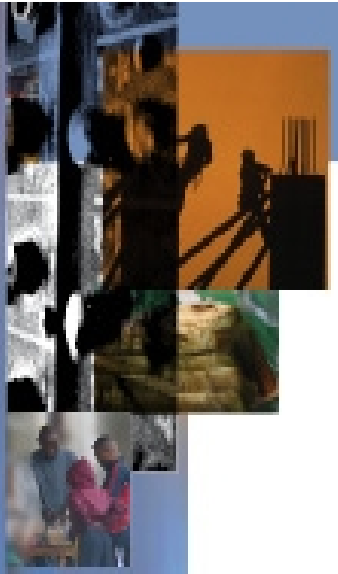
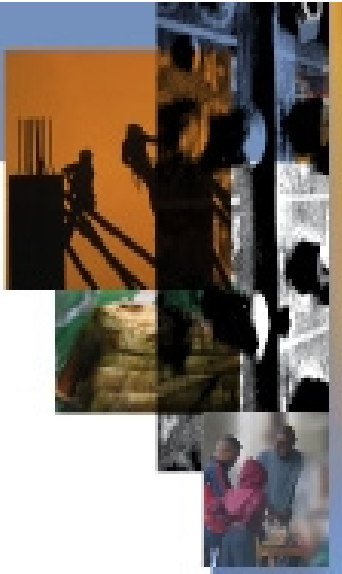

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The Regulatory Environment and its Impact on the Nature and Level of Economic Growth and Development in South Africa

Lazy Rotten Sons? The intra-household allocation of work and leisure in South Africa

Martin Wittenberg

DFID Department for International Development
Employment Promotion Programme

FRIEDRICH EBERT STIFTUNG

Lazy Rotten Sons? The intra-household allocation of work and leisure in South Africa*

Martin Wittenberg
School of Economics and SALDRU
University of Cape Town
South Africa

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Abstract

We investigate the balance between work (including home production), leisure and personal care (chiefly sleep) within South African households. Previous studies have suggested that South African men seem to be able to appropriate additional household resources for the purposes of "leisure" in the form of reduced work effort. Such studies have, however, not been able to control adequately for informal work and home production. Furthermore such studies have controlled for household structure (extended or nuclear) in very crude form only.

By using the South African time use survey we are able to obtain a better measure of the division of total labour (paid and unpaid) within South African households. Furthermore we construct a measure of household "connectedness" which allows us to differentiate between members of households that are more or less "central" and hence more or less likely to feel altruistic towards other members of the household.

Our empirical results show that South African men do, indeed, seem to spend less time on work. Furthermore our connectedness variable suggests that households that are more tightly connected seem to elicit more work from their members, particularly women.

But the son, if he is wicked, will naturally avoid aiding his father, or not be zealous about it; for most people wish to get benefits, but avoid doing them, as a thing unprofitable. (Aristotle, Nicomachean Ethics, Book 8, Section 14.)

1 Introduction

Aristotle's quote highlights the fact that families and households have been the site of conflict about the distribution of "benefits" and work since time immemorial; this despite the fact that households are perhaps also the preeminent site of altruism and mutual care. Analysing the balance between altruism and exploitative behaviour is tricky, since what may appear to outsiders as a lopsided distribution of "benefits" within the household may actually be the outcome of voluntary "gifts" of time and resources.

Indeed economists have traditionally tended to view households as being united in their preferences over work and consumption choices (Becker 1991). This "unitary" model of the family has come under attack in the last few decades (Manser and Brown 1980, McElroy and Horney 1981, Chiappori 1988, Chiappori 1992, Chiappori 1997, Lundberg and Pollak 1994, Lundberg and Pollak 1996). (For a review of the literature see Bergstrom 1996, Bergstrom 1997). The implication of the new "household bargaining" models is that the distribution of work and benefits will shift with who has power in the house. "Power" is usually thought of in terms of the "outside

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options" of the household members concerned; individuals who would be better off if the household dissolved would have a greater say in how the "benefits" of the household are divided.

The Aristotelian idea that the division of benefits and work may be a serious subject of enquiry is therefore gaining ground, even among economists. Indeed there has been a call for the "burden of proof" to shift, from the presumption of a unitary model to the collective one (Alderman, Chiappori, Haddad, Hoddinott and Kanbur 1995). The possibility of conflict in South African households has already attracted some attention. In a famous paper Duflo (2003) has argued that pensions accruing to women are spent in different ways from pensions accruing to men. In a similar way, Bertrand, Mullainathan and Miller (2003) have suggested that some South African men become unemployed when social pensions are paid to the elderly (Bertrand et al. 2003). This study restricted its attention to three-generation households, because the authors were concerned about heterogeneity in preferences between different types of households. Nevertheless one of the most striking "stylised facts" of South African labour economics is how little work there is in these extended households. This raises a perennial question of South African labour economics, whether there may be unrecorded types of activities in these households.

The data set most suitable for answering these questions is South Africa's Time Use Survey, conducted in 2000. A look at Table 1 will confirm that there is not a lot of primary production or informal service work captured in this survey either. Total effort on anything that might be considered "work" is around six and a half years for prime age males. This contrasts with almost ten hours devoted to sleeping, eating and personal hygiene.

The table also shows a marked gender division of labour with women doing roughly fifty minutes more in all types of work and having fifty minutes less of all types of leisure. Within these broad categories of time use there are also pronounced differences, with women more specialised in home production and men more engaged in wage work.

As (Alderman et al. 1995) point out, however, an unequal distribution of work and benefits need not be a sign of conflict in the household. It may be in everyone's interest for the "breadwinner" to be given a light domestic chore load if that will result in higher productivity at work. Nevertheless given that South Africa has a high male unemployment rate, the fact that one is seeing so little evidence of other types of work gives one pause for thought. It may also be the case that South African women prefer their men to be out "socialising with nonfamily members", but again this does not seem entirely plausible.

Of course the raw means reported in Table 1 are not all that informative, since we are not controlling for anything. It may be the case that the men and the women are concentrated in different types of households or that some other characteristics account for these apparent differences. One objective of this paper is to explore some of the dimensions along which work and leisure within the household are divided.

We will also be trying to assess to what extent it is plausible to assume that the observed distribution of work and leisure is the result of common household preferences. Ideally we would need some exogenous price or income variation, but that is hard to come by. Instead we will be focusing on a variable that we argue should affect only the relative "power" or altruism of the individual in the household but not any of the preferences or costs associated with work and leisure. We show that there is considerable evidence that how "central" an individual is within the household will affect how much work they do or how much leisure they are able to enjoy. We show that there are some interesting gender asymmetries in the performance in this variable. We argue that our findings suggest that there is indeed conflict about the division of benefits and costs within households.

The plan of the article is as follows. In section 2 we briefly discuss some of the economic.theories of the household. We adapt a standard Chiappori style model to our purposes in (3) and then discuss how we propose to estimate this in section 4. We turn to discuss our data set and how we construct our variables in more detail in (5). Our empirical results are contained in section 6 and we conclude in section 7.

2 Economic theories of intra-household allocation

Traditional models of household allocation have assumed that the household maximises a single utility function (for an overview of the literature see Ermisch 2003). An initial defence of this position was provided by Samuelson (1956), although a more rigorous justification was only provided much later, by Becker (1974, 1991). Becker's model relies on the actions of an altruistic household head to internalise, as it were, the conflicting preferences of household members. As long as the household head transfers resources to each household member, the household behaves *as though* it maximises a single utility function - that of the altruist. Some of the limits of this defence of the unitary household model were pointed out by Bergstrom (1989). He notes that Becker's proof relies on the

existence of "conditional transferable utility", i.e. that conditional on each set of choices the utility possibilities frontier[1] is a simplex. If the head of the household chooses the final allocation on this frontier, then it is in the interests of every member of the household (however rotten) to push the frontier as far out as possible. Bergstrom notes that for a number of interesting applications of the theorem, it is also necessary that the head of the household be able to precommit to a particular allocation strategy, otherwise it may be possible for particular household members ("lazy rotten kids") to restrict the choices available to the head of household.

Clearly the model also relies on the fact that the head of the household distributes resources to every other household member. As Manser and Brown (1980, p.32) note, this in fact presupposes that the resource allocation issue has already been settled, because how else is the head free to distribute resources if he[2] does not have private rights to his money? Total household expenditure therefore reflects the preferences of the head of the household because he has control over a sufficiently large share of resources that he can effectively determine the final allocations. If the altruist does not have large enough resources, however, then the final allocations need not reflect coherent preferences, even in a household of altruists (Stark 1995, Chapter 1).

Because the conditions under which the rotten kid theorem are applicable are restrictive, a number of authors have explored alternatives. In a series of articles Chiappori and his co-authors (Chiappori 1988, Chiappori 1992, Browning and Chiappori 1994, Browning, Bourguignon, Chiappori and Lechene 1994) have advanced the case that the model of the unitary household is flawed in theory and probably not applicable in practice. Instead, they posit that household allocations are efficient, i.e. they are such that intra-household redistribution cannot lead to a Pareto improvement. While these papers are agnostic about the mechanism through which such allocations are arrived at they show that the final allocations can be viewed as deriving from a "sharing rule" in which total income is allocated in the first phase to different members of the household and these members then in turn purchase consumption items in the second phase. We sketch out this model in more detail below.

Manser and Brown (1980, p.32) and McElroy and Horney (1981) introduced the idea that the sharing rule is derived from a bargaining process in which the "threat point" is given by the payoff available to each member when single. Manser and Brown's presentation can best be interpreted as bargaining about the surplus generated within the household *prior* to household formation. The model has, however, been viewed (including by its authors) as bargaining about the sharing rule under the threat of divorce. As such it is held that changes in the "outside options" should lead to noticeable shifts in the allocation patterns of the household. Bergstrom has noted, however, that the threat of divorce is rather extreme for a household bargaining model:

> To many persons with marital experience, it seems unlikely that couples resolve disagreements about ordinary household matters by negotiating under the pressure of divorce threats. If one spouse proposes a resolution to a household dispute and the other does not agree, the expected outcome is not a divorce. A more likely outcome is harsh words and burnt toast, until the next offer is made. (1996, p.1926)

In the Nash bargaining model the divorce option should therefore be seen as a *constraint* on the feasible allocations, rather than as the threat point payoff. The point is that divorce is irrevocable - it represents the breakdown of bargaining, rather than a position from where to hold out for a better deal. In that sense increases in the value of being divorced may not reflect themselves in increased bargaining power (on this point see also Chiu and Yang (1999)).

Lundberg and Pollak (1993, 1994, 1996) have presented a bargaining model in which the threat point is an "uncooperative household". In their model different household members specialise in the production of different public goods. In an uncooperative household these goods are underprovided. Unlike the models of Chiappori and of the "divorce bargaining" models, this account allows for a final allocation that is not efficient.

These different accounts have different empirical implications. In the unitary model, it should not matter who contributes the income, only total income matters. In the bargaining models, household demand depends also on who contributes. In the "separate spheres" model of Lundberg and Pollak income (such as transfers) that only accrues to married women (i.e. which does not change their outside options) will make a difference to household demand, provided that the household is in an uncooperative state.

Empirical tests have frequently rejected the implications of the unitary model (Browning et al. 1994, Quisumbing and Maluccio 2003). A striking refutation comes from a "natural experiment" in the United Kingdom where

[1] for some representation of preferences

[2] This pronoun is used advisedly. Although Becker's model is theoretically neutral about the gender of the altruist, much of it can be seen as an idealised representation of the nuclear family, with the male head of the household as the breadwinner, who distributes resources to every other member of the family.

changes in the child benefit payments system led to a reallocation of the funds from the husband to the wife. As a result there was a measurable change in household expenditures towards female and children's clothing and away from men's clothing (Lundberg, Pollak and Wales 1997). Generally empirical applications have focused on married couples, since other types of households might introduce heterogeneity which would make the econometric tests less convincing. Nevertheless in many countries non-nuclear households predominate. Dauphin and Fortin (2001) show how one might test for the number of decision-makers and for collective rationality given only information about household expenditure decisions and a set of "distribution factors", i.e. factors that influence how resources are shared but do not themselves affect preferences. We do not have the sort of data that would allow us to operationalise this testing procedure. Instead we will be content to show that these "distribution factors" seem to matter in ways which is difficult to reconcile with the standard unitary model. We turn to a simple model that explains how we propose to implement our test.

3 A simple Chiappori-style model

We adopt the framework presented by Browning et al. (1994) but allow n decision-makers in the household. We assume that individuals maximise a "caring" utility function of the sort

$$\begin{aligned} V_i &= V_i\left(U_1, U_2, \ldots, U_n\right), i = 1, \ldots, n, \text{ where} \quad (1) \\ U_j &= U_j\left(u_j\left(\mathbf{x}_j, l_j\right), \mathbf{G}\right), j = 1, \ldots, n \quad (2) \end{aligned}$$

U_j is an "egotistical" sub-utility function which is separable in the vector of private consumption goods $\mathbf{x}_j$ including leisure l_j and the vector of household public goods $\mathbf{G}$. We assume that V_i is a well-behaved preference function, in the sense that it is non-decreasing in all its arguments. Note that the formulation of the utility function in equation 1 subsumes the case where individual i does not care for any of the other individuals. In this instance the weight of those individuals in V_i would simply be zero.

We assume that household allocations are efficient, so that it is impossible to reallocate aggregate household expenditure without making at least one individual worse off. Under these circumstances individual i's optimisation problem can be written as

$$\begin{aligned} \max \quad & V_i \\ s.t. \quad & \mathbf{p}'\mathbf{x} + \mathbf{P}'\mathbf{G} \leq \sum_{i=1}^{n} \left\{y_i + \left(T - l_i\right) w_i\right\} \\ & V_j \geq V_j^* \text{ for } j \neq i \end{aligned}$$

where $\mathbf{p}$ is the vector of prices of the private consumption goods, $\mathbf{P}$ is the vector of prices of the public goods, y_i is individual i's nonlabour income and w_i the wage rate and V_j^* is the reservation utility for individual j.

Under these assumptions Browning et al. (1994) show that the household allocations can be derived as though they were made in two stages. In the first stage the household pays for the optimal level of public goods $\overline{\mathbf{G}}$ out of the pooled nonlabour income $y = \sum_{i=1}^{n} y_i$. The remaining pooled income is then split among the n individuals, who then decide on their private consumption and leisure by solving the allocation problem

$$\begin{aligned} \max \quad & U_i\left(\mathbf{x}_i, \overline{\mathbf{G}}\right) \\ s.t. \quad & \mathbf{p}'\mathbf{x}_i \leq \theta_i\left(y - \mathbf{P}'\overline{\mathbf{G}}\right) + \left(T - l_i\right) w_i \end{aligned}$$

The individual shares θ_i are functions of the Lagrange multipliers μ_j that come from satisfying the constraints $V_j \geq V_j^*$. Any variables that will influence the reservation utility attainable by any member of the household will affect these shares. In particular relative earnings might be relevant. In the unitary model these shares would be independent of such considerations.

As it stands the model does not consider home production. If the outputs of home production are tradeable (e.g. cleaning services) then any individual specialising in home production could be thought to be providing services x_k to other individuals that these purchase at the market rate. That individual's wage rate w_i would then be equivalent to the price p_k. It is possible to extend the model above to include home production more explicitly.

For our purposes the main issue is to consider what might influence the observed distribution of work and leisure within South African households. Any variables $\mathbf{z}$ that are likely to influence preferences directly will be relevant, as will the prices of all commodities, in particular the wage rate. Total household income will also be important as will any variables that might influence θ_i. In short the demand function for l_i will be

$$l_i = l_i\left(\mathbf{z}, \mathbf{p}, \mathbf{P}, w_i, y, \theta_i\right) \tag{3}$$

Variables that influence θ_i but not preferences are particularly interesting, since they reveal something about the inner workings of households. Note that since the shares have to add up to one this imposes constraints on the impact of these factors. In the empirical part of the paper we will investigate the impact of a set of "connection" measures c_i, which summarise how "close" a particular individual is to other people in the household. It is difficult to conceive how such a measure might influence leisure (and hence work) choices except through θ_i. If we assume that $\theta_i = \theta_i\left(c_1, \ldots, c_n\right)$ it follows that

$$\frac{\partial l_i}{\partial c_i} = \frac{\partial l_i}{\partial \theta_i}\frac{\partial \theta_i}{\partial c_i}$$

We sketch out an argument in the appendix (section A.1) that the nature of the share functions θ_i would lead us to expect that

$$\frac{\partial \theta_i}{\partial c_i} \simeq \frac{\partial \theta_i}{\partial \overline{c}_{-i}}$$

where $\overline{c}_{-i}$ is the average of the connection measures over other people in the household. This expectation is based both on the adding up constraint as well as the assumption that only **relative** differences in connection should matter, i.e. shares would not be affected if everyone was moved equally "closer" or "further away" from everyone else. It follows that we would then also expect that

$$\frac{\partial l_i}{\partial c_i} = -\frac{\partial l_i}{\partial \overline{c}_{-i}}$$

This will be investigated in the empirical part of the paper. If the distribution factors c_i do not matter at all, then we will not be able to reject the unitary model.

4 Methods

In our empirical work we estimate equations of the sort

$$l_i = \mathbf{x}_i\boldsymbol{\phi} + \mathbf{z}_i\boldsymbol{\gamma} + c_i\beta_1 + \overline{c}_{-i}\beta_2 + \varepsilon_i \text{ and} \tag{4}$$

$$T_i - l_i = \mathbf{x}_i\boldsymbol{\phi}^* + \mathbf{z}_i\boldsymbol{\gamma}^* + c_i\beta_1^* + \overline{c}_{-i}\beta_2^* + \zeta_i \tag{5}$$

In these equations $\mathbf{x}_i$ is a row vector of individual characteristics, such as age, education, gender and marital status. We do not have any prices (compare to equation 3) so these variables will proxy both for the price of leisure, i.e. the wage rate, as well as acting as "taste shifters". $\mathbf{z}_i$ is a vector of household characteristics such as household size, household income (reported only in bands), location (stratum and province) and number of generations. Besides income[3] (which belongs in the regression according to equation 3), these variables can be thought of as proxying for price variations and taste differences as well as for differences in the cost of providing household public goods. It may be the case, for instance, that individuals in large households do less work and consume more leisure simply because home production involves high fixed costs and so the per person work load goes down with household size.

We consider two "distribution factors" c_i. The first of these is a measure of "connectedness" which we construct according to a modified version of Hamilton's "genetic relatedness" rule, as follows:

[3] Total household income is, of course, likely to be endogenous, particularly if hours worked are on the left hand side. This variable falls out in the fixed effects regressions which are also reported.The cross-sectional results when household income is omitted are very similar to the ones reported in this paper.

- an individual is related with score 1 to themselves
- related with score 0.5 to siblings, children and parents
- related with score 0.25 to grandchildren, grandparents, uncles, aunts, nephews and nieces
- related with score 0.125 to great-grandchildren, etc.
- related with score 0 to in-laws and other non-related individuals.

The modification that we make to this rule is that spouses score a relatedness index of 0.5. The effect of this modification is that members of nuclear households are related with a score of 0.5 to every other member, except themselves (with a score of 1). We arbitrarily assign the "other related" individuals a score of 0.125. We average the scores to get an "average connectedness" index for the particular individual concerned. Individuals with higher connectedness scores will be more "central" to the household than individuals with lower scores in the same household.

We analogously construct the measure $\overline{c}_{-i}$ for the other members of the household. The details of this are in appendix A.2. Individuals living in more complex households will have lower c_i scores and $\overline{c}_{-i}$ scores, so between them these variables control to some extent for household type.

The second distribution factor that we add to the regression is the age rank of the individual within the household. The resources that an individual might be able to command within the household may be a factor where in the birth order or pecking order they fall.

As noted above we test the hypothesis that

$$\beta_2 = -\beta_1 \tag{6}$$

Because c_i and $\overline{c}_{-i}$ tend to be highly correlated we estimate also models in which we impose this restriction.

It may seem odd that we want to estimate two separate equations (4) and (5). The reason for this is that certain types of leisure create positive externalities for other members of the household (Fong and Zhang 2001). We strip the category "socialising with family" out of our definition of leisure to create a more strictly private version of leisure. Furthermore there are other time uses, in particular sleep, which can be thought of as affecting T_i. Other studies have shown that these also respond to economic incentives (Biddle and Hamermesh 1990, Szalontai 2006). So while we would hope that our "leisure" regressions (4) provide information congruent with our "work" ones (5) there is no need for them to do so. To flesh the picture out further we also run regressions with "personal care" (sleep, eating and personal hygiene) as the dependent variable, i.e.

$$personal_i = \mathbf{x}_i\boldsymbol{\phi}^+ + \mathbf{z}_i\boldsymbol{\gamma}^+ + c_i\beta_1^+ + \overline{c}_{-i}\beta_2^+ + \xi_i \tag{7}$$

There are many reasons to suppose that the equations 4, 5 and 7 may differ between men and women. Consequently we also run separate regressions.

The power in most of these regressions comes from variations between households. It is always possible that we have omitted some key household level **preference** variables which contaminate our findings in relation to c_i. Our most stringent test is one in which we estimate the equations adding in household level fixed effects, i.e. we estimate the model

$$\begin{aligned} l_{ih} &= \alpha_0 + D_{ih}^m\alpha_1 + D_{ih}^m\mathbf{x}_{ih}\boldsymbol{\phi}^m + D_{ih}^f\mathbf{x}_{ih}\boldsymbol{\phi}^f + D_{ih}^m c_{ih}\beta_1^m + \\ &\quad D_{ih}^f c_{ih}\beta_1^f + D_{ih}^m\overline{c}_{-ih}\beta_2^m + D_{ih}^f\overline{c}_{-i}\beta_2^f + u_h + \varepsilon_{ih} \end{aligned} \tag{8}$$

where the subscripts now refer to the i-th individual in the h-th household. D_{ih}^m and D_{ih}^f are dummy variables for males and females respectively and $\boldsymbol{\phi}^m$, $\boldsymbol{\phi}^f$, β_1^m, β_1^f and so on are gender specific coefficients and u_h is a household fixed effect, which effectively subsumes the vector $\mathbf{z}$ of household variables. This specification allows us to investigate the determinants of work and leisure for individuals within the same household.

All our regressions are restricted to black South Africans[4] in order to reduce heterogeneity in our sample to some extent.

[4] We use the term "black" in the exclusive sense, i.e. we do not include Coloured and Indian South Africans.

5 The Data

5.1 The South African Time Use Survey

Our measure of time use comes from the South African Time Use Survey (SATUS), a nationally representative survey run in 2000 (Budlender, Chobokoane and Mpetsheni 2001). The core of the survey is a 24 hour time-diary completed retrospectively (on the following day) with the assistance of an interviewer. The diary is divided into thirty minute reporting periods and up to three activities could be recorded in any time slot. Activities were captured by means of a standardised activity list.

The SATUS was collected in a three stage sampling process. In the first stage 872 clusters were selected randomly from a national sampling frame of areas stratified according to four area types: formal urban areas, informal urban areas, rural farm areas and "other" rural areas, i.e. the previous "homeland" areas. Because sampling at this stage was disproportional we "weight" all our results with the person weights supplied by Statistics South Africa in order to make them nationally representative.

In the second stage ten households were randomly selected per area and in the final stage up to two people were randomly selected from age-eligible individuals within each household. In all we have information on about 14,000 people in around 8,000 households. The fact that we have more than one individual per household gives us some ability to compare how different types of individuals within the same household allocate their time. However since we have also at most two individuals from any one household we do not have a full time budget for the entire household. Our ability to look at shifts in the aggregate time budget (analogous to the analyses conducted on aggregate household expenditures, e.g. by Browning et al. (1994)) is therefore severely constrained. It also reduces the power of our "fixed effects" estimates, as we will see below. Finally it has the effect that small households are over-represented in our individual level sample. This is another reason why it is important to weight the estimates.

Another point to note about the sample design is that the SATUS information was collected in three tranches. One third was conducted in February, one third in June and one third in October. This allows us to measure some seasonal effects. Interviews were also staggered over the week, so that roughly one seventh of the sample was interviewed on each day of the week. Again this gives some insight into the weekly rhythms of activities.

The information was collected through three separate instruments. The first of these is a household level survey. This survey collected background information on the household. It also collected information on members of the household. It is from this membership roster that two respondents were selected for the second stage. Once the respondents had been identified, the relationships of all the other individuals to the two selected ones were captured. Since the relationship codes are organised around the respondents we can construct the "connectedness" variables directly, without having to infer the relationships between two individuals through a third party, e.g. the head of the household.

The second instrument is an individual level survey which records educational attainment, marital status and other useful information. The third instrument is the diary itself.

5.2 The dependent variables

As noted above we have three different dependent variables, namely:

1. **Minutes worked**

   This includes paid work, informal production work, looking for work, collecting wood or water, domestic chores, child care, attendance at school and home work. The inclusion of school attendance and home work is motivated by the fact that many young adults in South Africa still attend school. Furthermore one might view the educational efforts of younger members of the household as creating a certain kind of household public good. The other activities included in this category are indicated in the top block of table 1.

2. **Minutes spent on private leisure**

   This includes "socialising with non-family members", "doing nothing", participation in games, recreational activities, watching television, listening to the radio and reading

3. **Minutes spent on personal care**

   This includes sleeping, eating and personal hygiene.

5.3 Personal characteristics

The age of the respondent turns out to matter a great deal. In order to allow maximum flexibility we included a quintic in age. Educational attainment is measured in quite a crude way in the survey. We have the number of school years completed and then only an indicator variable for whether the individual has any post-school qualification. In addition we included dummy variables for marital status.

5.4 Household characteristics

Household size is an important control variable for reasons outlined in section 4. We also included the number of generations in the household on the assumption that individuals who stayed in households with multiple generations might have different preferences (e.g. they might be more conservative in their social attitudes) or the existence of large age ranges might affect the range of household production tasks that might have to be undertaken.

Household income was captured very badly in the survey. It consisted of one question which asked the respondent to place the household in one of a series of income brackets.

5.5 "Distribution factors"

We discussed the construction of our household connectedness variable in the previous section. As Table 2 indicates, our estimation sample shows a fair range in this variable, from a minimum of 0.1 to a maximum of 1 (in single person households). Figure 1 shows the empirical distribution within the data set. Notwithstanding the spikes at various salient points, the variable shows reasonable dispersion.

Construction of the connectedness variable for the other household members, i.e. $\overline{c}_{-i}$ is made more tricky by the fact that many of these relationships have to be inferred through third parties, viz. the respondents. We discuss the construction of this measure in more detail in the appendix.

One empirical difficulty that we faced in estimating regressions with both these variables included is that they are highly correlated. Indeed in many households (e.g. couples, nuclear households) the values are precisely the same for every member of the same household. This means that the variation in these measures, particularly in the fixed effects estimation, comes from complex households.

The second "distribution factor" that we included was the age rank in the household. In this case we did not include $\overline{c}_{-i}$, i.e. the average age rank of all the other individuals, since this almost perfectly collinear with household size and c_i.

6 Results

We present summary statistics for our estimation sample in Table 2. The mean minutes worked, spent on leisure and personal care confirm the fact that men seem to spend less time working and more time on private leisure. There are some differences between the characteristics of men and women, but not enough to expect us to be able to explain the large difference in time allocation by some non-gender related mechanism.

Table 3 presents the regression results for the work regressions (equation 5). In column 1 we pool men and women together. The results suggest that men spend almost an hour less on all types of work than women, after controlling for all the measured characteristics. This result confirms the results from the summary statistics. Work increases with education, since this increases the opportunity costs of time spent on leisure. Surprisingly household size and the number of generations seem to matter very little, but work decreases markedly with the position of the individual in the household. The "age rank" variable shows that more junior members (even controlling for age) do less work than more senior ones.

The "connectedness" coefficient suggests that individuals that are more central in households do more work than more peripheral household members. While this coefficient is positive, the coefficient on $\overline{c}_{-i}$ is negative. Both coefficients are statistically significant and a test of their joint significance (listed at the foot of the column) rejects the idea that they could both be zero. A test of the hypothesis that the coefficients are equal in magnitude and of opposite sign is accepted. It is also listed at the foot of the column as an "efficiency test". The positive sign on this coefficient is most easily explained in terms of altruism: individuals who are closer to other members

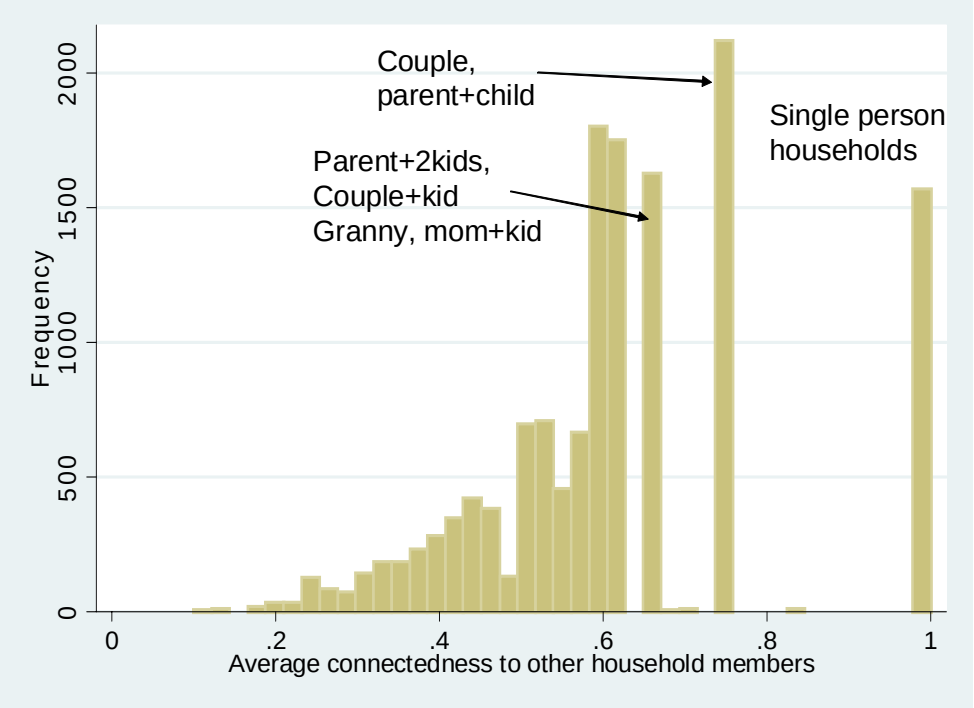

Figure 1: Distribution of the "connectedness" variable in the SATUS data set.

of the household are more willing to allow these individuals to benefit from their work. In terms of the model outlined above, it implies that higher connectedness leads to a lower share for oneself, i.e.

$$\frac{\partial \theta_i}{\partial c_i} < 0$$

In order to calibrate the magnitude of the effect it is useful to consider a shift from the 10th percentile of the distribution of the "connectedness" variable (with a score of .33929) to the 90th percentile (with a score of .75). The former score corresponds to an individual living with a spouse, a sibling, a sib-in-law and three "relations", while the latter corresponds to a couple. The individual living in the household with closer relationships would be doing an extra thirty-three minutes a day of work.

Because we have reasons to believe that these functions may be different for men and women we show the results of gender specific regressions in columns 2 to 5. In columns 3 and 5 we impose the restriction that $\frac{\partial \theta_i}{\partial c_i} = -\frac{\partial \theta_i}{\partial \overline{c}_{-i}}$ (equation 6) after showing in the previous columns that the data accept it. We observe an asymmetry in this impact. The results suggest that men that are more central in households do more work than more peripheral males, but the effect in the case of women is very small in absolute terms

Although it is not immediately evident from the coefficients of the quintic, the results imply that men work less than women (on average) and that the gap increases markedly with age.

Our preferred specification is the fixed effects regression (equation 8) which is reported in column six. In order to make the fully interacted model more readable we report the coefficients in two separate columns, although they have been derived from one regression. We prefer the fixed effects regression because it deals with any unobserved household heterogeneity. It gets at the issue of what happens within households more effectively than regressions which also rely on variations between households. A particular bonus is that it effectively eliminates one and two person households from the regression. It is hardly surprising that individuals in one person households would be more inclined to work!

The gender asymmetry noted earlier reappears in this context, except in quite a different form. After controlling for household level effects, it is the women who respond to their level of connectedness. The effect is fairly large implying forty-four extra minutes of work for the shift from the 10th percentile to the 90th percentile

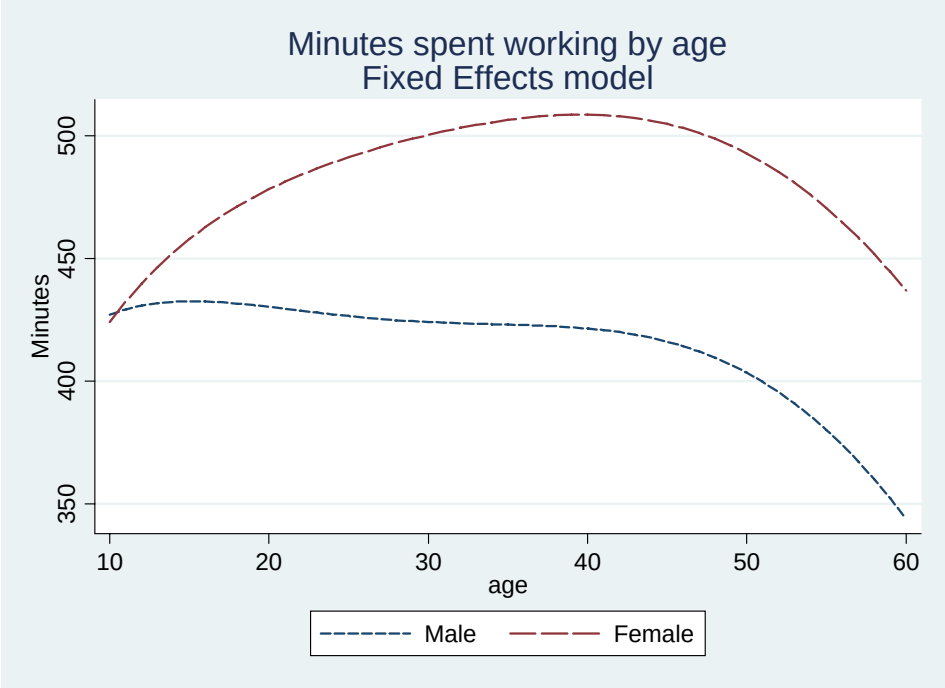

Figure 2: Predictions of minutes spent working from fixed effects regression model for single individual with 12 years education, no post-school training, living in a four person nuclear household.

considered earlier. The coefficient is significant at the 10% level. Considering some of the other coefficients, it appears as though the marital codes have absorbed some of the effect attributed to the "connectedness" variable in columns three and five. The coefficient on the "married" dummy variable for males is particularly striking, suggesting that single males (the "lazy sons") do much less work than their fathers, or indeed the female members of the households. The latter claim derives from a consideration of the gender-specific quintics in age given in column six. In order to make these more interpretable, we have generated predictions from the given regression output for an individual with twelve years of education, no post-school training, living in a four person nuclear household. We have set the age rank to one. The predicted number of minutes worked is shown in Figure 2. It is interesting to note that the gap from age forty to sixty is between eighty and ninety minutes. This is similar to the size of the "married" dummy for men.

In Table 4 we repeat these analyses, except that our dependent variable is private leisure. Many of the results are very similar. Interestingly enough, the "household size" variable now seems to matter in the cross-sectional regressions, while the "connectedness" variable does not seem to matter much. Once we include household fixed effects, however, it turns out that women who are more central in their households have considerably less private leisure than more peripheral ones. The size of the coefficient is big, suggesting a reduction of fifty minutes in private leisure when one moves from the 10th percentile to the 90th of the connectedness variable. The point estimate for the "connectedness" variable in the case of males is actually positive, suggesting that more central males are able to lead an easier life! This finding would be congruent with the Bertrand et al. (2003) study, except that our coefficient is estimated very imprecisely. Again there is a marked contrast between single and married men, with the former enjoying an extra hour of private leisure a day.

In Table 5 we run the analyses with minutes spent on personal care as the dependent variable. The main point of these regressions is to verify that the results are not driven by some other strange dynamics. We observe that there is little evidence that household structure or the "distribution factors" have any impact on personal care within the household. The only somewhat interesting feature is that married men spend about twenty minutes less on personal care (mainly sleep) than single men, once household effects are controlled for.

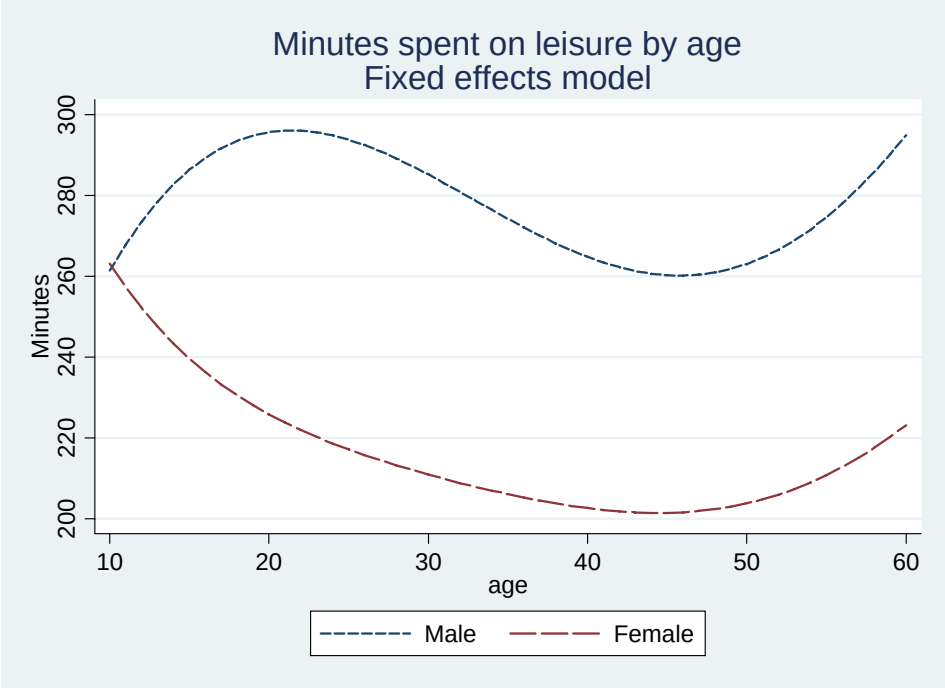

Figure 3: Predictions of minutes spent on private leisure from fixed effects regression model for single individual with 12 years education, no post-school training, living in a four person nuclear household.

7 Conclusion

Our analyses support the findings already evident in the summary statistics that there is a marked imbalance in the household division of work and leisure. Women tend to work considerably more than men, with single men appearing to be the largest slackers. These findings could be reconciled with the unitary model if one assumed that all household members agreed that these men should be allowed to enjoy their lives.

The size and significance of the "connectedness" coefficient, even in fixed effects regressions, undermines this argument. It is hard to see how this variable could impact on the household allocation process except through the individual shares θ_i. This, however, is not consistent with the unitary model. Of course if the unitary model has to be abandoned, the assumption that the lopsided division of labour within the household represents common preferences needs to be abandoned also. An alternative explanation of these imbalances is that they reflect imbalances in power or altruism. The men either extract more leisure by force, or they free-ride on the altruism of their women.

The gender specific impact of the connectedness variable is interesting, particularly when taken together with the "marriage" coefficients. The fixed effects regressions suggest that peripheral women have more leisure and do less work than more central ones. In the case of men, however, the work effort of single men, whether or not they are central to the household (i.e. sons), is significantly lower. This suggests that the marital status variable is a more reliable indicator of the degree of altruism felt by a male towards other members of his household than the closeness of the relationships themselves. To that extent Aristotle seems to have got it almost right: sons seem to avoid aiding their family because they enjoy getting the benefits, but avoid doing them!

A Appendix

A.1 Derivations

Let each $\theta_i(c_1, \ldots, c_n)$ be a function of the individual specific attributes $c_1, \ldots, c_n$. We will consider the impact of changes in these shares in the vicinity of a symmetrical distribution, i.e. one where $c_1 = \ldots = c_n$. We assume

that the functional forms are such that the impact of these distribution factors $c_1, \ldots, c_n$ is symmetrical on the shares θ_i, so that $\frac{\partial \theta_i}{\partial c_j} \simeq \frac{\partial \theta_j}{\partial c_i}$. Then by the adding up constraint

$$\begin{aligned} \frac{\partial \theta_i}{\partial c_i} &= -\sum_{j \neq i} \frac{\partial \theta_j}{\partial c_i} \\ &\simeq -\sum_{j \neq i} \frac{\partial \theta_i}{\partial c_j} \end{aligned}$$

One immediate implication is that the cross-impacts $\frac{\partial \theta_i}{\partial c_j}$ of the characteristics must be weaker relative to the direct impact $\frac{\partial \theta_i}{\partial c_i}$ in larger households. Specifically assume that $\frac{\partial \theta_i}{\partial c_j} = \frac{\partial \theta_i}{\partial c_k}$ for $j, k \neq i$ and let $\beta^n_{-i} = \frac{\partial \theta_i}{\partial c_j}$ be this impact in a household of size n. Let $\frac{\partial \theta_i}{\partial c_i} = \beta^n_i$ then we have $\beta^n_{-i} = \frac{1}{n-1}\beta^n_i$. Note that the requirement will be automatically met if θ_i can be written as $\theta_i\left(c_i, \overline{c}_{-i}\right)$ where $\overline{c}_{-i} = \frac{1}{(n-1)} \sum_{j \neq i} c_j$.

We can extend this example if we assume that the shares $\theta_i\left(c_1, \ldots, c_n\right)$ are homogeneous of degree zero in the attributes $c_1, \ldots, c_n$. It then follows that

$$\begin{aligned} \frac{\partial \theta_i}{\partial c_i} c_i &= -\sum_{j \neq i} \frac{\partial \theta_i}{\partial c_j} c_j \\ \beta^n_i c_i &= -\sum_{j \neq i} \beta^n_{-i} c_j \\ &= -\beta^n_{-i} \sum_{j \neq i} c_j \\ &= -\frac{1}{n-1} \beta^n_i \sum_{j \neq i} c_j \\ &= -\beta^n_i \overline{c}_{-i} \end{aligned}$$

If we assume that the direct impact $\frac{\partial \theta_i}{\partial c_i}$ is similar across different households, then we can standardise for the different household sizes by looking at the impact of a "representative agent" with the average characteristics of the other members of the household. Furthermore the impacts should be of equal magnitude and opposite sign. Note that if we write θ_i as $\theta_i\left(c_i, \overline{c}_{-i}\right)$, then homogeneity of degree zero would imply that

$$\frac{\partial \theta_i}{\partial c_i} c_i = -\frac{\partial \theta_i}{\partial \overline{c}_{-i}} \overline{c}_{-i}$$

Comparing coefficients we see that $\frac{\partial \theta_i}{\partial c_i} = -\frac{\partial \theta_i}{\partial \overline{c}_{-i}}$.

A.2 Construction of the $\overline{c}_{-i}$ variable

In order to work out the relationship scores between two individuals from their relationship to a third reference person (the respondent) we used the following rules:

relationships	score	Comment
spouse-child	0.5	
spouse-grandchild	0.25	
spouse-"relation"	0.125	
child-child	0.5	
child-grandchild	0.375	The grandchild could be either the child of the child, or a nephew or niece. This score is the average of 0.5 and 0.25
child-sibling	0.25	
child-parent	0.25	
child-"relation"	0.125	
sibling-sibling	0.5	
sibling-parent	0.5	
sibling-child	0.25	
sibling-grandparent	0.25	
sibling-grandchild	0.125	
sibling-"relation"	0.125	
parent-parent	0.5	
parent-grandparent	0.25	This ignores the possibility that the grandparent may be the parent-in-law of the parent.
parent-grandchild	0.125	
parent-"relation"	0.125	
grandparent-grandparent	0.5	This supposes that they are a couple and not (for instance) the paternal and maternal grandmother
grandparent-grandchild	0.0625	
grandparent-"relation"	0.125	
grandchild-grandchild	0.375	They could be siblings or cousins
granchild-"relation"	0.125	
unrelated-...	0	

Since in most cases we had two respondents in the survey, there would potentially be two different ways of coding the relationships between two other individuals in the household. We scored the relationship both ways and then took the average of the two scores . This would give us an average connectedness score c_j for every member j different from the respondent i. Where j was the other respondent we scored them directly, using the scores outlined in section 4. Once we had calculated these scores we calculated $\overline{c}_{-i}$ as the average of these scores over all the other individuals. For the purposes of single person households we set $\overline{c}_{-i} = 0$.

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Table 1: Time Allocation by black South Africans

	Prime age individuals				All			
	Female: n=2698		Male: n=2426		Female: n=5833		Male: n=5075	
Type of time use:	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.
Wage work	74.5	5.60	181.7	9.28	37.3	2.95	88.1	5.37
Domestic wage work	21.3	2.29	3.5	1.20	10.1	1.00	1.8	0.50
Primary production	10.0	1.76	18.5	3.34	11.5	1.47	25.5	2.97
Service work	21.2	2.59	19.7	3.13	12.5	1.42	13.3	1.58
Travel to work	20.4	1.36	41.8	2.11	10.5	0.75	20.3	1.23
Look for work	2.4	0.63	15.8	2.24	1.4	0.31	8.5	1.19
Other work	5.8	0.79	15.5	2.45	2.9	0.36	7.4	0.98
Cooking	103.9	3.21	21.0	1.49	85.2	1.84	19.6	1.13
Cleaning	57.1	2.23	28.3	2.24	49.5	1.44	25.4	1.46
Caring for kids	43.5	2.49	3.3	0.64	32.1	1.63	2.6	0.36
Other household work	61.7	2.80	33.1	2.51	48.6	1.71	30.7	1.52
Collect water	8.9	1.28	1.6	0.33	10.1	1.04	3.9	0.47
Collect wood	6.4	1.13	1.3	0.67	6.6	0.93	3.5	0.90
Attending school	3.8	0.97	4.4	1.35	69.2	3.85	80.7	4.58
Doing homework	2.3	0.45	4.9	1.41	16.1	1.05	19.0	1.43
Community work	5.7	1.13	6.5	1.79	3.4	0.50	5.6	1.06
Watching TV	61.7	3.50	70.1	3.60	61.1	3.05	66.0	2.80
Socialising with nonfamily members	36.5	2.07	84.3	4.59	37.8	1.46	71.0	2.60
Recreation	6.8	1.26	14.4	1.85	8.9	1.16	27.2	2.80
Participate in games	0.6	0.16	4.4	1.60	18.1	1.37	26.0	1.97
Listen to radio	33.1	2.08	36.2	2.23	28.0	1.32	30.3	1.39
Read mass media	3.9	0.60	5.8	0.74	3.9	0.42	5.1	0.46
Doing nothing	42.9	2.64	42.9	2.72	44.5	2.20	41.4	2.13
Socialising with family members	69.9	3.46	56.7	3.47	67.7	2.55	50.6	2.09
Sleeping	574.6	3.57	548.5	5.36	586.5	2.80	570.5	3.74
Eating	57.2	1.03	66.0	1.73	60.3	0.81	67.3	1.07
Personal hygiene	34.0	0.82	37.4	1.12	35.7	0.66	39.1	0.90

Notes: Own calculations from the South African Time Use Survey 2000. Estimates are weighted using the person weights supplied by Statistics South Africa. The standard errors have been corrected for clustering. Prime age is defined as ages 25 to 50, inclusive.

The numbers do not add up to 1440 minutes, because categories like religious observance and various other types of travel have not been listed

Table 2: Summary Statistics for the estimation samples

	All: n=10479				Female: n=5589				Male: n=4890			
Variable:	mean weighted	mean unweighted	min	max	mean weighted	mean unweighted	min	max	mean weighted	mean unweighted	min	max
work	401.6	411.1	0	1260	424.9	426.4	0	1225	374.9	393.7	0	1260
private leisure	260.1	254.4	0	1050	223.1	223.8	0	1050	302.5	289.3	0	990
personal care	678.7	677.1	30	1440	680.9	682.3	30	1440	676.2	671.2	50	1440
age	30.2	32.4	10	99	31.1	32.9	10	98	29.1	31.9	10	99
Years of education	6.85	6.76	0	12	6.83	6.75	0	12	6.89	6.76	0	12
Post-matric qualification	0.083	0.082	0	1	0.079	0.082	0	1	0.087	0.081	0	1
Male	0.466	0.467	0	1								
Single (base category)	0.640	0.551	0	1	0.614	0.535	0	1	0.670	0.570	0	1
Married/Living together	0.282	0.357	0	1	0.267	0.335	0	1	0.299	0.381	0	1
Widowed	0.050	0.055	0	1	0.084	0.086	0	1	0.011	0.018	0	1
Divorced/Separated	0.028	0.038	0	1	0.035	0.043	0	1	0.020	0.031	0	1
Household size	5.80	4.30	1	24	5.90	4.52	1	24	5.70	4.05	1	18
connectedness	0.542	0.617	0.1	1	0.532	0.594	0.1	1	0.553	0.644	0.111	1
HH connectedness	0.440	0.454	0	0.792	0.452	0.480	0	0.760	0.426	0.425	0	0.792
Number of generations	2.25	1.98	1	5	2.32	2.11	1	5	2.17	1.84	1	5
pnr of person interviewed	2.89	2.22	1	9	2.86	2.30	1	9	2.91	2.14	1	9
Tranche												
February (base)	0.344	0.325	0	1	0.342	0.331	0	1	0.346	0.317	0	1
June	0.328	0.339	0	1	0.342	0.337	0	1	0.312	0.341	0	1
October	0.328	0.336	0	1	0.316	0.332	0	1	0.342	0.341	0	1
Day of the week												
Monday (base)	0.181	0.178	0	1	0.178	0.177	0	1	0.183	0.179	0	1
Tuesday	0.168	0.169	0	1	0.177	0.173	0	1	0.157	0.164	0	1
Wednesday	0.127	0.143	0	1	0.125	0.138	0	1	0.129	0.149	0	1
Thursday	0.111	0.110	0	1	0.113	0.109	0	1	0.109	0.110	0	1
Friday	0.138	0.126	0	1	0.136	0.125	0	1	0.140	0.128	0	1
Saturday	0.102	0.112	0	1	0.092	0.107	0	1	0.113	0.118	0	1
Sunday	0.174	0.162	0	1	0.179	0.172	0	1	0.168	0.150	0	1
Stratum												
urban formal (base)	0.364	0.325	0	1	0.354	0.325	0	1	0.375	0.324	0	1
urban informal	0.114	0.296	0	1	0.110	0.295	0	1	0.118	0.296	0	1
other rural	0.472	0.229	0	1	0.491	0.251	0	1	0.450	0.204	0	1
farm	0.051	0.151	0	1	0.045	0.128	0	1	0.057	0.176	0	1

Province												
WC (base)	0.028	0.053	0	1	0.028	0.048	0	1	0.029	0.058	0	1
EC	0.170	0.133	0	1	0.177	0.144	0	1	0.162	0.120	0	1
NC	0.009	0.039	0	1	0.009	0.039	0	1	0.009	0.039	0	1
FS	0.075	0.124	0	1	0.072	0.120	0	1	0.078	0.128	0	1
KZ	0.220	0.161	0	1	0.228	0.165	0	1	0.212	0.158	0	1
NW	0.097	0.089	0	1	0.094	0.088	0	1	0.100	0.091	0	1
GT	0.177	0.148	0	1	0.165	0.140	0	1	0.191	0.156	0	1
MP	0.076	0.121	0	1	0.078	0.120	0	1	0.074	0.123	0	1
LP	0.148	0.131	0	1	0.150	0.136	0	1	0.145	0.126	0	1
Household income category												
0-399 (base)	0.215	0.245	0	1	0.210	0.242	0	1	0.221	0.248	0	1
400-799	0.345	0.325	0	1	0.364	0.348	0	1	0.324	0.299	0	1
800-1199	0.158	0.165	0	1	0.163	0.162	0	1	0.152	0.168	0	1
1200-1799	0.107	0.110	0	1	0.096	0.100	0	1	0.119	0.121	0	1
1800-2499	0.063	0.057	0	1	0.059	0.054	0	1	0.067	0.061	0	1
2500-4999	0.052	0.048	0	1	0.049	0.045	0	1	0.055	0.052	0	1
5000-9999	0.018	0.014	0	1	0.015	0.013	0	1	0.022	0.016	0	1
10000+	0.004	0.003	0	1	0.004	0.004	0	1	0.003	0.002	0	1
Don't Know	0.033	0.026	0	1	0.034	0.027	0	1	0.032	0.026	0	1
Refused to answer	0.006	0.006	0	1	0.005	0.005	0	1	0.006	0.006	0	1

Note: The sample includes only black South Africans. The weighted means were calculated using the person weights supplied by Statistics South Africa.

Table 3: Determinants of minutes worked by black South Africans

	(1) All	(2) Men	(3) Men - restricted	(4) Women	(5) Women - restricted	(6) FE Men - restricted	(6) FE Women - restricted
age	27.988	34.655	34.719	29.197	28.035	16.33	24.168
	[12.577]*	[17.881]+	[17.890]+	[16.118]+	[16.088]+	[17.479]	[15.858]
age^2/100	-159.357	-199.14	-200.139	-167.26	-161.345	-110.12	-114.621
	[65.827]*	[96.017]*	[96.089]*	[86.147]+	[85.960]+	[94.330]	[86.359]
age^3/1000	41.018	49.615	49.974	44.771	43.46	32.85	29.757
	[15.418]**	[22.812]*	[22.830]*	[20.714]*	[20.664]*	[22.649]	[21.170]
age^4/10000	-4.919	-5.729	-5.777	-5.545	-5.413	-4.406	-3.838
	[1.653]**	[2.455]*	[2.456]*	[2.284]*	[2.279]*	[2.469]+	[2.374]
age^5/100000	0.214	0.243	0.245	0.247	0.242	0.205	0.179
	[0.066]**	[0.097]*	[0.097]*	[0.094]**	[0.093]**	[0.099]*	[0.099]+
Years of education	4.798	3.085	3.084	7.111	7.137	6.682	6.304
	[1.303]**	[2.012]	[2.016]	[1.517]**	[1.512]**	[1.811]**	[1.449]**
Post-matric qualification	11.748	27.866	27.798	-4.872	-4.882	10.851	-17.214
	[12.715]	[20.288]	[20.275]	[14.558]	[14.557]	[18.070]	[16.142]
Male	-55.723					76.702	
	[6.181]**					[140.877]	
Married/Living together	33.393	51.464	52.99	21.309	21.768	79.098	4.495
	[9.903]**	[17.511]**	[17.192]**	[11.044]+	[10.953]*	[17.465]**	[12.013]
Widowed	-4.637	-70.213	-69.865	-14.151	-14.732	34.938	16.769
	[17.303]	[37.304]+	[37.281]+	[18.733]	[18.737]	[47.785]	[19.865]
Divorced/Separated	37.037	46.341	46.372	26.937	26.779	45.379	39.731
	[18.313]*	[33.054]	[33.101]	[21.666]	[21.694]	[42.901]	[25.434]
Household size	1.298	-0.508	-1.528	1.832	0.845		
	[1.771]	[2.900]	[2.539]	[2.216]	[1.892]		
connectedness	80.17	101.064	75.056	40.685	13.696	-20.004	107.752
	[25.491]**	[39.552]*	[18.196]**	[31.598]	[17.673]	[76.648]	[64.349]+
HH connectedness	-36.63	-60.725	-75.056	1.924	-13.696	20.004	-107.752
	[18.388]*	[27.665]*		[22.812]			
Number of generations	-2.473	-5.973	-6.994	-2.357	-3.312		
	[5.214]	[8.169]	[8.177]	[5.557]	[5.491]		
Age rank in HH (1=oldest)	-6.674	-4.025	-4.136	-5.941	-6.343	-0.459	6.439
	[3.183]*	[4.792]	[4.774]	[4.091]	[4.078]	[4.664]	[4.726]
Controls for day of week	Y	Y	Y	Y	Y	Y	
Controls for tranche, stratum, province, household income bracket	Y	Y	Y	Y	Y		
Household fixed effects						Y	
Observations	10479	4890	4890	5589	5589	10527	
Number of households						6385	
R-squared	0.25	0.26	0.26	0.25	0.25	0.15	
Joint test (P):	0.000	0.000		0.437			
Efficiency test (P):	0.211	0.472		0.295			

Note: Own calculations from the South African Time Use Survey 2000. The coefficient in the shaded cells is restricted to being the negative of the "connectedness" coefficient. All estimates are weighted using the person weights supplied by Statistics South Africa. Standard errors are corrected for clustering.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 4: Determinants of minutes spent on private leisure by black South Africans

	(1) All	(2) Men	(3) Men - restricted	(4) Women	(5) Women - restricted	(6) FE Men - restricted	(6) FE Women - restricted
age	-11.714	-0.6	-0.609	-28.991	-27.565	16.202	-16.835
	[10.458]	[15.569]	[15.580]	[13.513]*	[13.400]*	[14.758]	[12.286]
age^2/100	64.081	24.657	24.796	138.554	131.298	-52.794	78.401
	[55.984]	[84.075]	[84.279]	[72.210]+	[71.552]+	[80.697]	[65.172]
age^3/1000	-16.649	-10.643	-10.693	-31.625	-30.017	3.258	-19.518
	[13.340]	[20.087]	[20.163]	[17.349]+	[17.188]+	[19.603]	[15.527]
age^4/10000	2.082	1.721	1.727	3.493	3.332	0.653	2.382
	[1.451]	[2.178]	[2.189]	[1.914]+	[1.896]+	[2.165]	[1.694]
age^5/100000	-0.096	-0.092	-0.092	-0.146	-0.14	-0.061	-0.107
	[0.059]	[0.087]	[0.088]	[0.079]+	[0.078]+	[0.089]	[0.069]
Years of education	2.24	4.244	4.244	0.678	0.647	-1.373	-1.588
	[0.959]*	[1.535]**	[1.535]**	[1.167]	[1.168]	[1.393]	[1.137]
Post-matric qualification	5.71	0.795	0.804	12.14	12.153	10.389	6.168
	[10.887]	[17.597]	[17.596]	[10.835]	[10.812]	[14.877]	[12.576]
Male	77.957					-229.475	
	[5.070]**					[114.235]*	
Married/Living together	-33.416	-58.88	-59.093	-12.886	-13.449	-65.353	-3.431
	[8.059]**	[14.333]**	[14.368]**	[8.577]	[8.571]	[13.969]**	[9.229]
Widowed	3.968	74.403	74.354	4.994	5.708	16.702	-10.42
	[15.593]	[42.124]+	[42.165]+	[16.067]	[15.939]	[37.477]	[16.492]
Divorced/Separated	-37.028	-61.185	-61.19	-21.394	-21.2	-63.835	-60.363
	[13.558]**	[25.635]*	[25.637]*	[15.646]	[15.681]	[27.972]*	[19.818]**
Household size	-4.424	-0.631	-0.488	-6.144	-4.934		
	[1.764]*	[2.722]	[2.529]	[1.899]**	[1.752]**		
connectedness	-27.396	-19.166	-15.537	-17.446	15.657	82.752	-128.687
	[23.106]	[38.771]	[14.340]	[24.388]	[13.019]	[64.164]	[49.199]**
HH connectedness	-5.759	13.537	15.537	-34.814	-15.657	-82.752	128.687
	[13.423]	[21.635]		[16.779]*			
Number of generations	5.79	8.336	8.478	5.448	6.619		
	[4.515]	[8.049]	[7.644]	[4.290]	[4.256]		
Age rank in HH (1=oldest)	8.794	4.678	4.693	8.866	9.359	5.664	0.827
	[2.873]**	[4.470]	[4.467]	[3.002]**	[2.999]**	[4.052]	[4.022]
Controls for day of week	Y	Y	Y	Y	Y	Y	
Controls for tranche, stratum, province, household income bracket	Y	Y	Y	Y	Y		
Household fixed effects						Y	
Observations	10479	4890	4890	5589	5589	10527	
Households						6385	
R-squared	0.17	0.16	0.16	0.14	0.14	0.15	
Joint test (P):	0.494	0.556		0.106			
Eff test (P):	0.266	0.915		0.096			

Note: Own calculations from the South African Time Use Survey 2000. The coefficient in the shaded cells is restricted to being the negative of the "connectedness" coefficient. All estimates are weighted using the person weights supplied by Statistics South Africa. Standard errors are corrected for clustering.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 5: Determinants of minutes spent on personal care by black South Africans

	(1) All	(2) Men	(3) Men - restricted	(4) Women	(5) Women - restricted	(6) FE Men - restricted	(6) FE Women - restricted
age	-18.395	-27.476	-27.463	-11.556	-12.362	-30.19	-26.95
	[7.605]*	[11.628]*	[11.619]*	[9.766]	[9.871]	[10.202]**	[9.045]**
age^2/100	91.929	136.878	136.67	61.295	65.399	142.304	134.515
	[41.018]*	[65.500]*	[65.429]*	[50.980]	[51.499]	[55.354]*	[48.494]**
age^3/1000	-21.288	-29.883	-29.809	-16.197	-17.106	-30.939	-32.603
	[9.879]*	[16.179]+	[16.160]+	[12.247]	[12.363]	[13.339]*	[11.770]**
age^4/10000	2.303	3.025	3.015	1.967	2.058	3.218	3.74
	[1.084]*	[1.793]+	[1.791]+	[1.374]	[1.386]	[1.458]*	[1.313]**
age^5/100000	-0.09	-0.113	-0.112	-0.083	-0.087	-0.126	-0.157
	[0.044]*	[0.072]	[0.072]	[0.058]	[0.059]	[0.059]*	[0.054]**
Years of education	-5.388	-5.746	-5.746	-5.628	-5.61	-3.989	-3.508
	[0.737]**	[1.070]**	[1.070]**	[1.009]**	[1.013]**	[1.032]**	[0.923]**
Post-matric qualification	-20.969	-42.411	-42.425	1.318	1.31	-23.85	4.061
	[8.897]*	[12.838]**	[12.842]**	[9.295]	[9.302]	[11.386]*	[10.687]
Male	-1.076					25.347	
	[3.978]					[81.226]	
Married/Living together	-12.505	-21.385	-21.067	-6.982	-6.664	-23.438	-6.803
	[6.596]+	[11.309]+	[11.035]+	[6.586]	[6.589]	[10.614]*	[7.506]
Widowed	1.17	6.498	6.57	15.39	14.987	7.449	-13.605
	[11.011]	[25.968]	[25.976]	[10.760]	[10.725]	[29.609]	[12.804]
Divorced/Separated	0.632	7.04	7.047	-3.84	-3.949	12.349	2.861
	[11.269]	[21.752]	[21.714]	[12.736]	[12.778]	[27.747]	[14.597]
Household size	0.376	-2.294	-2.506	2.362	1.678		
	[1.250]	[2.192]	[2.054]	[1.351]+	[1.237]		
connectedness	2.046	-26.227	-31.645	33.599	14.874	-39.826	11.677
	[16.415]	[26.889]	[9.947]**	[19.993]+	[11.639]	[45.066]	[40.942]
HH connectedness	19.059	34.631	31.645	-4.038	-14.874	39.826	-11.677
	[10.965]+	[17.126]*		[14.424]			
Number of generations	-2.1	1.459	1.246	-4.439	-5.101		
	[3.381]	[5.328]	[5.040]	[3.784]	[3.759]		
Age rank in HH (1=oldest)	0.8	3.2	3.176	-1.544	-1.823	-0.936	-3.164
	[1.954]	[3.128]	[3.118]	[2.721]	[2.720]	[2.827]	[3.084]
Controls for day of week	Y	Y	Y	Y	Y	Y	
Controls for tranche, stratum, province, household income bracket	Y	Y	Y	Y	Y		
Household fixed effects						Y	
Observations	10479	4890	4890	5589	5589	10527	
Households						6385	
R-squared	0.15	0.18	0.18	0.15	0.15	0.1	
Joint test (P):	0.184	0.007		0.234			
Eff test (P):	0.361	0.829		0.234			

Note: Own calculations from the South African Time Use Survey 2000. The coefficient in the shaded cells is restricted to being the negative of the "connectedness" coefficient. All estimates are weighted using the person weights supplied by Statistics South Africa. Standard errors are corrected for clustering.

+ significant at 10%; * significant at 5%; ** significant at 1%