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**Resource Inflows and Household Composition:  
Evidence From South African Panel Data**

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# Resource Inflows and Household Composition: Evidence From South African Panel Data<sup>§</sup>

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## Abstract

Economic analysis of household behaviour, usually, assumes that household size and composition are fixed and exogenous. This study departs from this practice by analysing resource and household compositional variables, using an interdependent framework that treats them as jointly endogenous. The study is conducted using panel data set of Black households residing in Kwazulu Natal province in South Africa. The results provide evidence of fluidity of household structure, and point to new hypotheses on its responsiveness to changes in resources and other variables. The results also point to some sharp changes in South Africa between 1993 and 1998 in the direction and magnitude of the impact of several key variables

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**Keywords:** Private Transfers, Social Pensions, Household Structure, Panel Data, Crowding Out

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## 1. Introduction

Much of the empirical literature on household behaviour has assumed exogeneity of (i) household size and composition, and (ii) resource inflows. Moreover, the interdependence of (i) and (ii) has received relatively little attention in a literature which has conventionally treated the decisions on (i) and (ii) as fixed. Both these exogeneity assumptions have, however, been seriously questioned in recent years. With respect to (i), there is now a fairly extensive anthropological literature that documents the fluidity of the structure of the household in many developing, particularly African, countries.<sup>1</sup> Changes in household resources often result in changes in household composition. For example, Edmonds, Mammen and Miller (2000) observe, on South African census data, that the inflow of large pension amounts has led to an increase in household size. Regarding (ii), the South African evidence, presented in Maitra and Ray (1999), reject the exogeneity of resource inflows in the spending decisions of the household, and point to the need to recognise the simultaneity of the earning and spending decisions in analysing household behaviour. If, as has been claimed for low income countries, public policies cause demographic changes inside the family, then the underlying hypothesis ought to be formally tested, and any causal link between public policy and household formation should be taken into account in the design and implementation of policies in areas such as public pensions and other forms of public transfers.

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<sup>1</sup> See, for example, Edmonds, Mammen and Miller (2000) and the references cited therein.

This paper study extends the literature further by abandoning the two exogeneity assumptions, mentioned above, in an empirical analysis of resource inflows and household structure on panel data from post apartheid South Africa. Special attention is paid to the question of how household size and composition has changed in South Africa over the period 1993 – 98 in response to changes in the volume and composition of resource inflows. The issue of endogenous household formation is quite important in the context of South Africa. Though this has not been formally tested, there is a belief that the changing socio economic circumstances in post apartheid South Africa has resulted in increased child fostering among Black households. During the apartheid era, Black working age males would migrate to cities and mines in search of work, where they were not allowed to bring their families. In most cases, the wives and children would be left behind in the villages, while the adult male working in the city would remit a portion of his income back to his family. After the dismantling of apartheid and the repealing of the dreaded ‘pass laws’, Black women are increasingly migrating to the cities in search of employment. Because of the poor living conditions in the South African cities, adults often prefer not to bring their children with them to the cities, instead leaving them with their grandparents and/or other relatives in the villages. Black Africans also often prefer their children to grow up in the villages so as to maintain historical, social and tribal ties with the land. Maluccio, Haddad and Thomas (2001) provide evidence using the same data sets that compared to 1993, in 1998 a significantly larger number of children reside away from their mothers. There has been on the other hand no significant change in the proportion of children living away from their fathers in 1998 compared to 1993. An additional contributory factor has been the supposed generosity of the social pensions scheme that encouraged children and

other dependents to live with the pensioners. In the context of the Kwazulu Natal province this could be an important issue because this was one of the last regions to achieve racial parity in social pensions. So one could think of the period 1993 – 1998 as the first few years following the equalisation of pension support across the different races. Edmonds, Mammen and Miller (2000) use census data from South Africa to show that over the period 1991 – 1996 there have been significant changes in the household composition of Black households. They attribute this to the changes in the social pension program and the extension of the program to cover the majority of Black households.

The social pensions program<sup>2</sup> in South Africa has received attention in several recent studies. While Case and Deaton (1998) and Duflo (2000) speak favourably about the program, others are not as positive. Several recent studies have documented a list of unintended behavioural consequences that detract from the effectiveness of the social pensions program. For example, Jensen (1998), Maitra and Ray (1999) both provide evidence of crowding out of private transfers by public transfers consequent on the extension of the social pensions program to cover the majority of elderly South Africans. Bertrand, Miller and Mullainathan (2000), Maitra and Ray (2000) find that pensions also have a detrimental effect on the labour force participation of African men and on their labour earnings. Consistent with these results is the finding of Moller and Devey (1995) that, in 1993, 85% of households that include an age equalified pensioner have at least one unemployed working age adult resident, compared to 66% of households without any age-qualified pensioner.

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<sup>2</sup> See Lund (1994) and Case and Deaton (1994) for a description of the program.

The issue of the impact of resource inflows on household size and composition acquires importance in assessing the effectiveness of the social pensions scheme in South Africa. The limited evidence that does exist on this, due to Edmonds, Mammen and Miller (2000), is on Census data. Besides extending their study to panel data of households, this paper examines the demographic impact of all major resource inflows, not just pensions, taking explicit note of their endogeneity and of their interaction between themselves, as our previous studies (Maitra and Ray (1999, 2000)) have suggested. The availability of panel data provides a good opportunity to examine the nature and magnitude of changes in household size and composition due to the complete dismantling of the apartheid regime, removal of restrictions on movement, removal of the dreaded pass laws and the extension of the pensions program to cover all households in South Africa. One of the hypotheses this paper attempts to test is whether the propensity of the pensioners to share their pensions with others,<sup>3</sup> coupled with an increase in the amount of pensions, has led to a change in household size and composition. We then extend the analysis to examine whether other resource inflows, in particular private remittances received by the household have had similar effects.

Much of the literature on residency choice by household members has examined whether elderly parents choose to live with their working relatives.<sup>4</sup> In the South African context it is more important to examine whether the non pensioners choose to live with the pensioners, since the generosity of the pension, together with the fact that the pensions are means tested for the pensioners income only, presumably, act as strong incentives for household augmentation and

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<sup>3</sup> Evidence on this is contained in Ardington and Lund (1995), McKendrik and Shingwenyana (1995), Moller and Devey (1995), Moller and Sotshongaye (1996).

<sup>4</sup> See, for example, Wolf and Soldo (1988), Martin (1989), Da Vanzo and Chan (1994) and Cameron (2000).

household formation. Consequently, in this study, the number of working age adult residents and the number of resident children in the household are taken to be endogenous and jointly determined with all the income components in the estimation.

We distinguish between four components of income: (i) unearned income, (ii) earned income, (iii) social pensions, and (iv) private remittance. While these four income streams do not necessarily exhaust all types of inflows, they together constitute the dominant share of total household income. There are, at least, two related reasons why one needs to distinguish between these resource inflows. First, these mostly accrue to different individuals in the household with distinct preferences and often belonging to different generations. Consequently, an analysis of the interaction between these income streams yields information on how one individual's income earning activity is affected by the income accruing to other members of the household. Second, any "crowding out" of earned income and private remittances by social pensions as the recent evidence of Jensen (1998), Maitra and Ray (1999, 2000) and Bertrand, Miller and Mullainathan (2000) suggest, needs to be taken into account in the design and implementation of policies on public transfer. As argued earlier, there is a long history of private inter-household transfers arising primarily from the African male, working in the cities and mines, remitting money to his family living in the villages. In many cases, these private transfers are more important than the social pensions received by the household. There has been no analysis of the effect of private remittances on household composition, though there exists a literature that documents the effect of household

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composition on private remittances received by the household (see, for example, Cox and Jimenez (1995)).

The present study is conducted on panel data on approximately 1000 Black<sup>5</sup> households residing in the Kwazulu Natal province of South Africa over the period 1993 – 98. The choice of the South African data set for this study is particularly appropriate in view of the tendency for 3 generations or more to cohabitate. The availability of panel data is useful in assessing whether the composition of household income between its components, and the nature and magnitude of interaction between them have changed much over the period 1993 – 98. It also allows an investigation of changes in the magnitude, determinants and impact of the social pensions scheme in South Africa over 1993 – 98 by examining them in relation to the same households tracked through this period. Keeping in mind the fact that the early part of this period reflects a legacy of the apartheid era, the panel evidence allows an assessment of the impact of the demise of apartheid on the behaviour and welfare of African households.

To focus our minds more clearly, we list below the substantive questions that the study seeks to answer.

- (i) Have the absolute amounts and shares of the income components mentioned above altered during 1993-98?
- (ii) How do the earned income, social pensions and remittances interact with one another? In particular, do social pensions crowd out earned income and remittances? More generally, what are the principal determinants of these income components, and does the picture vary between 1993 and 1998?
- (iii) Has the supposed “generosity” of the social pensions scheme in South Africa led to an increase in the number of non pensioner adult residents and the number of resident children living with pensioners, as has been claimed in some recent studies?

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<sup>5</sup> The apartheid era South African government delineated four main racial groups: African (or Black), Indian, Coloured and White. Our use does not signify acceptance of this terminology or the system of racial naming.



The rest of the paper is organised as follows. Section 2 presents the estimating equations. Section 3 describes the data sets, presents key summary measures and provides evidence on how these have changed over the 1993-98 period. The results of estimation are presented and discussed in Section 4. The concluding comments are contained in Section 5.

## 2. Methodology

The empirical analysis is based on the following set of estimable equations.

$$U^h = f_1(\underline{Z}_1^h, \underline{A}^h, \underline{C}^h; \theta_1) + \epsilon_1^h \quad (1)$$

$$E^h = f_2(\underline{Z}_2^h, \underline{U}^h, \underline{P}^h, \underline{R}^h, \underline{A}^h, \underline{C}^h; \theta_2) + \epsilon_2^h \quad (2)$$

$$P^h = f_3(\underline{Z}_3^h, \underline{U}^h, \underline{E}^h, \underline{R}^h, \underline{A}^h, \underline{C}^h; \theta_3) + \epsilon_3^h \quad (3)$$

$$R^h = f_4(\underline{Z}_4^h, \underline{U}^h, \underline{E}^h, \underline{P}^h, \underline{A}^h, \underline{C}^h; \theta_4) + \epsilon_4^h \quad (4)$$

$$A^h = f_5(\underline{Z}_5^h, \underline{U}^h, \underline{P}^h, \underline{R}^h, \underline{C}^h; \theta_5) + \epsilon_5^h \quad (5)$$

$$C^h = f_6(\underline{Z}_6^h, \underline{U}^h, \underline{P}^h, \underline{R}^h, \underline{E}^h, \underline{A}^h; \theta_6) + \epsilon_6^h \quad (6)$$

where the superscript  $h$  denotes household and  $U^h$  (unearned income),  $E^h$  (earned income),  $P^h$  (social pensions received by the household) and  $R^h$  (private remittances received by the household) are the four components of household income.  $A^h$  and  $C^h$  denote, respectively, the number of non-pensioner adult residents and the number of resident children (individuals aged less than 18 years) in household  $h$ .  $Z^h$ 's are the predetermined vector of determinants, including the number of age-qualified pensioners (men aged 65 years and above, women aged 60 years and above) in the household.  $\epsilon^h$ 's are the stochastic error terms and the  $\theta$ 's denote the parameter vectors. The endogenous variables appearing on the right hand side of the estimating equations have been underlined. Note that all the four resource variables

( $U, P, E, R$ ) are defined in per equivalent adult terms by deflating the household values of these variables by the equivalence scale - see Ray (2000) for the scale estimates used in this paper.<sup>6</sup>

Traditionally, the resource equations (1) – (4) have been estimated independently assuming exogeneity of all the determinants and ignoring equations (5) and (6). Such an approach ignores the simultaneity of the different income components and, also, overlooks the correlation between the errors in the various equations, besides assuming exogeneity of household composition. In this paper, we estimate (1) – (6), simultaneously, as a system of equations separately for the years 1993 and 1998, and compare between the two sets of estimates. The three stage least squares (3SLS) procedure used here takes into account the simultaneity and the feedback between the various error terms by allowing a non-diagonal covariance matrix of disturbances in the joint estimation of the system of equations.

We, also, exploit the panel nature of the data by presenting the Fixed and Random Effects regressions of equations (2) – (6) described above. In the panel estimation, we estimate equations (2) – (6), equation-by-equation, instrumenting for the potentially endogenous variables. The standard Hausman test is used to determine whether the Fixed or the Random Effects model is preferred. Denoting  $\theta_{RE}, \theta_{FE}$  to be the parameter vector under, respectively, Random, Fixed Effects, the Hausman statistic is computed as

$$H = (\theta_{RE} - \theta_{FE})' (\Sigma_{FE} - \Sigma_{RE})^{-1} (\theta_{RE} - \theta_{FE}) \sim \chi_k^2$$

where  $\Sigma_{FE}, \Sigma_{RE}$  are the estimated variance covariance matrices, and  $k$  is the number of parameters estimated. If the null hypothesis cannot be rejected, it implies that the

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<sup>6</sup> A description of all the variables is contained in the Appendix (Table A1).

Random Effects model is both consistent and efficient while the Fixed Effects model is consistent but not efficient. In such a case, the Random Effects model will be preferred over the Fixed Effects model.

### **3. Data and Descriptive Statistics**

The panel data used in this study was constructed from two surveys conducted in 1993 and 1998. The first survey was conducted jointly by the World Bank and the South Africa Labour and Development Research Unit (SALDRU) at the University of Cape Town, as a part of the Living Standard Measurement Study (LSMS) in a number of developing countries. This survey was conducted in the nine months preceding the historic 1994 elections. While it gave a sample of approximately 9000 households, we considered only a subset, namely, 1000 Black households residing in the Kwazulu Natal province who were re interviewed in 1998 for the second survey used here, namely, the Kwazulu Natal Income Dynamics Study (KIDS).<sup>7</sup> The latter data set is the outcome of a collaborative project between researchers at the University of Natal, the University of Wisconsin-Madison and the International Food Policy Research Institute. Details of the KIDS data set have been described by its principal authors in May, Carter, Haddad and Maluccio (2000). As reported there, 84.1% of the original sample of Black households from the SALDRU data set residing in Kwazulu Natal in 1993 were successfully reinterviewed in 1998. In comparison with panel data sets available elsewhere, for example, Peru (Lima) and Indonesia, and given the length of time between the SALDRU and the KIDS data

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<sup>7</sup> Though approximately 200 Indian households were also re-interviewed, we ignore the Indian households from our study.

sets and, given the mobility of the South African population, a resurvey rate of 84% appears quite satisfactory.<sup>8</sup>

Table 1 provides evidence on the temporal movement between 1993 and 1998 in the household poverty rates for the panel of Black households in Kwazulu Natal. Following Carter and May (1999), the poverty line was set at R237 (1993 Rand) per adult equivalent per month. While neither the 1993 nor the 1998 poverty rates are representative of the poverty rate for the whole of South Africa, the latter are not even representative of Kwazulu Natal poverty in 1998. This stems from the fact that the reinterviewed households did not constitute a representative sample of the African population residing in Kwazulu Natal province in 1998. The poverty rates, reported in Table 1, show considerable sensitivity both in magnitude and temporal movement between those based on the equivalence scale estimates used in May, Carter, Haddad and Maluccio (2000) and those reported in Ray (2000) and used in our previous work (Maitra and Ray (1999, 2000)). The former appear to overstate household poverty quite sharply in relation to the latter.

Table 1 yields the following additional information. First, pensioner households, (households with positive reported social pension received) experienced lower poverty rates than non-pensioner households in both years. However, the importance of pensions and remittances in pensioner households is evident from the fact that, net of pensions and remittances i.e., based on non-transfer income, such households experienced much higher poverty than the others. Second, between pensions and remittances, the former are more important in keeping the pensioner households above the poverty line. Finally, the decline in the overall poverty rates for the panel over the period 1993 – 1998 from 77.1% to 72.8% hides significant

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<sup>8</sup> In a recent paper Maluccio (2000) argues that attrition in KIDS is non-random but fortunately the

differences in the poverty experiences of the pensioner and non-pensioner households. It is worth noting that, in pensioner households, neither social pensions nor remittances were having as much of a poverty reducing impact in 1998 as they did in 1993. Consequently, for such households, the poverty rates based on the income figures inclusive of pensions and remittances hardly changed over the period 1993 – 1998 though, based on non-transfer income, the poverty rates showed a significant decline. In contrast, the non-pensioner households in the panel registered a sharp decline in poverty, irrespective of whether remittances are included or excluded from household income.

Table 2 provides information on the absolute amount and share of the four income components at sample mean in the 2 years. The absolute amounts did increase for all the income components. It is noticeable, however, that in comparison with unearned and earned income levels, the pensions and remittances figures did not increase by as much over this period. In fact, for pensioner households alone, the adult pension per equivalent adult fell quite sharply over the period 1993 – 1998. Table 2A presents the panel sample means of household size and composition in the two years. There is an increase over 1993 – 1998 in, both, the number of resident adults and resident children in the sample of households constituting the panel. This is true of both pensioner and non-pensioner households. It is tempting to attribute these demographic changes to the increased coverage of the social pensions scheme and to an increase in the pensions amount, as some recent studies have suggested. However, the results of the 3SLS and panel estimation reported later, show that, *ceteris paribus*, neither the generosity nor the extension of social pensions can be

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attrition in the sample does not appear to be biasing the behavioural coefficients.

identified as the factors responsible for the increase in the number of resident adults or in the number of resident children.

## **4. Results**

### **4.1 Results from Year Specific Regressions**

Tables 3 and 4 present, respectively, the 3SLS estimates of the four resource equations (equations (1) – (4)) and those relating to the household compositional variables (equations (5) and (6)). The tables report the estimates separately for 1993 and 1998, thus, allowing a comparison between the years of the significance and magnitude of the estimates. The Breusch Pagan statistics ( $BP \sim \chi^2(15)$ ) show a clear rejection in each year of the hypothesis of diagonal covariance matrix of the disturbances, thus, justifying the 3SLS technique used here. While the estimates for each year are interesting in their own right, a comparison of the estimates between 1993 and 1998 throw light on the changes that have occurred in South Africa over the five-year period.

Table 3 shows that the positive impact of years of education of the most educated male and female members on the household's unearned income has increased many fold between 1993 and 1998. The impact of unearned income on social pensions loses its statistical significance in 1998. In contrast, the impact of earned income on social pensions moved the other way - from being insignificant in 1993 to being positive and statistically significant in 1998. The coefficient estimates of the income variables in the pensions equation show that neither in 1993 nor in 1998 was social pensions being correctly means tested, i.e. they were not being targetted to pensioner households with low earned and unearned income. The household compositional variables in the pensions equation have the expected

coefficient estimates with an increase in the number of age-qualified pensioners leading to a large increase in the amount of pensions received.

The estimated coefficients in the earned income and remittance received equations show significant variation between 1993 and 1998. Pensions are seen to crowd out earned income quite strongly in 1993, but this effect weakens sharply to become statistically insignificant in 1998. The difference between the estimates in the two years is more dramatic in case of the estimated pensions coefficient in the remittance equation. Social pensions had a small but statistically insignificant crowding out effect on remittances in 1993, but this reversed to a large, highly significant, positive impact in 1998. These are qualitatively important results as they imply that the situation in South Africa has changed between 1993 and 1998 with respect to the crowding out of private transfer by pensions in 1993, noted by Jensen (1998), Maitra and Ray (1999), and the negative impact of pensions on earned income, noted by Maitra and Ray (2000), Bertrand, Miller and Mullainathan (2000).

The estimated coefficients of equations (5) and (6), presented in Table 4, provide evidence on the determinants of household composition in South Africa. In both years, the amount of pension received by the household has a significant and negative effect on the number of adult residents. In contrast, the significant and negative effect of remittance on the number of adult residents in 1993 fell sharply to become insignificant in 1998. The significant and negative impact of social pensions on, both, the number of non pensioner adult residents and the number of resident children in the household appear to deny the assertion (see Edmonds, Mammen and Miller (2000)) that the non pensioners, especially children, were coming to live with the pensioners in response to the generous social pensions provided by the South

African government. The estimated coefficients actually suggest the reverse – social pensions appear to be leading to household dissolution. One can argue that since the pensioners are now financially self-sufficient, the working age adults are able to leave them behind in the villages and migrate to the cities in search of jobs. This view is supported by Table 5 which presents the OLS estimates of the change between 1993 and 1998 of the number of non pensioner adult and child residents in the panel of households regressed on changes in a selection of regressor variables. The significance and negative sign of the coefficient estimates of the pensions and remittance variables confirm that, *ceteris paribus*, an increase in public and private transfers leads to a fall in the number of non-pensioner adult residents. Table 5 also shows that the number of negative shocks faced by the household does not have a statistically significant effect on the number of adult residents but significantly reduces the number of resident children.

#### **4.2 Results from Panel Estimation**

The 3SLS estimates discussed above do not take into account the panel structure of the data. To do so, we re-estimated equations (2) – (6) as a panel using Fixed and Random Effects Instrumental Variable estimators, instrumenting the four resource variables (unearned income, earned income, pensions and remittances) if and when they appear on the right hand side. The Fixed and Random Effect (Instrumental Variable) estimates of the resource variables (equations (2) – (4)) and of the household compositional variables (equations (5) and (6)) are presented in Tables 6 and 7, respectively. These estimates relate to ‘all households’, though we also conducted panel estimation on the pensioner households only. The latter results are available on request. The standard Hausman test rejects the Fixed Effects Model in



favour of the Random Effects Model in all cases. With some minor exceptions, the results are fairly robust between the Fixed and Random Effect estimates.

The results presented in Tables 6 and 7 also imply the following. First, social pensions crowd out earned income but not private transfers. The latter result is consistent with the evidence presented in Maitra and Ray (2000) and, also, earlier in this paper, which suggests that the crowding out of remittance by pensions has weakened over the period 1993 – 1998. Second, the coefficient estimates of the household compositional variables in the pensions equation show that, *ceteris paribus*, households with fewer children and fewer non pensioner adults and more elderly people receive larger quantum of social pensions than the others, as one would expect. Third, one of the significant differences between the Fixed and Random Effects estimates relates to the impact of earned income on remittances. While the former reports a weak and insignificant effect, the Random Effects estimator shows strong crowding out of remittance by earned income. Finally, Table 7 allows some useful inferences to be drawn from the panel estimates on the nature of household formation. The negative and significant coefficient estimates of the social pensions variable confirm the result, noted earlier, that, *ceteris paribus*, an increase in pensions led to a reduction in the number of non pensioner adults and the number of children residing in the household. An increase in remittances, also, produced a similar effect. The panel estimates, like the 3SLS estimates discussed earlier, deny the suggestion that the pensions encourage non-pensioners to come and live with the pensioners. With an increase in their bargaining power due to pension receipts, pensioners tend to break away from their non pensioner relatives leading to significant changes in the size and composition of the pensioner households. Also as argued earlier, given the financial independence that is achieved by the elderly as a

result of the social pension program enables the working age adults to leave the elderly and migrate to the cities in search of jobs. It is worth adding here that, in separate panel estimation carried out on pensioner households, we found no evidence of social pensions inducing children and working age adults to reside with their elderly parents and grandparents.<sup>9</sup>

In response to the possibility of measurement errors in the amounts of social pensions and private transfers received, we re estimated equations (5) and (6) with the amount of pensions and remittances replaced as endogenous regressors by dummy variables that represent the receipt or otherwise by the household of these forms of transfers. The results are presented in Table 8. These are, it might be noted, ordinary fixed and random effect estimators. The estimated coefficient of the remittance dummy shows that the number of adult residents is significantly lower in households that receive private remittances. It is interesting to note that, while the pensions dummy has no significant effect on the number of adult residents, the Random Effect estimate (for the number of resident children) does provide some support, though only a weak one, to the proposition that, *ceteris paribus*, households that receive social pensions will have more resident children than households that do not receive pensions. In other words, there is some support for the hypothesis that the extension of the social pensions scheme to the majority Black households encouraged the non-pensioner (working age) adults to migrate to the cities in search of jobs leaving their children to be fostered by their grandparents. This is confirmed by the positive and significant coefficient estimate of the “migrate” variable that measures the number of non-resident working age adults in the household – the higher the number of non-resident adults the higher is the number of resident

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<sup>9</sup> We also conducted the ordinary Fixed and Random Effects estimation of equations (5) and (6). The

children. It is important to note that it is the household's receipt of pensions, rather than the pension amount, that is a likely incentive for child fostering by the pensioners.

## 5. Conclusion

An analysis of the responsiveness of household size and composition to changes in economic, demographic and other factors has not figured much in the economics literature. However, the issue has featured routinely and prominently elsewhere. For example, there is a fairly extensive anthropological literature that documents the fluidity of the household structure in many developing countries. This is at odds with the practice in economics of treating household size and composition as fixed and exogenous in the estimation and analysis. One of the principal motivations of this study is to depart from this practice by analysing resource and household compositional variables using an interdependent framework that treats them as jointly endogenous. Special attention is paid to analysing the impact of resource inflows and household composition changes on one another and also, on the interaction between the various types of resource inflows.

The panel based results on South Africa, presented here, contain no evidence to support the hypothesis that, *ceteris paribus*, an increase in pensions amount or an extension of the pensions program to a wider group of households leads to an increase in household size with more working age adults and children residing in pensioner households. In fact, the evidence points to the contrary, namely, that a *ceteris paribus* increase in pensions amounts and/or in their coverage leads to a reduction in the number of non pensioner, i.e. working age, adults in the

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results are not particularly different from the IV results that are presented.

household. This result is seen from the 3SLS estimates for each year and, also, from the panel estimation under fixed and random effects. A possible explanation is that the expanding social pensions program in South Africa encourages the working age adults to leave their elderly parents in the villages in search of jobs in the cities. There is however, weak support for the hypothesis of child fostering by the grandparents – the pension received dummy (0 for a non-recipient, 1 for a recipient), though not the pensions amount, has a positive impact on the number of resident children in the household.

The results also show that the five-year post apartheid period in South Africa, considered here, witnessed several significant changes in the direction and magnitude of several key variables. For example, the evidence, though weak, of crowding out of private remittance by social pensions in 1993 transformed itself into a strong complementary relationship between the two resource inflows. This is consistent with the results, presented in Maitra and Ray (1999), which suggest that the nature of interaction between the two types of transfers is highly sensitive to the level of economic affluence of the household. This is a result that needs further investigation on other data sets. On this and in other respects, the results of this study have policy implications that extend much beyond South Africa.

**Table 1: Household Poverty Rates of Panel**

Income Definition	Using Equivalence Scales Recommended by May, et al (2000)		Using Equivalence Scales Estimated by Ray (2000)					
	1993	1998	1993			1998		
	All Households	All Households	All Households	Pensioners	Non Pensioners	All Households	Pensioners	Non Pensioners
Income Net of Pensions and Remittances	0.902	0.913	0.817	0.846	0.805	0.767	0.807	0.744
Income Net of Remittances	0.890	0.905	0.788	0.751	0.805	0.740	0.733	0.744
Total Income	0.886	0.905	0.771	0.718	0.795	0.728	0.719	0.733

**Table 2: Monthly Amount (Rand Per Equivalent Adult)  
and Share of Income Components at Sample Mean**

Income Component	Amount (Rand)		Share	
	1993	1998	1993	1998
Unearned Income	138.87	380.09	0.36	0.51
Earned Income	181.65	294.12	0.48	0.39
Pensions Received	35.31	44.66	0.09	0.06
Remittances Received	25.87	28.20	0.07	0.04
Total Household Income	381.70	747.07	1.0	1.0

**Table 2A: Household Size and Composition (Panel Means) by Year**

Household Composition	All Households		Non Pensioner Households		Pensioner Households	
	1993	1998	1993	1998	1993	1998
No. of boys, 0-17 years	1.70	2.11	1.57	1.89	2.00	2.50
No. of girls, 0-17 years	1.71	2.00	1.64	1.87	1.86	2.24
No. of adult males, 18-63 years	1.69	2.23	1.57	2.11	1.95	2.44
No. of adult females, 18-59 years	1.86	2.67	1.78	2.54	2.05	2.91
No. of elderly adult males, 64 years and above	0.12	0.16	0.04	0.08	0.30	0.30
No. of elderly adult females, 60 years and above	0.33	0.46	0.08	0.18	0.89	0.94
Household Size	7.40	9.63	6.68	8.66	9.04	11.33

Table 3: 3 SLS Estimates by Year for the Resource Inflows

Unearned Income			Earned Income			Pensions			Remittances		
Variable	Coefficient Estimate		Variable	Coefficient Estimate		Variable	Coefficient Estimate		Variable	Coefficient Estimate	
	1993	1998		1993	1998		1993	1998		1993	1998
Sexhead	24.594 (1.908)	25.674 (0.179)	Unearned Income	1.657 (3.098)	0.234 (3.061)	Unearned Income	0.247 (3.979)	0.00 (0.023)	Unearned Income	0.107 (2.126)	-0.004 (0.718)
Ave. Age M	-6.184 (2.630)	-92.373 (2.837)	Pensions	-2.588 (2.528)	0.221 (0.332)	Earned Income	-0.005 (0.542)	0.027 (2.153)	Earned Income	0.004 (0.394)	-0.010 (0.670)
(Ave. Age M) <sup>2</sup>	0.057 (1.383)	3.535 (3.605)	Remittances	-0.100 (0.056)	-1.951 (0.557)	Sexhead	-0.871 (0.203)	-5.538 (1.559)	Pensions	-0.193 (1.491)	0.923 (5.949)
Ave. Age F	-7.935 (2.555)	17.583 (0.437)	Sexhead	23.048 (0.744)	39.550 (0.768)	Age Head	1.464 (1.928)	1.095 (1.278)	Sexhead	8.824 (2.955)	13.554 (3.465)
(Ave. Age F) <sup>2</sup>	0.132 (1.377)	-2.503 (1.648)	Ave. Age M	-4.572 (0.374)	-14.511 (0.635)	(Age Head) <sup>2</sup>	0.000 (0.020)	0.010 (1.247)	Age Head	-0.478 (0.813)	-0.892 (0.964)
Max. Male Ed.	5.320 (2.589)	81.710 (3.592)	(Ave. Age M) <sup>2</sup>	0.319 (1.817)	0.047 (0.087)	Hdeduco	1.182 (0.415)	1.387 (0.303)	(Age Head) <sup>2</sup>	-0.005 (1.021)	-0.010 (1.145)
Max. Fem. Ed.	3.770 (1.942)	126.431 (5.016)	Ave. Age F	-8.144 (0.58)	-21.09 (1.131)	Total Child	-1.297 (1.069)	-3.309 (3.487)	Hdeduco	-2.131 (0.627)	-2.322 (0.456)
Total Child	-21.436 (3.995)	-199.178 (2.735)	(Ave. Age F) <sup>2</sup>	0.327 (1.160)	0.465 (0.957)	Total Elder	36.423 (7.354)	33.975 (11.837)	Total Child	5.993 (6.844)	8.441 (13.098)
Total Elder	33.011 (3.433)	-80.833 (0.739)	Educom	77.700 (1.288)	-113.903 (0.749)	No. of Adults	-20.236 (15.904)	-19.082 (6.894)	Total Elder	0.981 (0.141)	-34.214 (5.478)
No. of Adults	4.729 (0.447)	-95.071 (0.613)	Educof	45.278 (1.159)	-70.685 (0.758)	Constant	-33.278 (1.617)	-1.684 (0.076)	No. of Adults	-0.733 (0.373)	22.243 (6.606)
Own	38.255 (2.480)	408.175 (2.285)	Total Child	-48.064 (1.603)	-83.602 (1.891)				Migrate	10.534 (5.698)	8.342 (6.01)
Wsour	-34.569 (1.502)	-79.936 (0.348)	Total Elder	61.053 (0.959)	-89.526 (1.580)				Constant	-6.990 (0.455)	-30.577 (1.280)
Toilet	5.241 (0.481)	-342.496 (2.686)	No. of Adults	39.057 (1.116)	45.231 (1.176)						
Toiletoc	-7.875 (0.729)	-76.448 (1.030)	Constant	78.209 (0.387)	766.591 (2.069)						
Connect	17.841 (1.650)	50.995 (0.551)									
Constant	179.756 (5.034)	299.878 (0.470)									

Notes: (i) See Appendix (Table A1) for a description of the abbreviations used above.

(ii) Figures in parentheses indicate t values.

(iii) Breusch Pagan statistic:  $\chi^2_{15} = 252.429$  (1993), 263.236 (1998)

**Table 4: 3 SLS Estimates by Year for the Household Compositional Variables**

Number of Non Pensioner Adult Residents			Number of Resident Children		
Variable	Coefficient Estimate		Variable	Coefficient Estimate	
	1993	1998		1993	1998
Unearned Income	0.011 (3.803)	0.000 (2.322)	Unearned Income	-0.006 (1.387)	0.001 (1.464)
Pensions	-0.049 (12.816)	-0.031 (7.215)	Pensions	0.012 (1.165)	-0.082 (4.876)
Remittances	-0.009 (2.459)	-0.003 (0.711)	Remittances	0.084 (3.865)	0.089 (3.793)
Sexhead	0.143 (0.766)	-0.123 (0.858)	Earned Income	-0.004 (4.323)	-0.002 (1.168)
Agehead	0.070 (2.045)	0.078 (2.494)	Sexhead	-0.366 (1.060)	-1.230 (2.790)
(Agehead) <sup>2</sup>	0.000 (0.138)	0.000 (0.210)	Agehead	0.131 (3.048)	0.062 (0.729)
Hdeduco	-0.113 (0.567)	0.093 (0.591)	(Agehead) <sup>2</sup>	-0.001 (3.071)	0.001 (1.224)
Total Child	0.025 (0.500)	-0.189 (5.353)	Hdeduco	0.193 (0.757)	0.258 (0.550)
Total Elder	1.811 (6.416)	0.882 (4.703)	Total Elder	-0.125 (0.226)	3.032 (4.413)
Constant	-1.613 (1.740)	0.487 (0.584)	No. of Adults	-0.078 (0.466)	-1.811 (4.274)
			Migrate	-0.993 (2.999)	-0.802 (3.323)
			Constant	0.286 (0.249)	4.608 (2.110)

Note: Figures in brackets indicate t values



**Table 5: OLS Estimates of Change in Number of  
Non-Pensioner Adults and Number of Resident Children**

Change in Number of Non Pensioner Adults		Change in Number of Resident Children	
Variable	Coefficient Estimate	Variable	Coefficient Estimate
<u>Change between 1993 and 1998 of:</u>		<u>Change between 1993 and 1998 of:</u>	
Unearned Income	0.000 (0.584)	Unearned Income	0.000 (0.878)
Pensions	-0.003 (3.130)	Pensions	-0.004 (3.69)
Remittances	0.006 (5.978)	Remittances	-0.000 (0.179)
Wsour	0.181 (1.642)	Earned Income	-0.000 (2.721)
Toilet	0.041 (0.276)	W Sour	0.223 (1.928)
Toiloc	-0.073 (0.622)	Toilet	0.197 (0.685)
Own	0.004 (0.023)	Toiloc	0.160 (1.289)
Agehead	0.019 (0.694)	Own	0.071 (0.404)
(Agehead) <sup>2</sup>	-0.000 (0.372)	Agehead	0.002 (0.057)
Total Child	-0.021 (0.697)	(Agehead) <sup>2</sup>	0.000 (0.044)
Total Elder	-0.285 (3.043)	Number of Adults	-0.118 (2.884)
Numpshk	0.138 (1.453)	Migrate	-0.174 (4.021)
Numnshk	-0.044 (0.876)	Total Elder	-0.010 (0.099)
Constant	-0.387 (3.051)	Numpshk	-0.111 (1.102)
		Numnshk	-0.290 (5.491)
		Constant	-0.815 (5.763)

Note: Figures in parentheses indicate t values

**Table 6: Instrumental Variable Panel Estimates of the Resource Equations**

Pensions			Earned Income			Remittances		
Variable	Coefficient Estimate		Variable	Coefficient Estimate		Variable	Coefficient Estimate	
	Fixed Effects	Random Effects		Fixed Effects	Random Effects		Fixed Effects	Random Effects
Unearned Income	-0.028 (2.598)	-0.015 (1.959)	Unearned Income	0.368 (4.796)	0.532 (11.343)	Unearned Income	0.017 (1.461)	0.023 (3.063)
Earned Income	0.014 (0.972)	-0.009 (0.990)	Pensions	-2.035 (2.425)	-1.527 (3.514)	Earned Income	-0.007 (0.473)	-0.032 (3.449)
Sexhead	6.256 (1.206)	-0.922 (0.335)	Remittances	-0.545 (0.519)	-4.772 (7.747)	Pensions	-0.082 (0.736)	-0.027 (0.371)
Age Head	-3.032 (3.082)	-1.267 (2.214)	Sexhead	-1.019 (0.026)	45.743 (2.281)	Sexhead	9.603 (2.012)	10.782 (4.650)
(Age Head) <sup>2</sup>	0.037 (3.996)	0.026 (4.967)	Ave. Age M	-0.310 (0.051)	-3.036 (0.849)	Age Head	-0.246 (0.274)	1.150 (2.361)
Hdeduco	-4.161 (0.866)	-6.602 (2.121)	(Ave. Age M) <sup>2</sup>	0.020 (0.179)	0.107 (1.455)	(Age Head) <sup>2</sup>	0.003 (0.405)	-0.010 (2.086)
Total Child	-2.214 (2.232)	-4.106 (7.512)	Ave. Age F	-14.553 (1.763)	-1.899 (0.371)	Hdeduco	0.632 (0.139)	-2.596 (0.942)
Total Elder	37.612 (12.110)	41.927 (18.963)	(Ave. Age F) <sup>2</sup>	0.492 (2.096)	0.138 (0.851)	Total Child	0.006 (0.006)	0.043 (0.080)
No. of Adults	-3.109 (2.478)	-3.217 (3.975)	Educom	-99.38 (1.562)	-69.812 (1.685)	Total Elder	0.861 (0.155)	-3.955 (1.063)
Constant	88.083 (3.296)	37.861 (2.455)	Educof	50.637 (0.809)	48.715 (1.121)	No. of Adults	-4.083 (3.105)	-2.714 (3.555)
			Total Child	-10.032 (0.963)	-17.573 (3.182)	Migrate	4.214 (3.294)	6.634 (7.641)
			Total Elder	79.281 (1.781)	31.042 (1.135)	Constant	28.995 (1.186)	-7.382 (0.567)
			No. of Adults	43.996 (4.057)	15.814 (2.482)			
			Constant	191.668 (1.756)	282.652 (4.891)			
Hausman Statistic	$\chi^2_9 = 44.52$		Hausman Statistic	$\chi^2_{13} = 57.09$		Hausman Statistic	$\chi^2_{11} = 26.79$	

Notes: Figures in parentheses indicate t values.

**Table 7: Instrumental Variable Panel Estimates of the Household Compositional Variable Equations**

Number of Non Pensioner Adults			Number of Resident Children		
Variable	Coefficient Estimate		Variable	Coefficient Estimate	
	Fixed Effects	Random Effects		Fixed Effects	Random Effects
Unearned Income	0.001 (3.951)	0.001 (7.128)	Unearned Income	0.000 (1.042)	0.001 (1.773)
Pensions	-0.033 (13.785)	-0.034 (18.749)	Pensions	-0.040 (12.951)	-0.051 (19.101)
Remittances	-0.044 (17.627)	-0.030 (15.945)	Remittances	-0.078 (8.155)	-0.071 (9.531)
Sexhead	0.619 (5.030)	0.324 (4.334)	Earned Income	-0.004 (7.790)	-0.007 (15.406)
Age Head	0.085 (3.668)	0.101 (6.556)	Sexhead	0.334 (1.865)	0.628 (4.845)
(Age Head) <sup>2</sup>	0.000 (0.718)	-0.000 (1.712)	Age Head	0.055 (1.945)	0.057 (2.687)
Hdeduco	-0.384 (3.454)	-0.231 (2.937)	(Age Head) <sup>2</sup>	0.000 (0.414)	0.000 (1.199)
Total Child	-0.099 (3.711)	0.069 (4.276)	Hdeduco	-0.377 (2.785)	-0.693 (6.384)
Total Elder	1.101 (8.662)	1.132 (11.489)	No. of Adults	-0.001 (0.035)	0.201 (6.553)
Constant	0.563 (0.896)	-0.905 (2.219)	Migrate	0.569 (6.549)	0.530 (7.603)
			Total Elder	1.452 (8.230)	1.975 (13.097)
			Constant	3.472 (4.841)	2.834 (5.328)
Hausman Statistic	$\chi^2_9 = 186.57$		Hausman Statistic	$\chi^2_{11} = 229.60$	

Note: Figures in parentheses indicate t values.

**Table 8: Panel Estimates of the Household Compositional Variables with Pensions and Remittances Dummies as Regressors**

Number of Non Pensioner Adults			Number of Resident Children		
Variable	Coefficient Estimate		Variable	Coefficient Estimate	
	Fixed Effects	Random Effects		Fixed Effects	Random Effects
Unearned Income	-0.000 (0.533)	0.000 (0.406)	Unearned Income	0.000 (.0097)	0.000 (0.547)
Pensions Dummy	-0.142 (0.962)	-0.039 (0.340)	Pensions Dummy	0.030 (0.183)	0.266 (1.817)
Remittances Dummy	-0.573 (6.220)	-0.518 (7.182)	Remittances Dummy	-0.044 (0.403)	0.148 (1.488)
Sexhead	0.207 (1.414)	0.174 (2.074)	Earned Income	-0.000 (0.874)	-0.001 (4.924)
Age Head	0.025 (0.920)	0.066 (3.866)	Sexhead	-0.820 (5.051)	-0.271 (2.306)
(Age Head) <sup>2</sup>	0.000 (0.322)	-0.000 (2.496)	Age Head	0.020 (0.667)	0.055 (2.329)
Hdeduco	-0.284 (2.148)	-0.270 (3.091)	(Age Head) <sup>2</sup>	0.000 (0.778)	-0.001 (2.710)
Total Child	0.059 (2.092)	0.205 (13.898)	Hdeduco	0.206 (1.374)	0.442 (3.700)
Total Elder	-0.281 (2.934)	-0.391 (5.327)	No. of Adults	0.153 (3.950)	0.418 (14.020)
Constant	1.885 (2.553)	0.141 (0.315)	Migrate	0.188 (5.308)	0.332 (10.892)
			Total Elder	0.110 (1.022)	0.172 (1.813)
			Constant	3.071 (3.720)	0.936 (1.499)
Hausman Statistic	$\chi^2_9 = 50.55$		Hausman Statistic	$\chi^2_{11} = 173.05$	

Note: Figures in parentheses indicate t values.

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**Table A1: Description of Variables**

Variable Name	Description
Unearned Income	Unearned income of the household per adult equivalent
Pensions	Social pensions received by the household per adult equivalent
Remittances	Remittances received by the household per adult equivalent
Earned Income	Earned income received by the household per adult equivalent
Sexhead	Gender of household head (1, if male, 0, otherwise)
Age Head	Age of household head
Hdeduco	1, if household head has no education, 0, otherwise
Total Child	Total number of children in the household
Total Elder	Total number of elderly people (males aged 65+, females aged 60+) in the household
No. of Adults	Total number of non pensioner adults resident in the household
Migrate	Total number of adult non residents in the household
Ave. Age M	Average age of working age resident males in the household
Ave. Age F	Average age of working age resident females in the household
Educom	1, if no male in household has any education, 0, otherwise
Educof	1, if no female in household has any education, 0, otherwise
Max. Male Ed.	Years of education of most educated male in household
Max. Fem. Ed.	Years of education of most educated female in household
Own	1, if household owns home, 0, otherwise
WSour	1, if main source of water is public free tap, 0, otherwise
Toilet	1, if toilet type is latrine, 0, otherwise
Toiletoc	1, if toilet location is outside house, 0, otherwise
Connect	1, if connected to electricity, 0, otherwise
Numpshk	Number of positive shocks experienced by the household
Numnshk	Number of negative shocks experienced by the household
Pensions Dummy	1, if the household receives social pensions, 0, otherwise
Remittances Dummy	1, if the household receives remittances, 0, otherwise

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