HOUSEHOLD DECISION MAKING IN GERMANY AND SOUTH AFRICA

Household expenditure patterns and resource pooling: evidence of changes in post-apartheid South Africa

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Abstract The primary aim of this paper is to examine whether resources accruing to different members of the household and from different sources have differential impacts on household expenditure patterns. The issue is of considerable policy interest for, if the identity of the income recipient does matter in the household's expenditure decisions, then it indicates the usefulness of targeting income assistance at particular members of the household. The South African evidence is generally supportive of the hypothesis of resource pooling by the income earners in their spending decisions on food, clothing and energy. The results of this paper have been placed in the wider context of social, political and economic developments following the end of apartheid that have caused significant changes in the nature of resource inflow and in the balance of power in decision making within the South African household. The results are indicative of improvements in the standard of living of the majority of South Africans following the end of apartheid.

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1 Introduction

The end of apartheid in South Africa in the early 1990s has been widely recognized as an event of immense political significance. These political changes had wider ramifications, especially in the economics arena, which extended to the behavior of households. For example, while the evidence generally points to real expenditure gains of the African households in post-apartheid South Africa, there is less recognition of the shift in the intra-household balance of power in decision making due to changes in the source and nature of the resource inflows into the household, especially in the gender composition of the income recipients. There now exists a large literature on the economic changes in South Africa following the dismantling of apartheid. However, there has not been much attempt to study their impact on the household's expenditure pattern via possible changes to the decision making process inside the household.

The primary aim of this paper is to examine on South African data whether resources accruing to different members of the household and from different sources have differential effects on the household's expenditure patterns. In other words, we investigate whether or not the members of the South African household "pool" resources between themselves and between alternative sources before "collectively" deciding on the household's expenditure outcomes. A particular distinguishing feature of this paper is its consideration of the *recipient* as well as the *source* of the resource inflows into the household. While the results of these tests hold universal policy interest (for example, in increasing the effectiveness of income transfers to households by targeting them at individual members), they are of particular significance in the context of post-apartheid South Africa. The period following the end of apartheid has resulted in an increased feminization of the labor force in South Africa (Casale & Posel, 2002). The interesting question now is whether this increase in income accruing to females has resulted in a shift in intra-household balance of power with consequent implications for household behavior. Interest in this issue has been heightened by the recent Canadian evidence of Dosman and Adamowicz (2006) which suggests that an increased income by one partner does not necessarily lead to increased influence by her/him in the household's decisions.

The traditional analysis of household behavior did not assign any role for the relative income of the resource recipients in the household or of the different sources in determining the household's various outcomes. However, relative income is expected to influence intra-household allocation of resources as argued by Becker (1973) in his theory of marriage and subsequently in the bargaining theories of the household (Manser & Brown, 1980; McElroy & Horney, 1981). In further developments in the literature on intra-household behavior, there has been a spate of "collective household" models that also allow relative income to influence household outcome. Pollak (2003), who provides a chronological survey of the models of intra-household behavior, traces the origin of this literature to the pioneering work of Becker (1973).

Pollak (2003) identifies the resource pooling hypothesis as a crucial feature of Becker's altruist models. In the words of Pollak (2003, p. 131), ''Becker's altruist model implies resource pooling.......hence, evidence against pooling is evidence against the altruist model''. The results of the present study, that are generally supportive of resource pooling in post-apartheid South Africa, should be seen in this context. Browning, Chiappori, and Lechene (2006), however, warn that ''income pooling is neither necessary nor sufficient for a unitary model'' (p. 5). Such a model is defined by these authors as one that portrays ''the decisions of a many person household as though the household had a set of stable and transitive preferences''.

There is now a large literature that tests the traditional model of altruist household behavior. While the earlier literature was based on bargaining theories with the focus of those studies on Slutsky conditions, the recent strand of this literature is within the collective framework with the resource pooling hypothesis adopted as the testable proposition of altruistic behavior. As Pollak (2003) has pointed out, the emergence of the test of resource pooling as the ''crucial empirical issue'' is the dividing line that separates the earlier bargaining models from the recent developments in the literature on intra-household models. We show that in order to investigate the changes to household behavior in post-apartheid South Africa, the recent advances on intra-household resource allocation can be put to good use.

The origin of the empirical literature on resource pooling within the household can be traced back to the work by Thomas (1990) and Schultz (1990). As pointed out by Schultz (1990) and further discussed by Lundberg, Pollak, and Wales (1997), a key limitation of much of this literature is that in lumping together all non-labor income under ''unearned income'' and conducting pooling tests based on this heterogeneous item, the literature overlooks the fact that unearned income consists of different components (for example, asset returns, public and private transfers) that have different sets of determinants and recipients, with different behavioral and welfare implications. This paper tackles this issue by treating (a) social pensions and (b) remittances received, previously lumped together under unearned income, as separate resource inflow variables, disaggregated by the gender of the recipient. The remaining constituents of unearned income, namely, non-farm self employment, agro-pastoral activities and other income (for example, non pension welfare payments), have been aggregated into a resource inflow category called non-wage income.

Analysis is conducted using two household survey data sets from South Africa. Besides providing us with the gender disaggregated information on resource inflows that we require, the South African data is of special interest for two other reasons: (a) private remittances and social pensions are significant sources of resource inflows into the South African household, and (b) the 1993 and 1998 surveys of households in Kwazulu-Natal provide us with a panel that allows an examination of key behavioral and welfare changes during the first five years of post-apartheid South Africa. We build on the work done using the 1998 data by Maluccio (2000), Maluccio, Haddad, and May (2000)

and Maluccio, Thomas, and Haddad (2003). The social pension program in South Africa has recently attracted a great deal of attention (see Bertrand, Mullainathan, & Miller, 2003; Case & Deaton, 1998; Duflo, 2003; Edmonds, Mammen, & Miller, 2003; Jensen, 2004; Maitra & Ray, 2003, 2004). However, much of this analysis (with the notable exception of Edmonds et al., 2003) is based on the 1993 data. This paper updates the evidence and extends our earlier work (Maitra & Ray, 2003) by disaggregating the various resource inflows based on the gender of the recipient.

We find evidence in favor of resource pooling by the income earners within a household. The present South African evidence differs from most existing evidence that is generally supportive of the idea that relative income has a significant impact on expenditure patterns. The South African evidence acquires added significance from the fact that the test results are generally robust between the two surveys. There have been several significant changes in expenditure allocation during the initial 5 years of post-apartheid South Africa, though not much of it can be attributed to changes in the intra household balance of power. For example, a decline in the budget share of food may be due to a combination of rising household affluence and increasing educational levels of the head of the household.

2 The post-apartheid South African labor market[1]

In order to put these results, reported and discussed later, in a wider socio-political and economic context, let us first turn to a brief overview of the changes in the South African labor market following the end of apartheid. South Africa had, historically, very low participation rates in the formal labor market. These rates compared poorly not only with developed countries, but also with developing countries. Combined with the gender differential in the labor force participation rates, this meant very low participation rates of South African women in the formal labor market. For example, using data from the October Household Survey, 1994, published by Statistics South Africa, Winter (1999) reports that the participation rates of South African women and men in the formal labor market in 1994 were 27.2% and 42.0%, respectively. These compared with corresponding figures of 43.0% and 83.0% for Brazil in 1989, 36.5% and 68.0% for Venezuela in 1990, 36.5% and 68.0% for Chile in 1987 and 45.0% and 74.0% for South Korea in 1990. This suggests that, historically, wage income from the formal labor market was not a dominant source of resource inflows into the South African household compared to some of the other developing countries. A significant share was borne by remittances from migrants, social pensions and other welfare payments, and income from the informal sector. During the apartheid era, movements by black South Africans in search of employment were restricted, forcing them to leave their

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[1] This overview is largely based on two recent comprehensive studies of the South African labor market: Casale and Posel (2002) and Bhorat and Oosthuizen (2005). The reader is referred to these papers for more details.

families in the homeland. As a result, the migrant was, typically, a black male remitting money home. Combined with male dominance in both the formal and informal job markets this ensured that the male was the dominant income earner in the household.

This situation changed in the post-apartheid period with, what Casale and Posel (2002) call ''the feminization of the labor force'' in South Africa. Over the period 1995–1999 the percentage of females between the ages of 15 and 65 who were either working or actively looking for work increased from 38% to 47%. There were two other related developments over this period that had implications for the changing nature of resource inflows into the South African household, namely, (a) an increase in female unemployment, and (b) the growth in employment has been mostly in self employment in the informal sector. Casale and Posel (2002) interpret these developments as reflecting an increase in the number of female job seekers which in turn is explained by an ''erosion in women's access to (male) income support''. These developments lead one to expect (i) a reduction in the share of formal wage or earned income, especially of males, in total resource inflows into the household, and (ii) an increase in the corresponding share of non-wage income, especially of females, in the post-apartheid period. A comparison of the summary statistics in the two data sets, that have been used here, supports such a trend over the period 1993–1998.

Bhorat and Oosthuizen (2005) have recently obtained similar results, finding substantial increases in both unemployment and labor force participation rates for all races and gender groups in South Africa. They also report increasing household dependence on state pensions and other grants since unemployed individuals are increasingly concentrated in households with no salary or wage earners. Further, the informal sector employment as a share of total employment may have risen slightly over the period 1997–2001, thereby contributing to a decline in the share and importance of earned income in the total resource inflow into the household.

Figures presented by Bhorat and Oosthuizen (2005, Table 6) show that among the four racial groups in South Africa, blacks registered the highest increase in broad labor force participation rates (12.8%) over the period 1995–2002.[2] The key group, which registered the largest increase, are black females who increased their participation rate from 47.0% to 64.4% over this period. By 2002, the gap between the labor force participation rates of the African male and female has narrowed sharply to 5.7% from 15.5% in 1995. Regionally disaggregated estimates, presented in Bhorat and Oosthuizen (2005), show that the Kwazulu-Natal province, where the data sets used in our analysis come from, witnessed one of the highest increases (13.4%) in labor force participation during the period 1995–2002.

These developments in the South African labor market implied significant changes in the nature and composition of resource inflows into the household

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[2] During the apartheid era all South Africans were categorized into one of the following race groups: black (or African), coloured (or mixed Race), Indian (or Asian) and white (or Caucasian).

following the end of apartheid. This raises the question of the impact of such changes on the household's expenditure pattern and the validity of the resource pooling assumptions in a period which witnessed major political and economic transformations.

3 Data and selected descriptive statistics

Two different data sets are used in this paper: the 1993 South Africa Integrated Household Survey data set (henceforth called the SIHS 1993 data set) and the 1998 Kwazulu-Natal Income Dynamics Survey data set (henceforth called the KIDS 1998 data set).

The SIHS 1993 data set was obtained from a survey 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[3] (LSMS) in a number of developing countries. The main instrument used in this survey was a comprehensive questionnaire covering a wide range of topics. The data set is unique because it is the first that covers the entire South African population, including those residing in the predominantly African "homelands".[4] The complete sample consists of approximately 9000 households drawn randomly from 360 clusters.

Households in the SIHS 1993 data set that resided in the Kwazulu-Natal province were re-interviewed in 1998 as a part of the Kwazulu-Natal Income Dynamics Study (KIDS). Details of the KIDS data set can be obtained from May, Carter, Haddad, and Maluccio (2000), Maluccio et al. (2000), Maluccio (2000) and Maluccio, Thomas, and Haddad (2003). Kwazulu-Natal is the home of a fifth of the population of South Africa and was formed by combining the former Zulu homeland and the province of Natal. 12% of the population of Kwazulu-Natal are Indians, 85% are Africans and the remaining are of European descent, primarily British. There were no coloured households in Kwazulu-Natal in the SIHS 1993 data set. The KIDS 1998 data set did not re-interview the white households.

Empirical analysis is restricted to households that were surveyed both in 1993 and in 1998. In the pooled data combining the 1993 and 1998 data sets, nearly 87% of the households received income from multiple sources. Table 1 presents comparative descriptive statistics on resource inflows (Panel A), share of each resource category (Panel B) and expenditure shares (Panel C) of the Kwazulu-Natal households in the two data sets. We use a nine commodity classification of household expenditure: food, clothing, health, other non-food, education, personal expenses, transportation, energy and other expenditure. Following Thomas (1990), all income from agricultural profits and from household enterprises was treated as the non-wage income of the head of the

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[3] See Grosh and Glewwe (1995) for a comparative catalogue of the LSMS data sets and detailed description of the commodity and income classifications.

[4] The "homelands" were designated residential regions for the black households during the apartheid regime.

Table 1 Selected descriptive statistics

	SIHS 1993: Households in Kwazulu-Natal only	KIDS 1998	*t*-test for difference[a]
Panel A: Resource inflow[b]			
Male non-wage income (U_m)	21.97	224.44	4.1416***
Female non-wage income (U_f)	15.25	122.47	1.8094*
Male earned income (E_m)	139.42	248.76	6.3309***
Female earned income (E_f)	57.60	155.28	7.5396***
Social pension received by men (P_m)	12.54	11.41	− 0.6120
Social Pension Received by Women (P_f)	27.17	31.22	1.5973
Remittance received by men (R_m)	3.50	3.52	0.0298
Remittance received by women (R_f)	25.37	23.44	− 0.1887
Total	302.82	820.55	6.2707***
Panel B: Share of resource			
Male unearned income (U_m)	0.1119	0.1717	5.6729***
Female unearned income (U_f)	0.0667	0.1305	6.8996***
Male earned income (E_m)	0.2680	0.2686	0.0346
Female earned income (E_f)	0.1722	0.1750	0.2246
Social pension received by men (P_m)	0.0494	0.0336	− 2.53892***
Social pension received by women (P_f)	0.1277	0.1073	− 2.0068**
Remittance received by men (R_m)	0.0187	0.0119	− 1.7897*
Remittance received by women (R_f)	0.1852	0.1014	− 7.2198***
Panel C: Expenditure shares			
Food	0.5158	0.3982	− 5.472***
Clothing	0.0393	0.0362	− 0.379
Health	0.0122	0.0118	− 0.065
Non Food	0.0305	0.0553	2.835***
Education	0.0209	0.0322	1.633
Personal expenses	0.0657	0.0881	1.948*
Transportation	0.0448	0.0646	2.015**
Energy	0.0903	0.0673	− 1.983**
Other expenses	0.1806	0.2463	3.713***

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

[a] *t*-test for difference: Average (1998)–Average (1993)

[b] All the eight resource inflows are expressed in terms of ''per adult equivalent in the household''. In Rand per month

household and categorized as male/female accordingly. There has been a significant improvement in the current income of Kwazulu-Natal households over the period 1993–1998.[5] The expenditure gain is highlighted, via Engel's Law, by the statistically significant decline in the budget shares of the necessity items, food, energy and increases in those of non food, personal and other expenses.

There was a sharp change in both the share and the volume of several of the resource inflows over the period 1993–1998 in Kwazulu-Natal. Male and female non-wage income increased significantly. The share of male and female

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[5] See Rospabe (2001) for an extension of this observation to the whole of South Africa over the period 1993–1999.

earned income remained constant over the period. The significant decrease in remittances received by women (as a proportion of total resources flowing into the household) is possibly due to the changing nature of migration in South Africa. With the feminization of the labor force, more and more women moved to the cities in search of jobs and were no longer in receipt of remittances.

4 Methodology

4.1 Specification and hypothesis testing

We distinguish between four types of resource inflows: non-wage income (U_m, U_f), social pensions (P_m, P_f), private remittances (R_m, R_f) and earned income (E_m, E_f), with the subscripts denoting the gender of the recipient (m for male, f for female). The first three resource inflows (U, P, R) constitute the three components of non-labor income (I) (also referred to as unearned income). The collective household[6] approach, which provides the basic framework of this paper, implies budget share equations of the form:

$$b_g = b_g\left(U_m, U_f, P_m, P_f, R_m, R_f, E_m, E_f; \xi\right) + \varepsilon_g; g = 1, \ldots, 9 \qquad (1)$$

where b_g denotes item g, ξ denotes the set of exogenous variables that affect budget shares, and ε_g denotes a random error specific to each budget share, b_g.

An important motivation of this paper is to test on South African data the validity of the resource pooling hypotheses relating to the three components of unearned income, I, namely, U, P and R ($I \equiv U + P + R$). The pooling hypotheses are:

(i)   Men pool their non-wage income, social pensions and remittances received i.e. $I_m = U_m + P_m + R_m$ appears in the set of explanatory variables in Eq. (1) rather than the three separately.
(ii) Similarly, for women: $I_f = U_f + P_f + R_f$.
(iii) Pooling of non-wage income by men and women, i.e. $U = U_m + U_f$ appears on the right hand side of Eq. (1) rather than U_m and U_f separately.
(iv) Pooling of social pensions: $P = P_m + P_f$
(v)   Pooling of remittances: $R = R_m + R_f$

The pooling hypotheses (i)–(v) are specified as testable restrictions on the parameters of the budget share equations. Let f_g^R denote the resource dependent component of the budget share equation of item g. To keep the estimation simple, we assume linearity and ignore interaction between the resource components.[7] Estimation is conducted on a pooled sample from

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[6] See Bourguignon and Chiappori (1994) for a detailed description of the collective household model.

[7] See Maitra and Ray (2005) for a more complex specification that includes square and interaction terms of the resource components.

the 1993 and 1998 surveys and we include a year/time dummy (YD) and its interaction with the eight resource components appearing in Eq. (1). So f_g^R is specified as follows:

$$
\begin{aligned}
f_g^R = &\beta_{1g}U_m + \beta_{2g}U_f + \beta_{3g}P_m + \beta_{4g}P_f + \beta_{5g}R_m + \beta_{6g}R_f \\
&+ \beta_{7g}E_m + \beta_{8g}E_f + \beta_{9g}YD + \beta_{10g}(YD \times U_m) \\
&+ \beta_{11g}(YD \times U_f) + \beta_{12g}(YD \times P_m) + \beta_{13g}(YD \times P_f) \\
&+ \beta_{14g}(YD \times R_m) + \beta_{15g}(YD \times R_f) + \beta_{16g}(YD \times E_m) + \beta_{17g}(YD \times E_f)
\end{aligned}
$$

(2)

where the time dummy, YD, takes on the value 0 in 1993 and 1 in 1998. The pooling hypotheses (i)–(v) imply the following restrictions in the 2 years on the parameters of the budget share equations:

H_A: Male's pooling of non-earned income from the different sources:

$$
\begin{aligned}
1993 &: \beta_{1g} = \beta_{3g} = \beta_{5g} \\
1998 &: \beta_{1g} + \beta_{10g} = \beta_{3g} + \beta_{12g} = \beta_{5g} + \beta_{14g}
\end{aligned}
$$

H_B: Female's pooling of non-earned income from the different sources:

$$
\begin{aligned}
1993 &: \beta_{2g} = \beta_{4g} = \beta_{6g} \\
1998 &: \beta_{2g} + \beta_{11g} = \beta_{3g} + \beta_{13g} = \beta_{5g} + \beta_{15g}
\end{aligned}
$$

H_C: Pooling of Male and Female non-wage income:

$$
\begin{aligned}
1993 &: \beta_{1g} = \beta_{2g} \\
1998 &: \beta_{1g} + \beta_{10g} = \beta_{2g} + \beta_{11g}
\end{aligned}
$$

H_D: Pooling of Male and Female social pensions received:

$$
\begin{aligned}
1993 &: \beta_{3g} = \beta_{4g} \\
1998 &: \beta_{3g} + \beta_{12g} = \beta_{4g} + \beta_{13g}
\end{aligned}
$$

H_E: Pooling of Male and Female private remittances received:

$$
\begin{aligned}
1993 &: \beta_{5g} = \beta_{6g} \\
1998 &: \beta_{5g} + \beta_{14g} = \beta_{6g} + \beta_{15g}
\end{aligned}
$$

In addition, we perform a test of the hypothesis of no source or gender effect that combines the above five pooling hypotheses:

H_F:Overall Pooling:

$$1993 : \beta_{1g} = \beta_{2g} = \beta_{3g} = \beta_{4g} = \beta_{5g} = \beta_{6g}$$
$$1998 : \beta_{1g} + \beta_{10g} = \beta_{2g} + \beta_{11g} = \beta_{3g} + \beta_{12g}$$
$$= \beta_{4g} + \beta_{13g} = \beta_{5g} + \beta_{14g} = \beta_{6g} + \beta_{15g}$$

While the results of the tests of resource pooling, done separately for each year, are of interest in themselves, a comparison of the test results between 1993 and 1998 (and in particular the joint significance of the year dummy and the interaction terms) will show whether the end of apartheid has led to a change in the intra-household behavior of South African households. We also estimate a restricted model where only the intercept term is allowed to vary across the 2 years.

4.2 Estimation

The empirical analysis involves random effect instrumental variables (IV) estimation of the budget share equations. All estimation was conducted on the pooled data. The IV estimation was undertaken to control for the potential endogeneity of earned income (E), non-wage income (U) and remittances (R) as explanatory variables in the budget share equations. These resource variables could be correlated with the unobserved determinants of the budget shares and, in ignoring this correlation, the OLS method might yield inconsistent estimates. Moreover, since individuals choose their hours of work given the market wage rate, earned income (E) is likely to be endogenous in the budget share equations and was, hence, instrumented in the IV regressions. Note, however, that we continue to maintain the assumption of exogeneity of social pensions as regressors in the budget share equations. A strong justification for this exogeneity assumption is the fact that the social pensions in South Africa are, typically, ''means tested'' (Alderman, 1999) and that the ''means'' are set at a level that is not binding for most black households.[8]

Since the focus of this study is on the budget share equations, we did not incorporate the possible simultaneity in the decisions on expenditure and resource generation by the household.[9] Consequently, we are overlooking the possible impact of the various resource components on one another. Such an analysis, which involves simultaneous equation estimation of the resource inflow variables and the budget share equations, is vastly more complex and has been reported in Maitra and Ray (2003) and its gender differentiated extension in Maitra and Ray (2005).

The validity of the instruments is essential for correcting the problem of inconsistency that affects the OLS estimates in case the resource variables

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[8] Further support for the exogeneity assumption is provided in Maitra and Ray (2005) who are unable to reject the exogeneity of pensions.

[9] We thank an anonymous referee for suggesting this simplified treatment.

(U,R,E) are endogenous. Considerable care was taken to choose as instruments variables that are likely to be highly correlated with these resource variables but are unlikely to directly influence the budget share equations. Appendix Table 5 lists the instruments used in this study. The Sargan statistic generally confirms the validity of the instruments used in the IV regressions. Note, also, that the calculated Durbin-Wu–Hausman statistics confirmed endogeneity of non-wage income, remittances and earned income as regressors, thus, suggesting significant inconsistency in the OLS estimates.[10]

Since the 1993 and 1998 data sets on Kwazulu-Natal households constitute a panel, we perform instrumental variable random effects regression of the budget share equations on the pooled data set. Using the Hausman test statistic, we are almost always unable to reject the null hypothesis that a random effects model adequately models the household specific effects. To ensure consistency we always present the random effects estimates even in cases where the Hausman test chooses the fixed effects model. The coefficient estimates from the fixed effects regression are available on request.

5 Results

Table 2 presents the random effects IV regression results on the pooled data. The coefficient estimates of the resource inflow variables vary widely between the different commodities. There is very little similarity between the random effects IV estimates and the OLS estimates, reflecting the presence of endogenous regressors. The IV estimates, generally, have weaker statistical significance than the OLS ones. The resource inflow variables do not have a particularly strong (and statistically significant) effect on the expenditure patterns. The exception is female earned income, which has a significantly positive effect on the household's budget share of clothing and a significantly negative effect on the budget share of personal expenses. Race of the household has a significant effect on the budget share of food. *Ceteris paribus*, a black household spends a higher share of its total expenditure on food than the other households, reflecting the inferior economic status of the former. Note, however, that the significantly negative coefficient estimate of the interaction term between the race dummy and year dummy suggests that the budget share of food in the black households decreased sharply during 1993–1998, reflecting their rising economic status over this period.

The last row of numbers in Table 2 shows that the hypothesis of constant budget shares between 1993 and 1998 is rejected for most items, especially strongly for food. This is a further confirmation of the changing food preferences of the majority black households, reflecting their increased economic prosperity during this post-apartheid period. Another significant result

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[10] See Stewart and Gill (1998, pp. 142–144) for a clear exposition of the Sargan statistics and the Durbin-Wu–Hausman statistic that have been used here. The estimated values of the Durbin-Wu–Hausman statistic (for testing for endogenous regressors) and the Sargan statistic (for testing the validity of the instruments) will be made available on request.

Table 2 Random effect IV regression results for budget share regressions

	Food	Clothing	Health	Other non-food	Education	Personal Expenses	Transportation	Energy	Other expenditure
Male non-wage (U_m)	4.47e-04. (7.23e-04)	−1.29e-04 (1.82e-04)	3.84e-05 (1.21e-04)	−4.49e-04 (3.33e-04)	−1.06e-04 (2.03e-04)	1.88e-04 (3.45e-04)	2.36e-04 (4.99e-04)	−3.04e-04 (3.54e-04)	4.25e-05 (8.25e-04)
Female non-wage (U_f)	−7.21e-04 (1.38e-03)	9.19e-05 (4.31e-04)	1.69e-04 (3.13e-04)	4.89e-04 (8.49e-04)	7.06e-05 (5.18e-04)	6.44e-05 (7.69e-04)	1.02e-03 (1.27e-03)	−6.74e-04 (6.98e-04)	1.69e-03 (1.58e-03)
Male earned (E_m)	6.54e-05 (8.39e-05)	8.19e-06 (2.17e-05)	−9.35e-06 (1.45e-05)	1.25e-05 (3.95e-05)	1.16e-05 (2.41e-05)	−1.65e-05 (4.06e-05)	1.22e-05 (5.99e-05)	4.57e-05 (4.07e-05)	−1.02e-04 (9.60e-05)
Female earned (E_f)	7.56e-05 (2.28e-04)	8.78e-05** (4.44e-05)	3.73e-06 (3.75e-05)	4.93e-05 (1.11e-04)	7.71e-05 (6.77e-05)	−2.03e-04** (8.01e-05)	−4.45e-05 (1.36e-04)	−5.62e-05 (8.40e-05)	1.75e-05 (2.70e-04)
Remittance received by men (R_m)	5.14e-03 (6.16e-03)	−2.38e-04 (2.19e-03)	−4.26e-04 (1.38e-03)	−1.42e-03 (3.55e-03)	3.06e-04 (2.17e-03)	1.07e-05 (3.96e-03)	−8.40e-03 (6.09e-03)	2.35e-03 (3.46e-03)	−2.12e-03 (6.96e-03)
Remittance received by women (R_f)	1.78e-04 (6.89e-04)	9.67e-05 (2.45e-04)	−9.12e-05 (1.77e-04)	1.58e-04 (4.82e-04)	2.05e-04 (2.94e-04)	−5.63e-04 (4.36e-04)	−9.69e-04 (7.17e-04)	3.15e-04 (3.82e-04)	−2.75e-04 (7.80e-04)
Social pension received by men (P_m)	−1.55e-04 (2.43e-04)	−5.01e-05 (5.31e-05)	−1.97e-05 (3.44e-05)	1.36e-04 (9.41e-05)	1.55e-05 (5.74e-05)	5.95e-05 (1.01e-04)	−9.38e-05 (1.44e-04)	3.83e-05 (1.07e-04)	4.17e-05 (2.81e-04)
Social pension received by women (P_f)	1.49e-04 (5.72e-04)	−4.06e-05 (1.83e-04)	−6.36e-05 (1.25e-04)	−1.12e-04 (3.31e-04)	−2.69e-05 (2.02e-04)	−1.49e-05 (3.31e-04)	−4.75e-04 (5.22e-04)	3.04e-04 (3.01e-04)	−5.43e-04 (6.50e-04)
Year dummy (YD)	3.12e-03 (1.59e-01)	1.97e-03 (5.30e-02)	4.27e-03 (4.14e-02)	8.09e-02 (1.15e-01)	1.28e-02 (7.04e-02)	−7.47e-02 (9.31e-02)	1.84e-01 (1.61e-01)	−1.20e-02 (8.25e-02)	4.48e-02 (1.81e-01)
$U_m \times YD$	−4.03e-04 (7.27e-04)	1.15e-04 (1.85e-04)	−4.05e-05 (1.24e-04)	4.48e-04 (3.39e-04)	9.92e-05 (2.07e-04)	−1.76e-04 (3.49e-04)	−2.34e-04 (5.08e-04)	2.94e-04 (3.56e-04)	−1.10e-04 (8.29e-04)
$U_f \times YD$	7.61e-04 (1.37e-03)	−9.91e-05 (4.27e-04)	−1.77e-04 (3.10e-04)	−4.91e-04 (8.41e-04)	−7.85e-05 (5.13e-04)	−5.35e-05 (7.60e-04)	−1.00e-03 (1.25e-03)	6.68e-04 (6.90e-04)	−1.71e-03 (1.57e-03)
$E_m \times YD$	−2.56e-04 (2.22e-04)	2.32e-05 (3.60e-05)	−1.39e-06 (2.17e-05)	−4.66e-05 (5.84e-05)	2.79e-05 (3.56e-05)	1.08e-04 (7.18e-05)	4.96e-05 (9.28e-05)	−9.19e-05 (8.57e-05)	3.61e-04 (2.60e-04)
$E_f \times YD$	−1.73e-04 (2.35e-04)	−7.91e-05 (6.06e-05)	−2.01e-05 (5.00e-05)	−7.92e-05 (1.46e-04)	−4.95e-05 (8.94e-05)	1.93e-04* (1.08e-04)	5.80e-05 (1.85e-04)	9.78e-05 (1.05e-04)	−8.97e-05 (2.72e-04)
$R_m \times YD$	−5.22e-03 (9.30e-03)	3.30e-05 (2.89e-03)	2.25e-04 (1.74e-03)	1.10e-03 (4.42e-03)	−4.41e-04 (2.70e-03)	−1.83e-04 (5.36e-03)	9.24e-03 (7.79e-03)	−4.59e-03 (4.97e-03)	7.61e-03 (1.05e-02)
$R_f \times YD$	−1.52e-03 (1.47e-03)	8.19e-05 (3.69e-04)	1.80e-04 (2.55e-04)	7.28e-06 (6.94e-04)	−1.14e-04 (4.23e-04)	9.20e-04 (6.81e-04)	1.10e-03 (1.04e-03)	−3.73e-04 (6.83e-04)	1.85e-03 (1.68e-03)

Table 2 continued

	Food	Clothing	Health	Other non-food	Education	Personal Expenses	Transportation	Energy	Other expenditure
$P_m \times YD$	-3.24e-04 (5.50e-04)	9.45e-05 (1.09e-04)	4.57e-05 (7.27e-05)	-4.77e-05 (1.99e-04)	3.93e-06 (1.21e-04)	1.02e-04 (2.09e-04)	3.47e-05 (2.99e-04)	8.08e-05 (2.30e-04)	7.96e-04 (6.40e-04)
$P_f \times YD$	-2.67e-04 (5.80e-04)	2.59e-05 (1.89e-04)	8.58e-05 (1.30e-04)	1.00e-04 (3.46e-04)	6.22e-05 (2.11e-04)	4.01e-06 (3.41e-04)	4.30e-04 (5.41e-04)	-3.17e-04 (3.09e-04)	6.62e-04 (6.58e-04)
Total number of children (TOTCHILD)	0.0115 (0.0075)	0.0008 (0.0019)	-0.0007 (0.0012)	-0.0000 (0.0033)	0.0026 (0.0020)	-0.0021 (0.0034)	-0.0103** (0.0052)	0.0011 (0.0034)	-0.0120 (0.0087)
TOTCHILD × YD	-0.0113 (0.0097)	0.0000 (0.0023)	0.0002 (0.0014)	-0.0013 (0.0036)	-0.0014 (0.0022)	0.0027 (0.0043)	0.0116* (0.0060)	-0.0043 (0.0044)	0.0139 (0.0112)
Total number of adults (TOTADULT)	-0.0046 (0.0085)	-0.0004 (0.0029)	0.0017 (0.0019)	0.0013 (0.0050)	-0.0008 (0.0030)	0.0038 (0.0052)	0.0124 (0.0081)	-0.0061 (0.0046)	0.0017 (0.0096)
TOTADULT × YD	0.0088 (0.0115)	0.0010 (0.0033)	-0.0016 (0.0020)	0.0001 (0.0051)	0.0021 (0.0031)	-0.0042 (0.0061)	-0.0138 (0.0088)	0.0075 (0.0058)	-0.0112 (0.0131)
Total number of elderly (TOTELDER)	-0.0246 (0.0243)	0.0043 (0.0073)	0.0065 (0.0051)	0.0004 (0.0137)	-0.0047 (0.0084)	0.0022 (0.0131)	0.0140 (0.0210)	-0.0150 (0.0121)	0.0504* (0.0278)
TOTELDER × YD	0.0263 (0.0236)	-0.0036 (0.0075)	-0.0075 (0.0055)	0.0008 (0.0151)	0.0023 (0.0092)	0.0023 (0.0134)	-0.0134 (0.0223)	0.0152 (0.0121)	-0.0497* (0.0269)
Male headed household (SEXHD)	-0.0872 (0.0647)	0.0110 (0.0244)	0.0066 (0.0174)	0.0399 (0.0461)	0.0064 (0.0281)	-0.0041 (0.0429)	0.0708 (0.0717)	-0.0202 (0.0363)	0.0797 (0.0732)
SEXHD × YD	0.0884 (0.1056)	-0.0082 (0.0302)	-0.0045 (0.0194)	-0.0447 (0.0506)	-0.0081 (0.0309)	-0.0004 (0.0553)	-0.0735 (0.0837)	0.0448 (0.0522)	-0.1467 (0.1209)
Age of household head (AGEHD)	-0.0079 (0.0055)	0.0008 (0.0015)	-0.0006 (0.0009)	0.0029 (0.0025)	0.0013 (0.0016)	-0.0006 (0.0027)	-0.0012 (0.0040)	0.0007 (0.0027)	0.0009 (0.0063)
AGEHD × YD	0.0030 (0.0067)	-0.0010 (0.0015)	0.0003 (0.0010)	-0.0031 (0.0026)	0.0001 (0.0016)	-0.0012 (0.0028)	-0.0012 (0.0039)	-0.0000 (0.0030)	-0.0000 (0.0077)
Age of household head squared (AGEHD2)	0.0001 (0.0001)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0001)
AGEHD2 × YD	-0.0000 (0.0001)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0001)
Highest education of household head is primary school (HDEDUC1)	0.0106 (0.0220)	0.0041 (0.0046)	0.0028 (0.0029)	-0.0022 (0.0078)	0.0027 (0.0047)	-0.0068 (0.0088)	0.0162 (0.0121)	-0.0022 (0.0096)	-0.0117 (0.0255)

Table 2 continued

	Food	Clothing	Health	Other non-food	Education	Personal Expenses	Transportation	Energy	Other expenditure
HDEDUC1 × YD	−0.0299 (0.0261)	0.0001 (0.0059)	−0.0017 (0.0039)	0.0142 (0.0108)	−0.0023 (0.0066)	−0.0058 (0.0114)	−0.0151 (0.0162)	0.0056 (0.0120)	0.0246 (0.0300)
Highest education of household head is secondary school (HDEDUC2)	−0.0607* (0.0317)	0.0078 (0.0054)	0.0025 (0.0035)	−0.0020 (0.0094)	0.0047 (0.0057)	0.0016 (0.0105)	0.0042 (0.0144)	−0.0122 (0.0124)	0.0723* (0.0369)
HDEDUC2 × YD	0.0232 (0.0375)	0.0009 (0.0081)	0.0011 (0.0056)	0.0336** (0.0154)	−0.0081 (0.0094)	−0.0311** (0.0152)	0.0013 (0.0229)	0.0115 (0.0159)	−0.0395 (0.0436)
Highest education of household head is more than secondary school (HDEDUC3)	−0.0793* (0.0454)	−0.0066 (0.0106)	−0.0067 (0.0075)	0.0253 (0.0210)	−0.0046 (0.0128)	0.0017 (0.0199)	−0.0199 (0.0298)	0.0153 (0.0204)	0.0701 (0.0525)
HDEDUC3 × YD	0.0162 (0.0987)	0.0355 (0.0286)	0.0255 (0.0217)	0.0399 (0.0613)	0.0307 (0.0374)	−0.0730 (0.0519)	−0.0122 (0.0841)	−0.0435 (0.0493)	0.0125 (0.1129)
Rural residence (RURAL)	0.0571 (0.0356)	−0.0007 (0.0084)	0.0090 (0.0056)	0.0060 (0.0149)	0.0021 (0.0091)	−0.0208 (0.0155)	0.0094 (0.0234)	0.0257* (0.0154)	−0.0426 (0.0417)
RURAL × YD	0.0384 (0.0350)	0.0030 (0.0115)	−0.0104 (0.0085)	0.0042 (0.0232)	−0.0064 (0.0141)	−0.0008 (0.0205)	−0.0370 (0.0341)	−0.0278 (0.0184)	−0.0115 (0.0398)
Black household (BLACK)	0.1808*** (0.0892)	−0.0134 (0.0222)	−0.0137 (0.0152)	−0.0432 (0.0414)	0.0045 (0.0253)	−0.0154 (0.0415)	0.0920 (0.0622)	−0.0669 (0.0418)	−0.0649 (0.1028)
BLACK × YD	−0.1576*** (0.0771)	0.0326* (0.0195)	0.0094 (0.0146)	0.0243 (0.0409)	0.0300 (0.0249)	0.0680* (0.0356)	−0.0314 (0.0571)	0.0129 (0.0350)	0.0024 (0.0892)
Negative shock (NEGSHOCK)	−0.0043 (0.0702)	0.0138 (0.0151)	0.0091 (0.0106)	−0.0029 (0.0299)	0.0237 (0.0182)	−0.0348 (0.0282)	0.0384 (0.0425)	0.0152 (0.0294)	−0.0116 (0.0820)
NEGSHOCK × YD	−0.0279 (0.0757)	−0.0116 (0.0158)	−0.0068 (0.0112)	0.0259 (0.0312)	−0.0213 (0.0190)	0.0391 (0.0293)	−0.0351 (0.0448)	−0.0262 (0.0305)	0.0286 (0.0888)
Constant	0.5594*** (0.1885)	−0.0053 (0.0405)	0.0193 (0.0284)	−0.0515 (0.0774)	−0.0687 (0.0472)	0.1718** (0.0750)	−0.1087 (0.1153)	0.1210 (0.0778)	0.2175 (0.2209)
ρ	0.8160	0.3444	0.0076	0.0000	0.0000	0.0584	0.0423	0.0870	0.3402
Observations	1944	1944	1944	1944	1944	1944	1944	1944	1944
Number of households	1063	1063	1063	1063	1063	1063	1063	1063	1063

Table 2 continued

	Food	Clothing	Health	Other non-food	Education	Personal Expenses	Transportation	Energy	Other expenditure
Pooling tests 1993									
(χ^2)									
H_A	2.21	0.26	0.18	3.40	0.26	0.14	1.95	0.71	0.12
H_B	0.23	1.32	0.31	1.65	2.26	5.48*	2.03	0.99	1.10
H_C	0.84	0.33	0.20	1.34	0.13	0.03	0.46	0.35	1.28
H_D	0.40	0.00	0.18	0.79	0.06	0.08	0.80	1.22	1.13
H_E	0.75	0.03	0.07	0.24	0.00	0.02	1.79	0.41	0.08
H_F	2.21	2.69	0.51	6.35	2.49	6.88	3.22	1.52	1.79
Pooling tests 1998									
(χ^2)									
H_A	1.08	0.52	0.45	0.41	0.11	0.77	0.24	2.27	2.70
H_B	2.11	1.24	2.20	0.38	1.39	1.19	0.58	0.02	1.90
H_C	0.00	0.19	0.27	0.00	0.00	0.00	0.22	0.02	0.56
H_D	0.50	0.51	0.01	0.48	0.03	1.11	0.00	0.47	1.44
H_E	0.11	0.18	0.30	0.12	0.07	0.09	0.10	1.38	0.78
H_F	2.15	1.30	2.93	0.76	1.50	1.85	1.32	3.40	3.41
Test of change over period 1993–1998[a]	143.15***	35.87**	22.46	66.74***	23.25	39.87***	19.40	73.12***	65.13***

Pooled data

Standard errors in parentheses

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

ρ:Fraction of variance due to the household level effect

[a] No intercept or slope effect

See text (section 4) for a description of the Pooling tests H_A–H_F

is that the hypothesis of no change in budget share, i.e., static preferences, cannot be rejected in case of health, education and transportation. In other words, *ceteris paribus*, the household spent the same share of its budget on these items in 1998 as it did in 1993.

Table 2 also presents the χ^2 values for the tests of the resource pooling hypotheses, H_A–H_F. Alternatively stated, the χ^2 values provide the tests of the hypothesis that only the aggregate income of the household matters in determining its expenditure outcomes and not how the income was generated or which household member received the income. There is strong evidence in support of resource pooling between individuals and between sources. The overall picture did not alter much over the period 1993–1998. The 1998 test values show no rejection, for any item, of the overall resource pooling hypothesis, H_F, namely, that the budget shares are insensitive to the source and the recipient of the income.

Table 3 reports the random effect IV regression estimates[11] when the coefficients of the interaction terms of the time dummy (YD) with the other determinants of budget share are all constrained to be zero. A comparison between Tables 2 and 3 allows examination of the robustness of the evidence contained in Table 2 to the restriction that the magnitude of the impact of the year dummy (YD) on the budget shares does not vary across the source and the recipient of the income. The estimated coefficients of the year dummy are highly significant for most items, thus, providing strong evidence of a shift in consumer demand between 1993 and 1998. *Ceteris paribus*, there was a shift in household spending away from food, clothing and energy towards the other items, most notably other non food and other expenditure. While the budget share on education increased significantly, that on health remained unchanged over this period.

The χ^2 values for testing the various pooling hypotheses, reported in Table 3, show that there are more instances of rejection of resource pooling than was reported in Table 2. For example, hypothesis H_B, that the female spouse pools the constituents of non-earned income, i.e. her non-wage income, social pensions and remittances received, before deciding on the purchase of an item, is strongly rejected in case of personal expenses and transportation. In other words, the household's spending on these items is affected by the breakdown of the female's non-earned income between its constituents. The decisiveness of the rejection of H_B leads to the result that the overall resource pooling hypothesis, H_F, namely, that none of the relative incomes matter in the determination of expenditure outcomes, is also decisively rejected for personal expenses, transportation and, additionally, for other non food. In case of the last item, the data rejects, at 5% significance level, both hypotheses H_A and H_B, thus suggesting that neither the male nor the female pools the constituents of his or her non-earned income. In contrast, and consistent with the earlier evidence reported in Table 2, the data is unable

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[11] Table 3 presents the estimated coefficients of the resource inflow variables and the year dummy. The full set of estimated coefficients of all the determinants is available on request.

Table 3 Random effect IV regression results for budget share regressions

	Food	Clothing	Health	Other non-food	Education	Personal expenses	Transportation	Energy	Other expenditure
Male non-wage (U_m)	-2.94e-05	-7.58e-07	-2.04e-06	2.32e-06	-1.45e-06	1.56e-06	4.28e-06	-1.71e-05*	5.96e-05*
	(3.26e-05)	(7.94e-06)	(4.41e-06)	(1.05e-05)	(9.33e-06)	(1.57e-05)	(1.16e-05)	(1.01e-05)	(3.40e-05)
Female non-wage (U_f)	3.48e-05	-3.45e-06	-4.89e-06	3.43e-06	-8.54e-07	8.39e-06	-8.60e-06	1.34e-06	-4.60e-05
	(2.59e-05)	(7.33e-06)	(4.55e-06)	(1.15e-05)	(7.95e-06)	(1.26e-05)	(1.31e-05)	(1.08e-05)	(3.18e-05)
Male earned (E_m)	-1.04e-05	2.77e-05**	-1.16e-05	-1.43e-05	1.81e-05	1.20e-06	3.99e-05*	4.26e-06	-2.80e-05
	(4.91e-05)	(1.33e-05)	(8.11e-06)	(2.05e-05)	(1.48e-05)	(2.38e-05)	(2.32e-05)	(1.91e-05)	(5.76e-05)
Female earned (E_f)	-1.64e-04***	3.00e-05**	-6.85e-06	-1.29e-05	3.50e-05***	-3.47e-05	5.03e-05**	-2.11e-05	1.24e-04**
	(4.38e-05)	(1.17e-05)	(7.26e-06)	(1.85e-05)	(1.30e-05)	(2.11e-05)	(2.11e-05)	(1.72e-05)	(5.08e-05)
Remittance received by men (R_m)	-1.96e-04	-2.93e-05	-6.50e-05	1.60e-04	-4.53e-04	-5.67e-04	-1.49e-03**	8.26e-05	3.27e-03**
	(1.28e-03)	(3.55e-04)	(2.22e-04)	(5.66e-04)	(3.87e-04)	(6.21e-04)	(6.45e-04)	(5.25e-04)	(1.54e-03)
Remittance received by women (R_f)	1.22e-06	9.60e-05*	4.60e-05	1.83e-04**	4.58e-05	-2.57e-04***	-2.81e-04***	-4.69e-05	1.73e-04
	(1.95e-04)	(4.99e-05)	(2.98e-05)	(7.48e-05)	(5.67e-05)	(9.38e-05)	(8.46e-05)	(7.01e-05)	(2.15e-04)
Social pension received by men (P_m)	6.11e-05	-2.37e-05	1.63e-05	1.24e-04***	-5.44e-06	2.15e-05	-7.58e-05	4.26e-05	-1.88e-04*
	(8.58e-05)	(2.51e-05)	(1.63e-05)	(4.24e-05)	(2.66e-05)	(4.18e-05)	(4.88e-05)	(3.89e-05)	(1.09e-04)
Social pension received by women (P_f)	2.06e-05	-5.50e-06	2.29e-05	9.77e-06	1.23e-05	-5.69e-05	-7.74e-05*	-1.97e-05	9.61e-05
	(8.05e-05)	(2.25e-05)	(1.43e-05)	(3.68e-05)	(2.44e-05)	(3.90e-05)	(4.21e-05)	(3.40e-05)	(9.78e-05)
Year Dummy (YD)	-1.14e-01***	-6.49e-03**	1.28e-03	2.81e-02***	7.97e-03***	1.82e-02***	1.98e-02***	-1.74e-02***	6.09e-02***
	(1.02e-02)	(2.61e-03)	(1.61e-03)	(4.12e-03)	(2.94e-03)	(4.88e-03)	(4.72e-03)	(3.82e-03)	(1.13e-02)
ρ	0.3940	0.2167	0.0938	0.0305	0.3073	0.3754	0.0000	0.0641	0.2023
Observations	1944	1944	1944	1944	1944	1944	1944	1944	1944
Number of households	1063	1063	1063	1063	1063	1063	1063	1063	1063
Pooling tests (χ^2)									
H_A	0.82	0.66	1.01	6.62**	1.46	0.93	8.15**	1.92	7.37**
H_B	0.07	4.27	6.51**	5.96***	1.05	11.90***	12.73***	0.83	3.13
H_C	1.80	0.04	0.11	0.00	0.00	0.09	0.38	1.10	3.64**

Table 3 continued

	Food	Clothing	Health	Other non-food	Education	Personal expenses	Transportation	Energy	Other expenditure
H_D	0.12	0.31	0.10	4.45**	0.25	1.96	0.00	1.57	4.98**
H_E	0.02	0.13	0.25	0.00	1.68	0.25	3.58**	0.06	4.10**
H_F	2.13	5.68	8.30	14.69**	3.06	12.67***	18.63***	2.96	10.54*

Pooled data. No interaction effects

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

ρ, Fraction of variance due to the household level effect. See text (section 4) for a description of the Pooling tests $H_A–H_F$

to reject any of the resource pooling hypotheses, H_A–H_F, in case of food, clothing, education and energy. The rejection of resource pooling, when it occurs, can be explained by the argument of Duflo and Udry (2004) who suggest that the different resource inflows are directed at different ''mental accounts'' and that the spending from these accounts are not fully fungible.

The impact of the exogenous determinants of household spending in South Africa on the budget share of food can be seen more closely from the reduced form regression estimates[12] of this item that are presented in Table 4. The reduced form equation, which contains only the exogenous determinants on the right hand side, is useful in quantifying the impact of the exogenous changes on the expenditure pattern of food in post-apartheid South Africa. Table 4 confirms the finding from Table 3 that, *ceteris paribus*, the period 1993–1998 witnessed a significant and large decline in the household's budget share of food. The addition of a child to the family increases its budget share of food. The rural household spends a significantly higher share of its expenditure outlay on food than the urban household. The budget share of food in a male-headed household is significantly lower than in a female-headed household. *Ceteris paribus*, a black household spends a higher share of its expenditure on food than an Indian household. The educational variables are all highly significant. An increase in the level of educational attainment of the household head leads to a shift in household spending away from food items. In contrast, the coefficient estimate of the variable 'negative shock' is not statistically significant. This suggests that, in the event of a major income disruption, the household draws on its savings and other assets for consumption smoothing and protects its food spending.

6 Summary and conclusion

The primary aim of this paper was to examine on post-apartheid South African data whether resources accruing to different household members and from various sources have differential effects on the household's expenditure patterns. Another significant motivation was the study of the effect of removal of apartheid on the nature and composition of the resource inflows into the household and on its expenditure patterns. While there have recently been several studies on the dependence of the household's expenditure outcomes on the gender of the resource recipient, this paper is one of the earliest attempts at extending the investigation to include the nature and source of the resource inflows.

We exploit the panel nature of the data set and also take into account the potential endogeneity of the various income inflows in performing tests of the pooling hypotheses. The post-apartheid period in South Africa witnessed significant changes in the nature, volume and composition of resource inflows

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[12] These estimates were obtained by employing the random effects GLS estimation procedure. The OLS estimates which are very similar are available on request.

Table 4 Reduced form regressions for the budget share of food

	Random Effect GLS
Social pension received by men (P_m)	– 0.0001 (0.0001)
Social pension received by women (P_f)	– 0.0000 (0.0001)
Year Dummy (YD)	– 0.1188*** (0.0068)
$P_m \times YD$	0.0003** (0.0001)
$P_f \times YD$	– 0.0000 (0.0001)
Total number of children (TOTCHILD)	0.0049*** (0.0014)
Total number of adults (TOTADULT)	– 0.0020 (0.0016)
Total number of elderly (TOTELDER)	– 0.0008 (0.0050)
Male headed household (SEXHD)	– 0.0275*** (0.0074)
Age of household head (AGEHD)	– 0.0037** (0.0015)
Age of household head squared (AGEHD2)	0.0000** (0.0000)
Highest education of household head is primary school (HDEDUC1)	– 0.0258*** (0.0079)
Highest education of household head is secondary school (HDEDUC2)	– 0.0651*** (0.0094)
Highest Education of Household head is more than secondary school (HDEDUC3)	– 0.1107*** (0.0141)
Rural residence (RURAL)	0.0980*** (0.0086)
Black household (BLACK)	0.0679*** (0.0121)
Negative shock (NEGSHOCK)	0.0125 (0.0081)
CONSTANT	0.5470*** (0.0414)
Number of observations	1944
Number of households	1063

Standard errors in parentheses

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

into the household, making this data set an ideal setting for this study. This paper also presents evidence on changes to the South African household's expenditure pattern following the end of apartheid.

The principal results can be summarized as follows. Between 1993 and 1998 there was a shift in the household's spending away from food, clothing and energy and towards personal expenses, transportation and other non food items. In contrast, the budget share of health remained unchanged over this period. The results of the tests of income pooling are somewhat sensitive to the manner of specification of the time trend variable designed to capture the unobservable time-varying changes between the two survey years. If one allows the time trend to interact with the key household characteristics, i.e. if the effect of time on the budget shares is allowed to differ across households, then the evidence in favor of income pooling is much stronger than otherwise. However, regardless of whether one allows such interactions or not, none of the income pooling hypotheses could be rejected in case of the principal items, food, clothing and energy. Since these three items constituted over 60% of total household expenditure in 1993, though falling to nearly 50% in 1998, this is a significant result in the wake of recent widespread rejections of income pooling on other data sets. We also find that with increasing educational

attainment of the household head, the household's expenditure pattern shifts away from the food items. Finally, negative income shocks do not have much impact on food spending, thus providing evidence in favor of consumption smoothing.

The issue analyzed in this paper is of policy interest because if the identity of the income recipient matters in the household's expenditure decisions, then it indicates the usefulness of targeting income assistance at particular members of the household. It is possible to conduct a similar analysis by stratifying households on the basis of generation (or age). Given the structure of residency in many developing countries where members of multiple generations co-reside, this could be another important form of stratification. That however is left for future research.

Appendix

Table 5 List of endogenous regressors, exogenous regressors and instruments used

Endogenous regressors	Male non-wage income (U_m), Female non-wage income (U_f), Male earned income (E_m), Female earned income, Remittance received by men (R_m), Remittance received by women (R_f)
Exogenous regressors	Social pension received by men (P_m), Social pension received by women (P_f), Total number of children (TOTCHILD), Total number of adults (TOTADULT), Total number of elderly (TOTELDER), Male household head (SEXHD), Age of household head (AGEHD), Age of household head squared (AGEHD2), Highest education of household head is primary school (HDEDUC1), Highest education of household head is secondary school (HDEDUC2), Highest education of household head is more than secondary school (HDEDUC3), Rural residence (RURAL), Black household (BLACK), Negative shock (NEGSHOCK)
Instruments used	Highest level of education attained by the most educated male member (EDUC1M, EDUC2M, EDUC3M), Highest level of education attained by the most educated female member (EDUC1F, EDUC2F, EDUC3F), The proportion of males in the household with primary, medium and secondary schooling (SHMAL1, SHMAL2, SHMAL3), the average age of the working age males (AVGAGEM), square of the average age of the working age males (AVGAGEM2), the proportion of females in the household with primary, medium and secondary schooling (SHFEM1, SHFEM2, SHFEM3), the average age of the working age females (AVGAGEF), square of the average age of the working age females (AVGAGEF), Number of male migrants (MALAWAY), Number of female migrants (FEMAWAY), Head is a Migrant (HEADAWAY), No Toilet in House (NOTOILET), Main Source of Drinking Water is Piped (PIPEWATER)

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