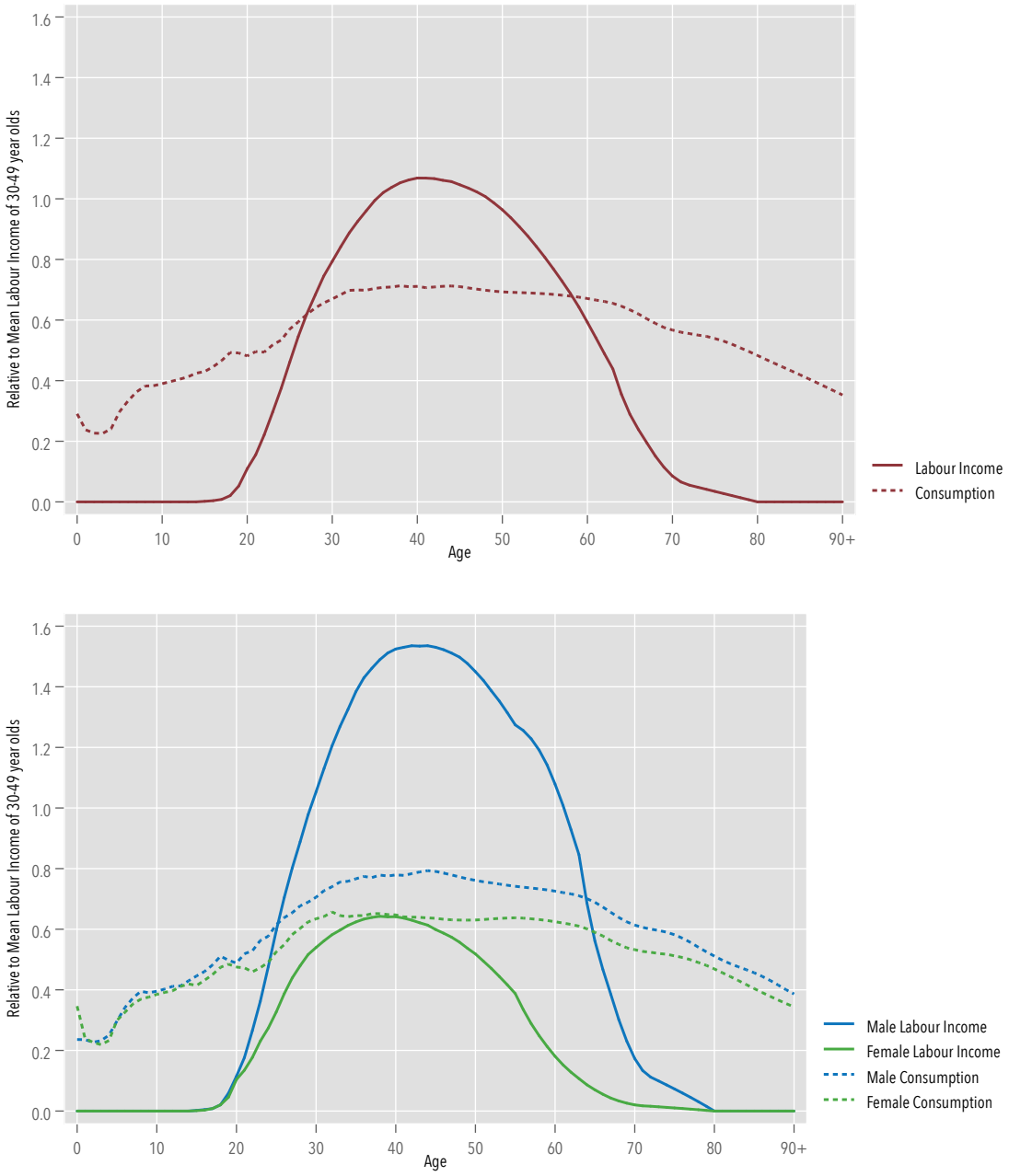
Labour income typically exhibits a bell-shaped pattern when presented by age. The very young generate no labour income for various reasons, including societal restrictions on child labour and the participation of children in education. As age increases, young people slowly enter the labour market in either paid or unpaid employment, and labour income gradually increases. At some point, this increase accelerates and labour income rises rapidly to reach a peak at some point during the prime working ages, after which it falls again. By old age, few continue to earn labour income and the labour income profile once again falls to zero. Consumption, on the other hand, is relatively low amongst the very young and gradually increases with age until adulthood. At this point, consumption profiles tend to level off, although there are many exceptions to this rule.

Labour income in South Africa in 2000 is initially zero and is estimated at only 10.9 percent of peak labour income at age 20. It does, however, increase rapidly throughout the twenties, reaching 79.4 percent of peak labour income at age 30. Labour income remains above 100 percent of peak labour income between the ages of 36 and 48 years, and falls as age increases thereafter. By age 55, mean labour income has fallen to 80.7 percent and at 65 is just 28.9 percent of peak labour income.

In contrast, consumption ranges between 20 and 30 percent of peak labour income for children under the age of five years. It rises with age thereafter, rising above 50 percent of peak labour income at age 23 and by age 35 is 70.4 percent of peak labour income. Consumption peaks at just over 70 percent between the ages of 35 and 47 years and thereafter declines gradually and continuously with rising age.

The lower panel of Figure 2 disaggregates the labour income and consumption profiles by gender. The gender-specific labour income and consumption profiles follow broadly similar patterns to the overall profiles: for labour income, both exhibit the standard bell-shaped pattern, while both consumption profiles rise with age to peak during the prime working ages and fall at older ages. What is immediately clear, however, is that labour income for males is significantly higher than that of females at all ages where labour income is non-negligible. In absolute terms, the gap is largest during the forties and fifties: at most ages between 40 and 59 years, labour income for males is 0.90 to 0.95 income units higher than that of females. In other words, labour income amongst males at these ages is higher than that of females by 90 to 95 percent of peak labour income. In relative terms, the gap is largest

Figure 2: Labour Income and Consumption in South Africa, 2000



Source: Own calculations, based on South African Reserve Bank (2018); Statistics South Africa (2007).

at older working ages: mean labour income amongst males is six times that of females at age 60 and eight times at age 65. In comparison, at age 30, male labour income is almost twice that of females.

Comparisons of labour income and consumption for males and females reveals that, while male labour income far exceeds male consumption from the mid-twenties to the mid-sixties, female labour income never exceeds female consumption. Considered in terms of NTA terminology, while the average male generates a substantial lifecycle surplus during the prime working ages, the average female produce no surplus at all. This is not to say, though, that individual women do not produce surpluses. The labour income and consumption profiles, however, include only SNA production (i.e. market work and market consumption) and exclude the production and consumption of unpaid services within the household. This yields an incomplete understanding of dependence across the lifecycle, one which the following sections aim to address.

3.2 Time Use Across the Lifecycle

3.2.1 Patterns of Time Use

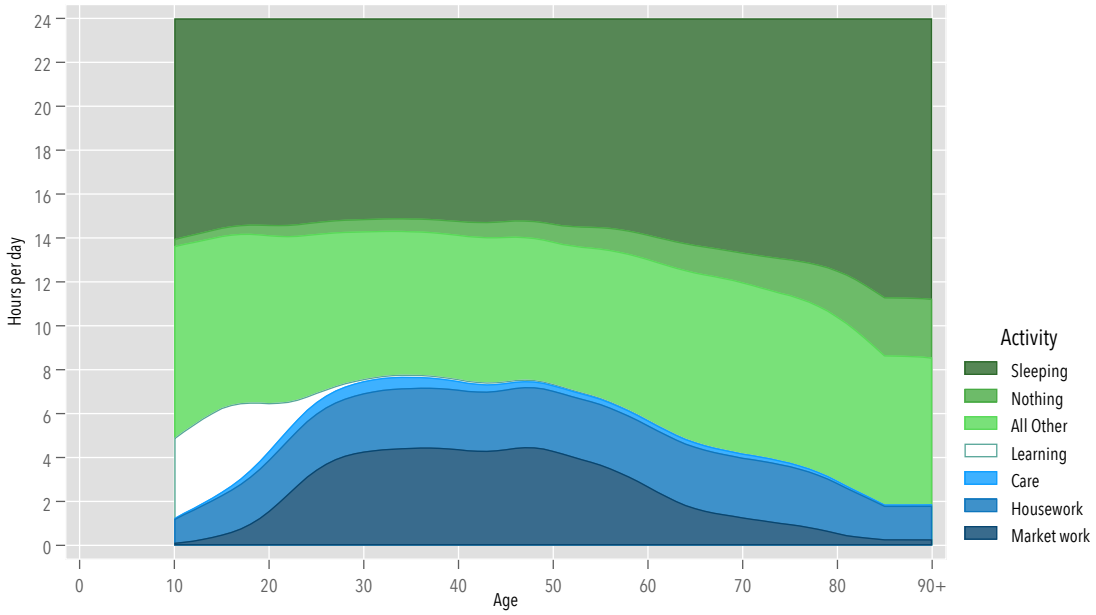
Time use surveys collect a wealth of information on the way in which people spend their time across numerous activities. Based on this data, it is possible to determine average time use patterns according to the age and gender of respondents. Using time use data for 2000, Figure 3 presents the average allocation of time across seven categories of time use for cohorts aged 10 years and above for South Africa. Across the entire population aged 10 years and older, the average person spent 2.7 hours in market production, 2.4 hours doing housework, 0.3 hours caring for others, and 1.2 hours in learning activities. The first three of these activities are considered productive activities; the average South African allocated 5.4 hours per day to productive activities in the market and the home.

It is clear from Figure 3 that time allocations to different activities have a lifecycle dimension. Time spent in learning activities is concentrated amongst younger cohorts, averaging between three and four hours per day for cohorts aged 10 to 18 years. Market work is particularly important amongst prime working-age adults. Between the ages of 28 and 52 years, between 4.0 and 4.5 hours per day is spent in market work activities, but it is close to zero for the youngest and oldest cohorts. Similarly, care peaks between the ages of 22 and 37 years at 0.5 hours per day and is, on average, negligible for the very young and very old. Housework is the one productive activity that does not seem to vary much by age through adulthood: on average, cohorts aged between 17 and 82 years report spending between two and three hours per day on housework, with the youngest and oldest cohorts spending at least an hour per day on this type of activity.

The majority of the day is spent in what is considered non-productive activities, primarily sleep. Time spent sleeping is relatively high across the lifecycle and is lowest amongst prime working-age cohorts. Nevertheless, even amongst these cohorts, the average person reported spending 9.1 hours asleep.

There is, however, a significant amount of gender specialisation in time use. Figure 4

Figure 3: Time Use by Age in South Africa, 2000



Source: Own calculations, based on Statistics South Africa (2001b).

illustrates this by plotting the difference between the female and male time allocations for the same seven activity categories by age. Where the difference is positive, females allocate more time to a particular activity on average relative to males; conversely, where the difference is negative, males allocate more time to the activity.

There are four activities that are characterised by substantial gender specialisation over a significant proportion of the lifecycle. Females are found to specialise in housework and care, while males specialise in market work and 'all other' activities, which includes leisure and personal care. Housework and market work exhibit the greatest degree of gender specialisation. Males spend at least one hour per day more than females in market work between the ages of 20 and 75 years. This difference peaks at more than 2.5 hours per day between the ages of 28 and 40 years. Although it peaks marginally lower at 2.6 hours per day, the difference in female and male time allocations to housework persist over a longer age range: females spend at least one hour per day more than males in housework between the ages of 14 and 78 years.

Care is another activity in which females specialise. Although the extent of specialisation measured in hours per day is much smaller than for market work or housework, it is substantial when considered relative to the average amount of time allocated to care. As noted above, the average South African aged 10 years and older allocated 0.3 hours per day to care for others, while market work and housework each averaged roughly 2.5 hours per day. The peak gender difference in time allocations for the latter two activities was therefore approximately equal to the time allocation to these activities by the overall population. In contrast, the peak gender difference for care, at over 0.8 hours per day is almost triple the average allocation to care for the population as a whole.

Figure 4: Gender Specialisation in Time Use by Age in South Africa, 2000

Source: Own calculations, based on Statistics South Africa (2001b).
Note: The differences plotted here are calculated as time spent by females in a given activity at a particular age less that spent by males in the same activity at the same age.

Although not classified as a productive activity, gender differences in time spent in learning have clear implications for the development of and gender inequalities in human capital accumulation. In South Africa in 2000, females accounted for 49.0 percent of all time spent in learning activities. However, while this may seem a relatively even split, it is important to note that females allocate slightly more time on average than males to learning activities below the age of 15 years (between 0.1 and 0.2 hours per day). In contrast, males show evidence of specialisation in learning activities in early adulthood (between 0.3 and 0.5 hours per day between the ages of 19 and 22 years). This suggests potential disadvantage for females in terms of educational attainment, either through lower enrolment at higher levels of education or through constraints imposed on their ability to allocate time to learning.

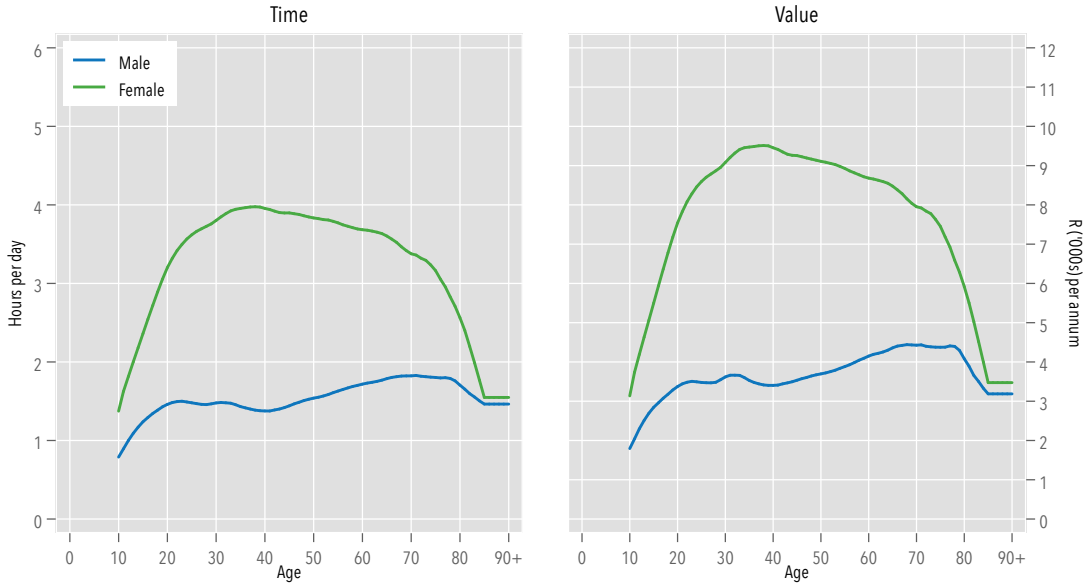
3.2.2 Housework and Care

We turn now to look more closely at non-market work by gender in terms of both time inputs and the monetary valuation of those time inputs. Time inputs are valued using the specialist wages discussed in section 2.2, and converted to annual amounts.

Figure 5 presents the age profiles of housework by gender in terms of time (the lefthand panel) and money (the righthand panel). For females, time spent doing housework rises from 1.4 hours per day at age 10 to a peak of 4.0 hours per day between the ages of 35 and 40. As age increases, the time allocation falls gradually, reaching 3.5 hours at age 67. From the early seventies, though, the time allocation falls steeply such that by age 85 it is back down to 1.5 hours per day. As already highlighted, males allocate less time than females to housework,

and the age profile has a slightly different shape. For males, time spent doing housework is 0.8 hours per day at age 10, rising to 1.5 hours during the twenties and early thirties. After a small decline during the latter half of the thirties, time allocated to housework increases again and averages 1.8 hours between the ages of 63 and 79, before falling to just under 1.5 hours.

Figure 5: Housework in South Africa, 2000

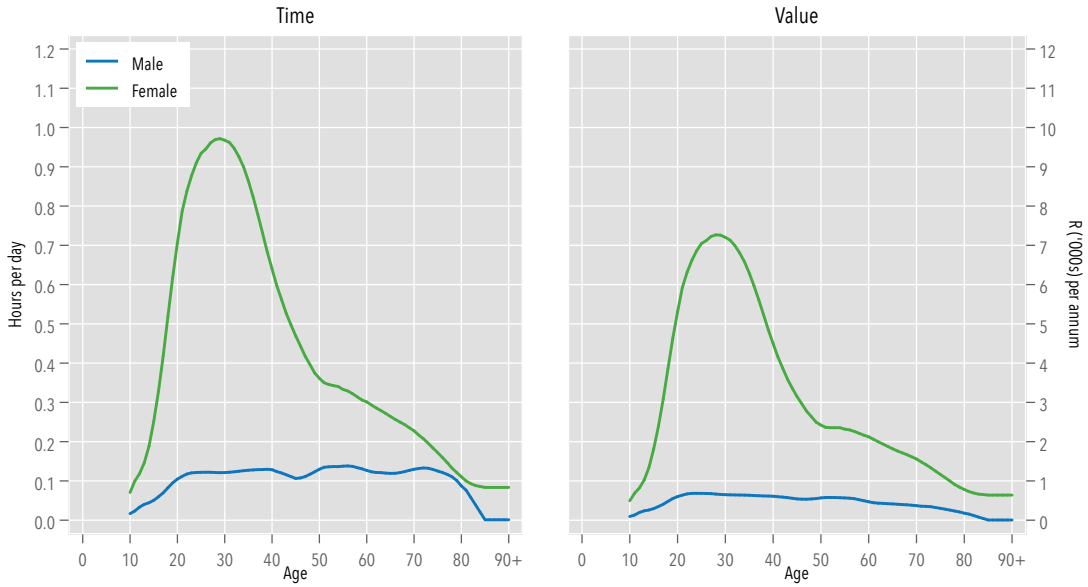


Source: Own calculations, based on Statistics South Africa (2001b).

In monetary terms, the general patterns remain although the different activity compositions across ages combine with differing activity-specific specialist wage rates to create very slight differences between time and value profiles. For females, the value of time spent doing housework peaks at just over R9 500 per capita per annum—equivalent to roughly 44 percent of nominal GDP per capita, which was R21 657 in 2000 (South African Reserve Bank, 2018)–and remains above R7 000 per annum for all cohorts between the ages of 19 and 76 years. For males, the peak value of their housework occurs in the late sixties at just over R4 400, or 21 percent of GDP per capita.

Time allocated to care activities is substantially lower than that allocated to housework. Unsurprisingly, peak time allocations by females to care occur during the prime reproductive ages (Figure 6). Between the ages of 23 and 35 years, women spend just under one hour per day on average in care activities. At younger ages there is a rapid increase in the time allocated to care, while at older ages there is a rapid decline until around age 50, after which the decline is significantly slower. Males, in contrast, allocate very little time to care activities at all, even during the prime reproductive ages. Indeed, there is very little variation in males' time spent caring for others across the lifecycle: on average, males between the ages of 19 and 79 years spent between 0.10 hours and 0.15 hours (6-10 minutes) per day in care activities.

Figure 6: Care in South Africa, 2000



Source: Own calculations, based on Statistics South Africa (2001b).

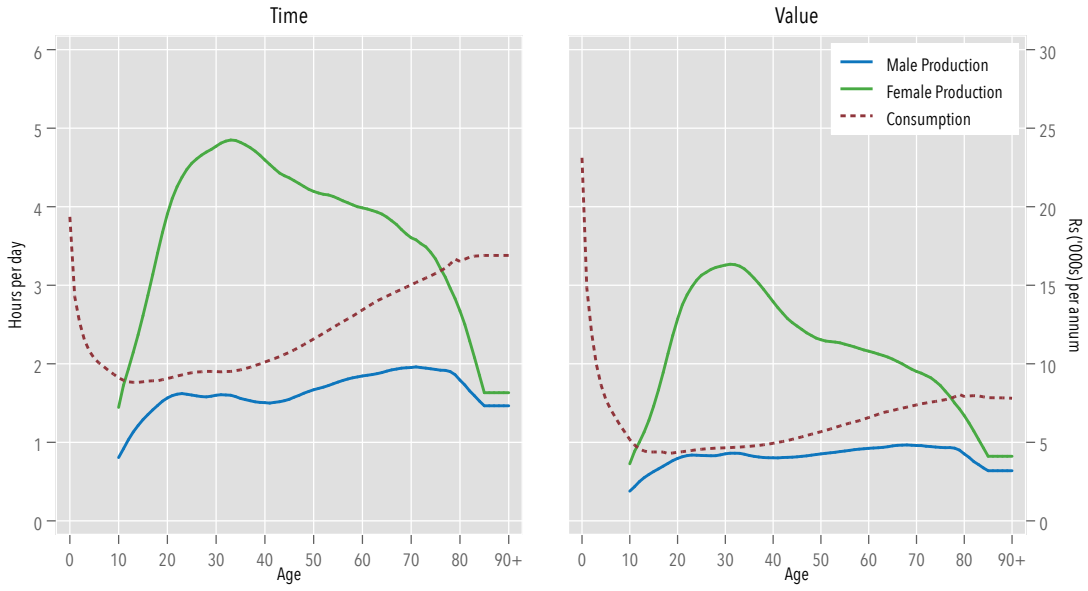
Such low allocations of time by males to care of others may be puzzling for those unfamiliar with the South African context. For all activities, the age profiles of time are a combination of the proportion of the population at each age performing the activity and the mean time allocated by those who perform the activity. These two factors can be described as the age-specific participation rates for a given activity and the age-specific intensity of participation. In South Africa, patterns of labour migration and household formation mean that a large proportion of adult males are not co-resident with children. For example, just 19.4 percent of male TUS respondents aged 20 years and above report being co-resident with a child under the age of seven (own calculations, Statistics South Africa, 2001*a*, p.67). Relatedly, Posel and Rudwick (2013, p.174) find that only 29.9 percent of African children under the age of 15 are co-resident with their fathers, compared to 50.1 percent whose fathers are alive but not co-resident. Thus, male care participation rates are very low: just six percent of male respondents report any care time (Statistics South Africa, 2001*a*, p.70).

Specialist wage rates for care activities are, as shown in Table 3, are relatively high. Consequently, the value of the time spent caring for others is substantial: for females it peaks at over R7 000 per annum (roughly one-third of GDP per capita) and is at least R2 000 per annum between the ages of 16 and 61 years. In contrast, the value of care work contributed by males remains between R300 and R700 per annum (1.3 percent to 3.2 percent of GDP per capita) for most ages.

Combining housework and care reveals significant production of unpaid services in South African in 2000 (Figure 7). Women between the ages of 21 and 62 years spend four to five hours daily in non-market work, with production peaking in the early thirties at 4.8 hours per day. In monetary terms, females' peak production of more than R16 200 per annum

occurs around age 30. In contrast, the peaks for men are much lower and occur much later, during their sixties and seventies. Men in their early seventies spend 2.0 hours per day in non-market work and the value of males' production peaks at around R4 800 per annum during their late sixties.

Figure 7: Non-Market Work in South Africa, 2000



*Source: Own calculations, based on Statistics South Africa (2001*b*).*

The effects of the differing composition of non-market work across the lifecycle and the differing activity-specific wage rates is evident from the two panels of Figure 7. In particular, mean replacement wage rates appear to be slightly higher for younger cohorts. This leads to a somewhat flatter value profile for males compared with their time profile, and a more accentuated value profile for females compared with their time profile.

The figure also presents the average profile of consumption of non-market work. This profile is not disaggregated by gender since the methods of imputation of consumption of non-market work are not well nuanced in terms of accounting for possible gender differences; as a result, the male and female consumption profiles are very similar and the combined profile is therefore a close approximation of both sets of consumption profiles. What is immediately clear from the two figures is that consumption of non-market work is highest amongst infants and young children. The average infant under the age of one consumes 3.9 hours of non-market work, including both care and housework, per day. Consumption falls quickly to 2.9 hours per day for one-year olds and 2.5 hours for two-year olds, before bottoming out below 1.8 hours per day for those aged 11 to 18 years. As age increases thereafter, so too does consumption of non-market work; this increase is initially slow but accelerates from the late thirties onwards. Consumption of non-market work therefore increases from its low point amongst teenagers to reach two hours per day at age 40 and three hours per day by age 70.

Once this time is valued, the high consumption levels amongst infants and young children

are accentuated due to the high replacement wage rates for childcare in particular. Consumption of non-market work is valued at over R23 000 per annum amongst infants (107 percent of per capita GDP), falling to R12 000 per annum for two-year olds. By age 18 it has fallen to just 20 percent of GDP per capita (R4 300 per annum) and, although it increases with age thereafter, by the eighties it is just under R8 000 per annum (around 37 percent of GDP per capita).

Comparisons of production and consumption of non-market work reveal that, over an extended segment of the lifecycle, females produce more than they consume. Measured in hours, females are net producers of non-market work between the ages of 12 and 76 years; in Rand terms, they remain net producers until age 77. In contrast, males are never net producers of non-market work, irrespective of the unit of measurement. This is a complete reversal of the situation observed in Figure 2, which showed a substantial NTA lifecycle surplus (i.e. a market work surplus) for males but no surplus at any age for females.

3.3 Market and Household Production Combined

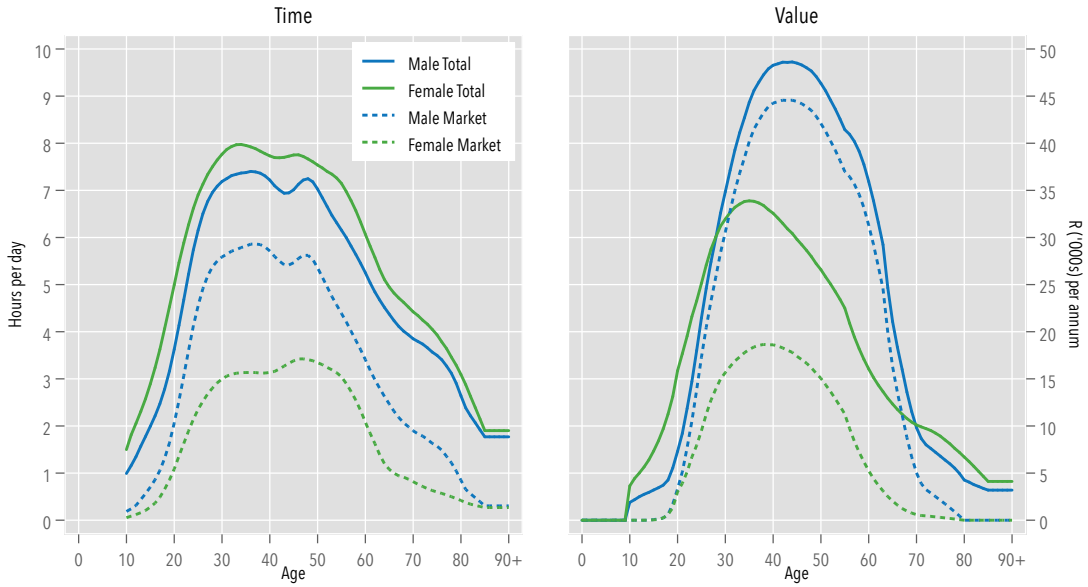
3.3.1 Total Production and Consumption

Having valued the production and consumption of non-market work over the lifecycle for both genders, these estimates can be incorporated into our NTA estimates, which cover market production and consumption. Figure 8 focuses on the production side and considers the impact that including non-market work has on our estimates of production for males and females across the lifecycle. Once again, the lefthand panel considers the impact in terms of time, while the righthand panel presents the estimates in terms of Rand value. The dotted lines in each panel represent market work, while the solid lines include both market and non-market work.

As previously noted, there is significant gender specialisation in productive activities in South Africa in 2000: males specialise in market work, while females specialise in non-market work. Measured in hours per day, males therefore allocate significantly more time to market work than do females over much of the lifecycle. However, once time spent in non-market work is included, the gain for females is much larger than for males. Considering all work then, females on average spend more time in productive activities than males at all ages.

The effect is not as dramatic in monetary terms, primarily because of the specialist replacement wage rates turn out to be relatively low when compared to average market wages. The two dotted lines in the righthand panel reflect the significant gap in labour income between males and females, which was highlighted in Figure 2. Including the value of household production has a different impact for males and females. For males, there is a relatively small upward shift in the profile which is relatively stable across the lifecycle, although it is muted slightly for the youngest and oldest cohorts. The result is a total production profile that is slightly higher, but very similar in shape to the market production (labour income) profile. For females, though, the impact is substantial and is particularly large amongst cohorts in their twenties and thirties. The result is that the shape of the total production profile becomes less symmetrical and is shifted somewhat to younger ages.

Figure 8: Total Production in South Africa, 2000



*Source: Own calculations, based on South African Reserve Bank (2018); Statistics South Africa (2001*b*, 2007).*
Note: Estimates of production in time units (lefthand panel) are derived from the time-use data. In the righthand panel, estimates of the value of market work are the NTA labour income profiles, while the total work estimates are calculated as the sum of the labour income profiles and the value of time spent in non-market work valued on the basis of specialist replacement wages.

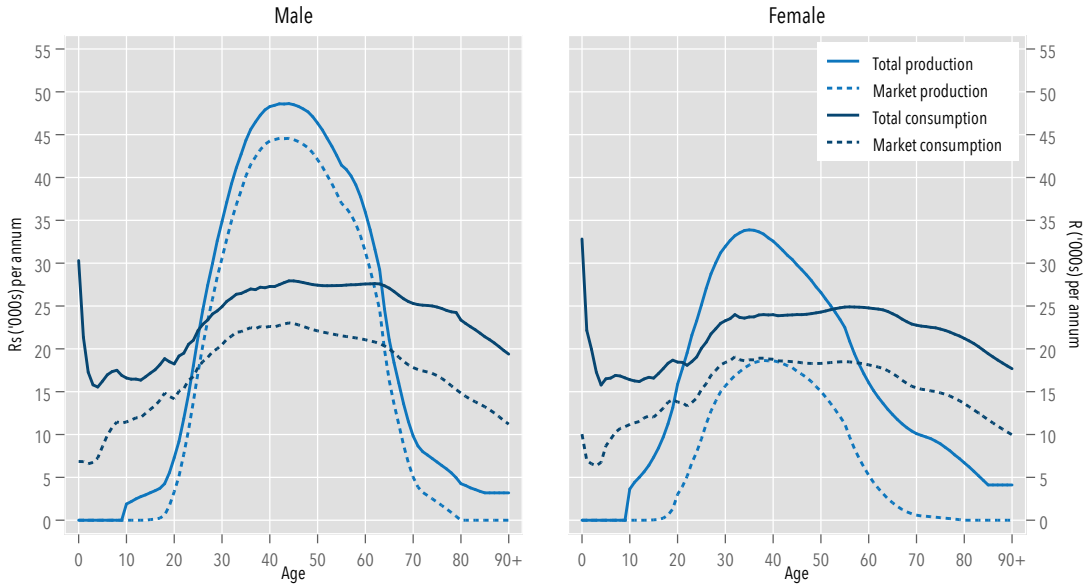
In terms of the total value of production, then, females outproduce males at younger and older ages (10 to 28 years, and 70 years and above), with the gap somewhat large at younger ages. However, between the ages of 29 and 69 years, the per capita value of total production by males is substantially higher than that of females. For 18 years from the age of 44 years, for example, this gap is between R18 000 and R21 000 per capita.

Figure 9 presents production and consumption profiles for males and females. Dotted lines represent market production and consumption, while solid lines represent total production and consumption. Based on the figure, a number of key points need to be highlighted. First, including household production into our estimates of total production reveal that both the young and the old are significant contributors to the economy. While this is true for both males and females, the impact is most apparent amongst females.

Second, young children are far more expensive when their consumption of non-market production is factored in. Total consumption amongst infants (less than a year old) is estimated at between R30 000 an R33 000 per annum, compared with market consumption of between R6 800 and R10 100 per annum. Even at four years of age, total consumption for boys and girls is more than twice their market consumption. This is a substantial difference and likely plays a significant role in influencing potential parents' decisions regarding having children. Given that the burden of care falls so heavily on women in South Africa, this factor may have an even stronger influence on women's decision-making processes.

Third, the inclusion of the consumption of non-market production serves to a certain ex-

Figure 9: Total Production and Consumption in South Africa, 2000



*Source: Own calculations, based on South African Reserve Bank (2018); Statistics South Africa (2001*b*, 2007).*

tent to flatten out the total consumption profile when compared with the market consumption profile. Thus, it is only amongst young children that the value of total consumption changes rapidly and substantially, while peak consumption is maintained over a significantly longer age range than is the case for market consumption.

The preceding discussion has focussed on per capita age profiles with little consideration of aggregate measures. Table 1 addresses this by presenting household production aggregates for South Africa in 2000, measured in terms of both time and money and disaggregated by gender and age group. In total, the population of South Africa is estimated to have spent 69.9 billion hours in productive activities during 2000. This was almost evenly split between market and household production, with the latter accounting for slightly more than half of the total (50.2 percent). Within household production, housework accounts for 87.7 percent of the total, while four-fifths (82.8 percent) of care is for household members.

Females account for 55.0 percent of total time spent in productive activities in 2000, compared to their population share of 50.9 percent. Females account for an extremely high share of time spent in care activities (85.2 percent of the total), as a result of performing almost all care for household members (92.4 percent), and of time spent doing housework (71.2 percent). The only household production activity whether there is an equal division between males and females is in care for non-household members, although this represents a tiny fraction of the total.

Roughly three-quarters (74.2 percent) of productive time is accounted for by those between the ages of 18 and 49 years, who represent 47.1 percent of the population. However, as seen in the age profiles presented above, there is significant variation in the allocation of

Table 1: Value of Aggregate Household Production relative to GDP, 2000

	Under 18 yrs	18-29 yrs	30-49 yrs	50-59 yrs	60 yrs plus	Male	Female	TOTAL
Total Time (millions of hours per annum)								
Housework	4 717	9 304	11 012	2 949	2 792	8 853	21 921	30 774
Care	361	1 784	1 722	258	190	638	3 678	4 316
For HH members	307	1 579	1 389	176	124	273	3 301	3 574
For non-members	55	205	333	82	67	365	377	742
Household Production	5 078	11 088	12 734	3 208	2 983	9 491	25 600	35 091
Market Production	1 134	10 232	17 836	4 007	1 632	22 005	12 835	34 840
Total	6 212	21 320	30 570	7 214	4 614	31 496	38 434	69 931
Share of Time (%)								
Housework	15.3	30.2	35.8	9.6	9.1	28.8	71.2	100.0
Care	8.4	41.3	39.9	6.0	4.4	14.8	85.2	100.0
For HH members	8.6	44.2	38.9	4.9	3.5	7.6	92.4	100.0
For non-members	7.4	27.7	44.9	11.1	9.0	49.2	50.8	100.0
Household Production	14.5	31.6	36.3	9.1	8.5	27.0	73.0	100.0
Market Production	3.3	29.4	51.2	11.5	4.7	63.2	36.8	100.0
Total	8.9	30.5	43.7	10.3	6.6	45.0	55.0	100.0
Total Value (Rs billions per annum)								
Housework	29.9	60.1	72.6	19.2	18.1	57.8	142.1	199.9
Care	6.9	35.6	32.3	4.4	3.1	8.8	73.5	82.3
For HH members	6.3	33.2	29.0	3.5	2.4	5.5	69.0	74.5
For non-members	0.6	2.4	3.4	0.9	0.6	3.3	4.5	7.8
Household Production	36.7	95.8	104.9	23.6	21.2	66.6	215.6	282.2
Labour Income	0.4	102.0	319.9	70.6	20.3	354.5	158.7	513.2
Total	37.2	197.8	424.8	94.1	41.5	421.1	374.4	795.4
Share of Value (%)								
Housework	14.9	30.1	36.3	9.6	9.1	28.9	71.1	100.0
Care	8.4	43.3	39.3	5.3	3.7	10.7	89.3	100.0
For HH members	8.4	44.6	38.9	4.7	3.3	7.3	92.7	100.0
For non-members	7.6	30.6	42.8	10.9	8.1	42.7	57.3	100.0
Household Production	13.0	33.9	37.2	8.3	7.5	23.6	76.4	100.0
Labour Income	0.1	19.9	62.3	13.8	4.0	69.1	30.9	100.0
Total	4.7	24.9	53.4	11.8	5.2	52.9	47.1	100.0
Value Relative to GDP (% of GDP)								
Housework	3.2	6.4	7.7	2.0	1.9	6.1	15.0	21.1
Care	0.7	3.8	3.4	0.5	0.3	0.9	7.8	8.7
For HH members	0.7	3.5	3.1	0.4	0.3	0.6	7.3	7.9
For non-members	0.1	0.3	0.4	0.1	0.1	0.4	0.5	0.8
Household Production	3.9	10.1	11.1	2.5	2.2	7.0	22.8	29.8
Labour Income	0.0	10.8	33.8	7.5	2.1	37.5	16.8	54.2
Population share (%)	*40.2*	*22.8*	*24.3*	*6.4*	*6.3*	*49.1*	*50.9*	*100.0*

*Source: Own calculations, based on South African Reserve Bank (2018); Statistics South Africa (2001*b*, 2007).*
Note: Figures expressed as share of GDP, which was R946.3 billion in 2000 current prices. Rand values of household production are in 2000 current prices. For household production activities, the age group "Under 18 yrs" refers to 10 to 18 year olds; for market production and population shares, it refers to 0 to 18 year olds.

time across activities by age. The cohort under the age of 18 years allocates relatively more of its productive time towards housework; this cohort therefore accounts for 15.3 percent of all time allocated to housework, which is nearly twice its share of total productive time. The cohort aged 18 to 29 years accounts for a disproportionately large share of all time allocated to care (41.3 percent, compared with its 30.3 percent share of total productive time

and its 22.8 percent share of the population). The next oldest cohorts—30 to 49 year olds and 50 to 59 year olds—account for relatively large shares of market production, care for non-household members and, to a lesser extent, housework. Finally, the population aged 60 years and older account for a relatively large share of housework and care for non-household members.

Total production—which includes both market and non-market production—is valued at R795.4 billion in 2000. Almost two-thirds (64.5 percent) of this amount is attributable to market work, or labour income. The aggregate value of housework is estimated at R199.9 billion, representing 25.1 percent of the value of total production. Within care, 90.5 percent in value terms is care for household members. Relatively low wages amongst employed females are evident in the fact that they account for a significant smaller proportion of labour income compared with their share of time in market work (30.9 percent compared to 36.8 percent). The same is true for the two youngest cohorts; this disadvantage is reflected in a significant advantage amongst 30 to 39 year olds, whose share of labour income is 12.1 percentage points higher than its share of time in market work.

To put these monetary values in context, the table also provides the values of the various productive activities as a proportion of GDP. Labour income, for example, is equivalent to 54.2 percent of GDP in 2000, while household production is estimated at 29.8 percent of GDP; of this latter figure, 21.1 percentage points relates to housework, 7.9 percentage points to care for household members, and 0.8 percentage points to care for non-household members. Labour income for males is equivalent to 37.5 percent of GDP, more than twice the proportion for females (16.8 percent); in contrast, the value of household production amongst females is more than triple that of males (22.8 percent of GDP compared to 7.0 percent of GDP). The aggregate figure of 29.8 percent of GDP for household production is in the general range of estimates derived for various countries around the world.

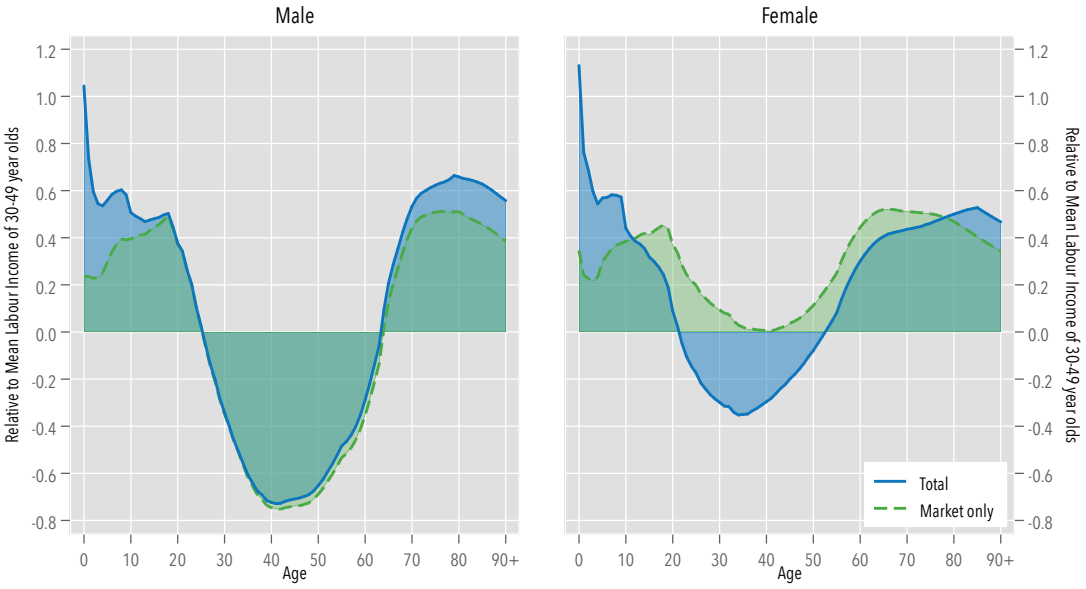
3.3.2 Lifecycle Deficits

The analysis has thus far revolved around the first two terms on the lefthand side of the NTA identity, presented in equation 2, namely consumption and labour income (or consumption and production in the context of household production). The difference between these two flows is the lifecycle deficit (when consumption is greater than labour income) or lifecycle surplus (when labour income is greater than consumption). In the same way that a conventional NTA lifecycle deficit is calculated, it is possible to calculate an NTTA lifecycle deficit that considers only household production and consumption or a total economy lifecycle deficit that considers both.

Figure 10 presents the total economy lifecycle deficits for South African in 2000 separately by gender. Values are expressed relative to mean labour income for 30 to 49 year olds, as per NTA convention. For males, the market (NTA) lifecycle deficit, represented by the dotted line, is positive from age zero to age 25 and again from age 64 to age 90 plus. This implies that males generate a market lifecycle surplus—i.e. labour income is greater than consumption—between the ages of 26 and 63; this surplus period therefore spans 38 years.

Females, however, remain in deficit throughout the lifecycle (although they come very close to zero around age 40).

Figure 10: Total Economy Lifecycle Deficits by Gender in South Africa, 2000



*Source: Own calculations, based on South African Reserve Bank (2018); Statistics South Africa (2001*b*, 2007).*

The addition of the production and consumption of non-market work has no impact on the duration and little impact on the magnitude of the lifecycle surplus of males. Specifically, the magnitude of the surplus is slightly reduced, particularly for older working-age males. At the same time, the total economy lifecycle deficit for the youngest and oldest cohorts is larger than the NTA lifecycle deficit. Amongst older cohorts, the increase is largest for those in their eighties (roughly 15 percent to 17 percent of peak labour income). For the young, though, the increase is substantial: 81 percent of peak labour income for infants and remaining above 20 percent of peak labour income until the age of eight.

For females, the difference between the NTA and total economy lifecycle deficits is even greater. Key here is that women generate a lifecycle surplus once household production is included; the surplus period lasts for 31 years from age 22 to 52 and reaches just over one-third of peak labour income during the mid-thirties. For a large number of cohorts on either side of the surplus period, the lifecycle deficit is reduced. Thus, for those aged from 16 to 21 years and those aged 53 to 67 years, the total economy lifecycle deficit is lower by between 10 percent and 31 percent of peak labour income. The outcome is that the lifecycle deficit is smaller (or the lifecycle surplus is larger) for females than for males for those aged 10 to 29 years[5], and those aged 68 years and above.

[5]This is also true for those aged between six and nine years, but for these ages this is entirely the result of gender differences in consumption.

3.4 Demographic Dividends

The possibility of capturing a demographic dividend has caught the attention of policymakers around the world. Within Africa, with its young population and pressing socioeconomic needs, the demographic dividend has recently become particularly prominent in the policy arena with the designation by the African Union of the theme for 2017 as "Harnessing the Demographic Dividend through Investments in Youth". In simple terms, the (first) demographic dividend can be described as the potential boost to per capita consumption that arises due to the changing structure of the population, as a society's large age cohorts enter the working ages.

National Transfer Accounts can be used to estimate the first demographic dividend. To do so, we begin with the following identity, which describes consumption per effective consumer (Mason and Lee, 2007, p.133):

$$\frac{C(t)}{N(t)} = c(t)\frac{Y(t)}{L(t)}\frac{L(t)}{N(t)} \tag{3}$$

where $C(t)$ is total consumption, $Y(t)$ is labour income, and $c(t)$ is the ratio of consumption to labour income. $N(t)$ and $L(t)$ refer to the effective number of consumers and the effective number of producers respectively; these aggregates are derived from the NTA labour income and consumption profiles as follows:

$$L(t) = \sum_{a=0}^{\bar{\omega}} \gamma(a)P(a,t) \tag{4}$$

$$N(t) = \sum_{a=0}^{\bar{\omega}} \phi(a)P(a,t) \tag{5}$$

where $P(a,t)$ refers to the population aged a in period t, while $\gamma(a)$ and $\phi(a)$ are "age-specific, time-invariant vectors of coefficients measuring age variation in productivity and consumption, respectively" (Mason and Lee, 2007, p.133) or simply the per capita labour and consumption age profiles.

The demographic dividend can be separated into a first and a second demographic dividend. The first demographic dividend measures the pure demographic effect of a changing population structure on consumption per effective consumer, *ceteris paribus*, and operates through the final factor within equation 3. This factor, $L(t)/N(t)$, is known as the economic support ratio and is defined, using the same notation as above, as:

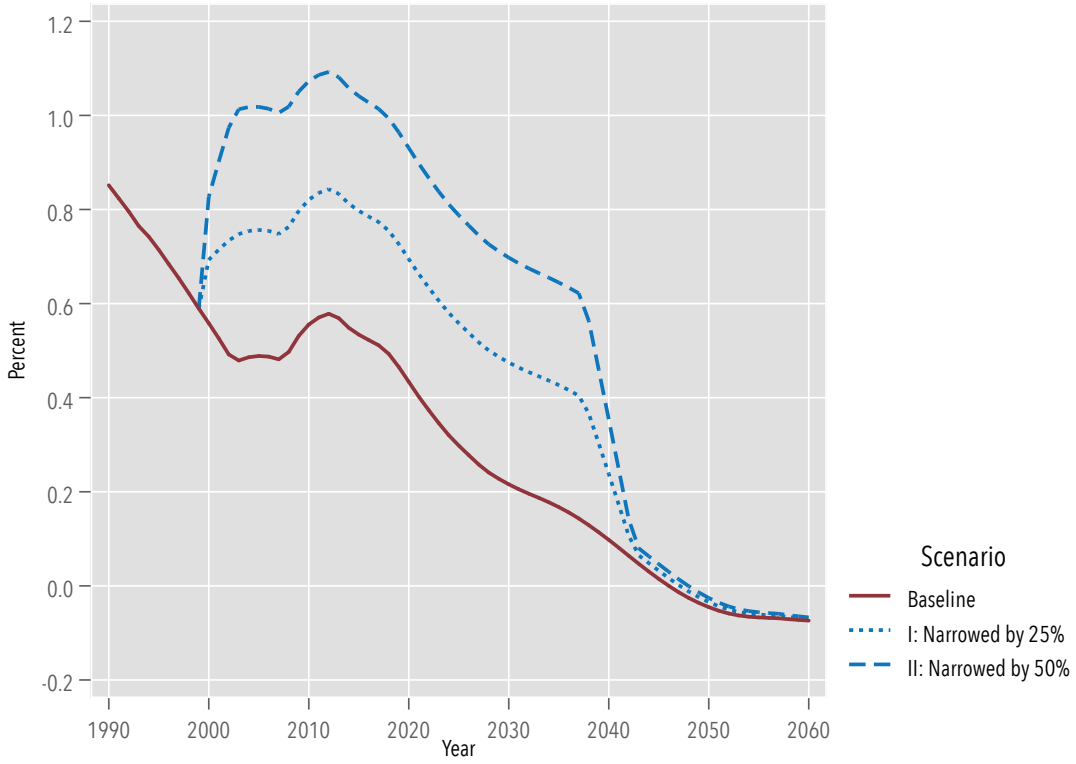
$$SR_t = \frac{L(t)}{N(t)} = \frac{\sum_{a=0}^{\bar{\omega}} \gamma(a)P(a,t)}{\sum_{a=0}^{\bar{\omega}} \phi(a)P(a,t)} \tag{6}$$

The first demographic dividend is calculated as the rate of change of the support ratio. In

other words, holding all other variables constant, the changing age structure of the population will cause the economic support ratio to change, which will result in an increase in consumption per effective consumer.

Figure 11 presents estimates of the first demographic dividend for South Africa, using the 2000 NTA estimates, for the 1990-2060 period. The baseline estimate presented in the figure refers to the demographic dividend calculated as per the description above. Given that the South African population has already begun to age, the first demographic dividend is estimated to decline from 0.9 percent in 1990 to zero in 2046 and to almost -0.1 percent in 2060. In other words, the changing age structure of the South African population will have a positive potential impact on living standards until the mid-2040s, after which it will act as a drag on living standards.

Figure 11: Demographic Dividends in South Africa, 1990-2060



Source: Own calculations, based on South African Reserve Bank (2018); Statistics South Africa (2001b, 2007); United Nations (2017).

These projections of the demographic dividend, however, rely on static labour income and consumption profiles. In terms of labour income, this means that prevailing labour market conditions and behaviours that give rise to the shape of the profile are unchanged over time. In the context of gender specialisation in market and household production, one interesting question is whether the demographic dividend can be improved by closing the gap between the gender-specific labour income profiles.

The possible impact of this narrowing of the gap between the male and female labour income profiles is simulated by gradually shifting the female labour income profile towards

that of males over a 40-year period from 2000. Instead of using constant profiles, the female labour income profile shifts at each age by a fixed amount. Prior to 2000, the female labour income profile is identical to that of the baseline scenario (i.e. the 2000 female labour income profile), while after 2041 the profile stops changing (i.e. it does not continue to close the gap with the male profile, having reached the specified target).

Figure 11 presents two scenarios: one where the gap is narrowed by 25 percent, and the second where the gap is narrowed by 50 percent. It is clear that in both instances, this narrowing of the gap between the gender-specific age profiles is beneficial in terms of the size of the demographic dividend. Both result in a temporary surge in the demographic dividend to between 0.8 percent and 1.1 percent (from around 0.6 percent) around 2010, with the projected dividends remaining between 0.2 percentage points and 0.5 percentage points above the baseline estimate until the early 2040s. Compounded over the 2010-2040 period, the baseline projection suggests a total dividend of 16.5 percent, meaning that demographic change alone is expected to allow per capita consumption to rise by 16.5 percent over the period (in real terms). In comparison, the corresponding estimates that allow for the narrowing of the gap between the gender-specific profiles are 29.1 percent (narrowing by 25 percent) and 41.7 percent (narrowing by 50 percent).

While these are significant improvements in the magnitude of the dividend, particularly in the context of the dividend turning negative during the 2040s, these simulations neglect an important fact: many, if not most, of the mechanisms that would narrow the gap between the labour income profiles would likely also reduce the time women are able to allocate to household production. These potential mechanisms can be thought of in various ways and include: increased labour force participation; lowered unemployment rates; raised employment-to-population ratios; increased hours of work or higher wages for existing workers; or reduced occupational segregation.

The impact is likely to be substantial. According to Statistics South Africa (2001*a*, p.39), unemployed females spend 349 minutes per day on non-SNA production compared to 210 minutes for employed females (for men, 118 minutes and 82 minutes respectively). Roughly speaking, for every seven women who move from unemployment to employment, the reduction in total non-SNA production is equivalent to two eight-hour days. This represents a substantial reduction in household production that would need to be made up through a number of means, including a redistribution of the responsibility for household production to other household members (specifically males) or to the market, or general reductions in the quantity of household production.

4 Conclusion

The original impetus for constructing NTTA estimates has been the recognition that conventional NTA estimates are unable to fully describe the nature of production, consumption and dependency. This is due to the delineation of the SNA production boundary in such a way that it excludes unpaid services. This is particularly problematic when analysing the

generational economy from the perspective of gender. Indeed, in the case of South Africa in 2000, it was shown that at no point in the lifecycle does the average female produce a lifecycle surplus.

Around the world, males and females specialise in different productive activities and South Africa is no different. The research presented here has focussed on better understanding gender specialisation in these activities across the lifecycle using time-use data for South Africa from 2000. The NTTA estimates confirm that males spend more time than females in market work at all ages—they account for almost two-thirds of total time spent in market production—while the same is true for females in terms of housework and care. Males also spend more time in 'all other activities', which includes personal care and leisure activities.

In aggregate terms, household production is substantial in value. Valuing time spent in household production with specialist replacement wages, annual household production is estimated at R282.2 billion in 2000. This is equivalent to 29.8 percent of GDP and is roughly half the value of aggregate labour income (54.2 percent of GDP). More than three-quarters (76.4 percent) of this value is produced by females.

Time allocated to housework and care vary substantially over the lifecycle and by gender. In terms of housework, females' time allocation follows an inverted U-shape, while that of males is lower and generally gradually increasing with age. Time allocations for care peak quickly for women during their twenties and thirties, with a sharp drop off until their fifties. For males, there is virtually no age variation in time spent in care activities and, at each age, they spend only a fraction of the time spent by females in care. The result is that males contributed just 14.8 percent of total care time in 2000, and just 7.6 percent of time allocated to caring for household members. Overall, though, females account for almost three-quarters of time spent in household production.

The impact of including household production within estimates of production—whether expressed in terms of time or money—is significant. At all ages, females allocate more time to productive activities than males, the inclusion of household production enabling them to overcome a large deficit in market production. In monetary terms, once household production is valued, the gap between males and females is narrowed significantly and, indeed, girls and young women are found to outproduce boys and young men. The extent to which the gender gap in the value of total production is narrowed depends on the wage rates used to value time and this is an important issue to keep in mind when considering these results.

The NTTA estimates reveal the significant 'hidden' costs associated with infants and young children once they are added to the NTA estimates. For infants, total consumption is more than triple the level of market consumption for girls and more than quadruple for boys. For four-year-olds, total consumption remains more than double market consumption. Young children are therefore far more costly to households than market-based estimates would suggest, with important implications for our understanding of the balance of costs and incentives related to fertility decisions.

While females do not produce an NTA lifecycle surplus at any age, they do produce a surplus once household production is included. Females also begin to produce surpluses at

younger ages than males. While the female total economy lifecycle surpluses are relatively small compared to those of males, their deficits are also generally smaller, particularly for teenagers and the elderly.

Improving women's position within the labour market, thereby narrowing the gap between the gender-specific labour income profiles, would have a positive and potentially substantial impact on South Africa's demographic dividend. However, time-use data reveals that many of the mechanisms through which this might be achieved would entail reductions in women's time allocations to household production. Such reductions would necessitate the reallocation of this production to other household members or to the market; alternatively, households would need to accept lower overall levels of household production. Policy that aims to achieve greater participation or employment of women therefore needs to explicitly acknowledge the constraints imposed on women by their involvement in household production, and should work to address them.

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A Aggregate Control Values

Table 2: Aggregate Control Values, 2000

Aggregate		R millions (2000 prices)	Relative to GDP (%)
Labour Income	YL	513 189	54.2
Employment Earnings	YLE	459 448	48.6
Self-Employment Earnings	YLS	53 741	5.7
Consumption	C	687 296	72.6
Private Consumption	CF	513 296	54.2
Private Consumption, Education	CFE	15 142	1.6
Private Consumption, Health	CFH	38 476	4.1
Private Consumption, Other	CFX	459 678	48.6
Public Consumption	CG	174 000	18.4
Public Consumption, Education	CGE	49 118	5.2
Public Consumption, Health	CGH	23 582	2.5
Public Consumption, Other	CGX	101 300	10.7
Lifecycle Deficit	LCS	174 107	18.4
GDP		946 324	100.0

Source: Own calculations, South African Reserve Bank (2018); Statistics South Africa (2005); World Bank (2018).

B Specialist Replacement Wage Rates

Table 3: Specialist Replacement Wage Rates, 2000

Activity	R per hour (2000 prices)
Cleaning	3.46
Laundry	6.09
Cooking	8.09
Household maintenance	10.92
Household management	22.01
Pet care	5.29
Travel	10.15
Purchases	5.29
Collecting fuel and water	5.29
Childcare, intra-household	21.63
Childcare, inter-household	21.63
Adultcare, intra-household	16.70
Adultcare, inter-household	16.70
Care, unspecified recipient	14.86
Volunteering	5.29

Source: Own calculations, Kerr et al. (2016).

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