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Changes in household organization and female headship patterns in South Africa in the 1990s in a time of HIV/AIDS and other macro-social transformations

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Introduction

The 1990s have seen profound political, social and demographic changes in South Africa. The period immediately preceding and following the collapse of the *apartheid* regime deeply changed the nature of population movements between rural and urban areas. This period also coincided with the rapid growth of HIV incidence rates and the consequent increases in AIDS mortality among young adults by the end of the decade. In addition to these two landmark events, forces of modernization continued to penetrate various segments of South African society, gnawing at traditional family relations, institutions and ideologies, a process was already well advanced in areas of high population concentrations located near to or around large urban centers such as Cape Town, Pretoria, Johannesburg and Durban. These cities are neural centers of government and service sectors, and have experienced sustained inflows of rural migrants. Finally, the effects of South Africa's unique pension laws, in combination with high prevalence of youth unemployment, may have encouraged the adoption of new residential arrangements, e.g. by inducing changes in individual coresidential preferences.

Any of these macrosocial phenomena, let alone their simultaneous operation, must have had some visible effects on family structure, headship patterns and, consequently, on dimensions of individual well-being related to the family. By family structure we mean the combination of an array of kin relations that are relevant for most individuals, individual residential patterns, and household composition and functioning. All three of these components and their combinations, play an important role in individuals' life course trajectories, careers, and ultimately, their levels of well-being.

Few studies have focused on the South African family, and even fewer have investigated the causal connections between observable patterns of family structure and social transformations.[1] As a result we know little about the changed landscape of South African families, and even less about the nature of adjustment to the aforementioned transformations.

[1] The exception to this is the growing body of South African studies over the last twenty years on changes in urban and rural domestic boundaries as a result of labor migration under rapidly changing social circumstances. See, *inter alia*, Murray 1976, 1981; Spiegel 1986, 1987, 1994a, 1994b; Spiegel, Watson and Wilkinson 1996; and Crankshaw 1996. (Cited in Russel 1998).

This paper contributes to our knowledge in this area by accomplishing three related goals. The first is to formulate a simple framework to interpret aggregate changes in household structure and headship patterns and to associate them with large-scale societal changes. The second is to provide a snapshot of changes in individual living arrangements and household organization during the decade between 1991 and 2001. We focus on observed residential arrangements and kinship relations within households. We do not explore in any depth the transformation of kinship relations as such but, instead, we use what we know about these relations to understand the nature of individual residential patterns and household composition. We also do not delve into the complex issue of changes in individual well-being that follow the adoption of different residential patterns. The third objective is to advance and test a few conjectures about the combination of forces that induced the observed changes in household composition and headship. We provide enough substantive and empirical material to partially identify the mechanisms responsible for the observed change, and to track the connections between changes in household type and headship patterns, on the one hand, and the aforementioned broad societal transformations, on the other.

IDENTIFICATION PROBLEM

The problems we confront are not unique to our material object of study, but they are generalized to all studies of families and household changes. These are problems of identification of causal connections and can be categorized in two classes.

Preferences and demographic constraints

Are observed changes in household composition and female headship the outcome of changes in individual (group) preferences or in demographic constraints?

The question of whether these observed changes are the result of individual or group preferences, the outcome of demographic changes, or both, is a key question since the most important theories about family changes invoke expectations that directly implicate individuals (groups) decision-making. This question is central in studies of historical family change in Western Europe (Wachter et al. 1978) and the United States (Ruggles 1987). Although these concerns are not directly addressed in studies of family

change in contemporary Africa, they are, however, tangentially alluded to and, in some cases, explicitly mentioned (*e.g*. Weisner, Bradley and Kilbride 1997).

To define the problem more precisely it is useful to resort to a simple example. Imagine that during an interval of time we observe a gradual shift in the distribution of households: from a distribution where the modal household type is stem or extended to a distribution dominated by nuclear households. Precisely this type of trajectory was posited in modernization theory to be characteristic of the transition from a traditional regime of household formation to a modern one. If the observed changes are associated with shifts in individual preferences and family decision-making, it would behoove us to seek the roots of such ideological changes. They could be found, for example, in changes affecting the division of labor, mode of production or rules governing ownership of and access to means of production, or on erosion of the affective and emotional basis of household formation. The problem arises because similar magnitudes of the shift in distribution of household type could be obtained if fertility had declined enough to constrain the supply of kin available to become members of households, *even if no transformations of individual or group preferences took place*. Thus, without information on individual or group preferences, it is difficult to use observable household distributions to make claims about preferences. In the absence of such information, there is only one way out and it involves a counterfactual: to search empirical support showing that the observed changes could not have been produced unless ideological transformations of a given magnitude had taken place. As a rule, such counterfactuals are quite difficult to support, they require special methodologies and a great deal of luck. Luck because if the observed changes are large enough that no conceivable demographic change could have produced them, one can at least attribute a measurable fraction of observed changes in household composition to ideologies, preferences and rules. This is unlikely to occur under most conditions but especially within short periods of time, when changes in households are likely to be of small magnitude and, in principle at least, associated with a number of possible sources.

While most studies of family and household change roam over periods spanning several decades, the focus of this paper is a time interval (1991-2001) of modest proportions. Admittedly, the events taking place in South Africa in the 1990s are so

powerful and their effects potentially so vast that observed changes in households may be much larger than what they would have been if the regime of social changes had been less severe. This is indeed a partial advantage in our favor. The flip side of the coin is that the scale of the events is such that it may have induced equally powerful transformation on the demographic constraints as well as in the regime of household preferences. The upshot is that, at least in the case of South Africa, luck is not abundant and we must resort to special procedures to produce informative inferences.

Multiple causal paths

Under some conditions, resolution of the preference-demographic constraint conundrum could lead directly to an equally baffling one, namely, to the inability to judge whether changes in demographic constraints (or in the regime of preferences) are attributable to one of two or more candidate events or causal factors. Again, let us deal with a simple example. Suppose we observe a shift from a regime where heads of households are predominantly males in their prime adult ages to one where heads are predominantly older adults. Suppose also that the society under study is one that, during the same period of time, experiences significant increases in adult mortality due to HIV/AIDS and large-scale labor force migration flows. Even if it were possible to assert that the observed changes in headship rates are largely attributable to demographic changes (as opposed to changes in preferences), how can we decide whether the changes are the product of migration patterns, HIV/AIDS or a combination of both? The point is moot if one is not interested in the investigation of the association between household transformation and the root cause of demographic changes. Yet, an important part of the literature on HIV/AIDS makes a powerful and believable claim about its relevance for many facets of social and economic life, including households and families. Hence, the issue cannot be ignored.

SOCIETAL TRANSFORMATIONS AND CHANGES IN FAMILIES, HOUSEHOLDS AND HEADSHIP PATTERNS IN SOUTH AFRICA

In this section we describe the most important transformations experienced by South Africa's society prior to and during the period under examination. The description is

necessarily sketchy, as our most important purpose is to identify in each case the expected change in the regimes of demographic forces and of household and headship preferences.

Apartheid and labor migration

Apartheid and its associated system of *separate development* imposed restrictions on spatial mobility, education, and employment of black South Africans, by forcibly resettling them to the homelands, four of which were made "independent states" in the 1960s and 1970s (Transkei, Bophuthatswana, Venda and Ciskei, or the TBVC states). This regime supported a migrant labor system, of circular character, which involved a large segment of the African adult population and affected almost every African household. Through the enforcement of influx control laws, African men working in the mining industries, on white farms, and in towns and cities were systematically denied the right to settle there with their families. Single sex hostels were built in all major cities to host rural African laborers. This system encouraged male out-migration but kept families divided by forcing heavy restrictions on residential changes of migrants' wives, children and elderly relatives (Murray 1980, 1987; Russell 1998). It transformed once undivided rural households into "stretched households", that is spatially divided units connected by kinship and remittances (Spiegel, Watson and Wilkinson 1996). After the collapse of apartheid and the reintegration into South Africa of the TBVC states, migration involved broader age groups as well as women (Posel and Casale 2002; Collinson et al. 2003). The intensification of migration resulted in the rapid peri-urbanization of formerly rural areas bordering large metropolitan areas and in the swelling of the population of black townships living in backyard shacks (Kinsella and Ferreira 1997; Spiegel et al. 1996; Percival and Homer-Dixon 1995). The intensification of migration flows coincided with the drying up of sources of labor absorption, particularly mining (Seidman 1997). Beside a shortage of urban housing, high rates of unemployment estimated between 25 and 60 percent (Cunningham et al. 1997) discouraged rural black South African families from settling permanently in urban areas and increased the circular character of migration and the degree of fluidity of rural households.

The relaxation of migratory restrictions in the early 1990s may have had a number of consequences for household structure and headship patterns. First, if migration flows under *apartheid* broke up families and households, with male migrants leaving behind their spouses to head households composed by mothers and children, the disintegration of this regime and the intensification of migration should translate into larger fractions of females migrating to join their husbands already at place of destination. This will result in a decline of female headed-households and an increase in nuclear households or households composed by husband and wife.

Second, under apartheid, exclusively male migration may have induced the merging of households headed by a young adult woman with those headed by elderly parents or parents-in-law, resulting in high prevalence of extended families and an older mean age of heads. The erosion of this regime and the process of family reunification that may have followed should tilt the age distribution of heads towards younger ages. Third, the lifting of migration restrictions may have not only encouraged family reunification but may have also intensified the stimulus for migration of different members of the household. This should triggered an increase in migration among younger (married and unmarried) males and females, and an overall increase in female migration, leading to a younger age distribution of household heads, a higher fraction of households composed of couples with no cohabiting children, a larger fraction of solitary households and of households made of grandparents and their young grandchildren ("skip-generation" households).

Finally, all three outcomes of reunification implicitly assume that this process did not have enough time to impact individuals' preferences. In fact, we have assumed throughout that the potential outcomes of reunification result from a mixture of preexisting preferences and additional freedom of movement.

The HIV/AIDS epidemic

With its 5 million cases (UNAIDS 2002), South Africa is currently the country with the largest number of people infected with the HIV/AIDS virus in the world. The rapidity with which the HIV virus has spread is exceptional. In less than a decade, adult HIV prevalence from antenatal surveys increased from 1 percent in 1990, 7.6 percent in 1994

to the current 26.5 percent (Department of Health 2003). The epidemic has so far taken a tragic toll, with a significant increase in mortality at young and mid-adult ages since the late 1980s, mainly attributable to AIDS, and an estimated 40% of adult deaths age 15-49 due to AIDS in year 2000 (Dorrington et al. 2001). The age patterns of mortality by sex are different, with women experiencing excess mortality due to AIDS in young adulthood at a later date than men, due to different sex-specific incidence curves and the dynamics of HIV transmission from males to females. Women, however, are rapidly catching up. Increasing evidence shows that women become infected at younger ages than men. Several community studies found the highest HIV prevalence rates among young African women between ages 20 and 24 (Coleman and Wilkinson 1997; Auvert et al. 2002), an indication of women's vulnerability to the risk of infection promoted by a generalized gender inequity in the face of the epidemic. Without treatment to prevent the progression from HIV to AIDS, Dorrington et al. (2001) estimated that the cumulative number of AIDS deaths is expected to reach between 5 and 7 million by 2010.

Most striking about the AIDS epidemic, especially if compared with other epidemic diseases in the African and Asian regions, is that it affects most severely the working age population, and children (Quinn et al. 1986). This age selectivity together with the disease's long period of incubation, which typically ranges from 7 to 10 years in Sub-Saharan Africa (Boerma et al. 1998), and the low probability of survival has serious consequences for social organizations that are equal if not more powerful than those observed for other diseases in Africa. Strategies adopted by households and families to cope with the depletion of human and material resources induced by HIV/AIDS may range from changes in household structure and patterns of living arrangements to reorganization of the division of labor in the domestic domain, shifts in norms regarding female, child and elderly labor force participation, and depletion of assets and cash reserves. The particular menu of adjusting strategies chosen will depend on the social group and some, though not all, of the changes in household structure introduced by HIV/AIDS could be reflected in observable shifts in living arrangements of children, women and the elderly, as a consequence of the excess mortality due to AIDS as well as the prolonged period of morbidity associated with it.

Four consequences for households and headship patterns should result from the spread of HIV/AIDS. First, the most direct consequence of excess mortality due to AIDS should be an increase of orphanhood and widowhood. Second, there should be an increase in skip-generation households in the areas most affected by the epidemic. This is because children of parents with HIV/AIDS or those whose parents have died could be taken into grandparents households. Other adjustments are of course possible, including fosterage to other relatives and also the rise of child headed households. Third, as widowhood rises, we may find marked increases in female headship rates.[2] Fourth, the number of extended households may increase and the age distribution of heads could become older if grandparents disproportionately take the burden of heading households with adult children affected by HIV/AIDS or, alternatively, younger and tilted toward females if the burden of the disease is deflected away from the older generation towards the female partners of people with AIDS.

Modernization and ideological shifts in family formation

Modernization theories have generally emphasized the roles of individual preferences and relegated the role of demographic factors to a secondary place. The most important insight offered by modernization theory is that as a result of economic transformation brought about by industrialization, the widespread establishment of wage labor, and the increasing influence of larger institutions associated with a central state, there is a decoupling of production and family division of labor. The family based economy is swept and displaced by wage labor and the advent of a strong linkage of most of its members to a labor market rather than to the family farm or craft shop. The traditional family relinquishes its role as the sole socialization agent and overseer of education of children. These two changes alone lead to an erosion of social control over family members and the weakening of emotional ties that sustain traditional adherence to a family and its patriarch. These transformations alter individuals' preferences for

[2] The extent to which this will happen will depend on widow remarriage practices as well as traditions regarding declaration of marital status within households. The widowhood impact of excess adult mortality will be masked in areas where remarriage is quick and swift. More cumbersome is the case when no remarriage occurs but widows are not recognized as such and confounded with other women whose spouse is absent. The increment of widowhood can also be offset by mortality of females due to AIDS. For all these reasons, we expect that widowhood measures will understate the impact if increased mortality.

household formation, residential arrangements, and allegiance to kin. First, the timing of marriage is left to individual choice and so is the selection of partner. This could lead to increases in ages at marriage and even to a decline in the prevalence of marriage in settings where arranged marriages were the rule. The need to migrate to hold a job may exacerbate the disruption in marriage patterns but lead to changes consistent with those suggested above. Second, the creation of a new household, as opposed to remaining in the parental home, becomes a preferred strategy among young adults. Extended households become a device to offset negative effects of exogenous conditions but not the preferred arrangement. The direct consequence of this is a reduction in the size of households, an increase in solitary households as well as an increase in headship rates at younger ages and especially among unmarried women.

Some of the transformations that erode traditional families have been present in African societies for a long time, particularly in the most urbanized areas. But the shift in preferences about marriage formation and dissolution and about household formation and dissolution could occur just as well in the absence of thorough changes in the economy. Indeed, the diffusion of a "western" ideal of family life can by itself propel changes as much as it does in the case of fertility. Thus, a shift toward later and less universal marriage, a move toward nuclear households or rising prevalence of young women living alone may spread in many areas, not necessarily according to the degree of economic transformations. A further complication is that the mixture of local traditions with the new ideas about marriage and households may lead to the adoption of very diverse transitional forms that are not quite predictable from traditional indicators such as degree of urbanization, industrialization, or the extent of central government influence.

At the very least we would expect that increased modernization in South Africa largest urban areas should lead to increases in age at marriage, probably a decrease in the fraction of women ever married and to a higher prevalence of nuclear households, and solitary households especially those headed by women.

The South African pension system

South Africa is an exception among African countries in its formal economic support for older citizens. Originally intended for white South Africans without employment pension, in early 1993 pension legislation was extended to all South Africans. Women age 60+ and men age 65+ are eligible for a means-tested general social pension. In the World Bank's1993 Living Standards Measurement Survey (LSMS), nearly 80% of age-qualified Africans reported receiving a social pension (Case and Deaton 1998). Similar to the effect of HIV/AIDS which may draw adult children back to their elderly parents' homes, pension sharing with an elderly relative may have become a reason for adult children to join their elderly parents' households and share the elderly pensions, especially in times of high unemployment. This should make households more extended and the age distribution of heads older.

These predictions are consistent with a particular type of reaction to the new pension system, namely, that adult children join the parental home. But this may not be the case. If elderly are the ones to join their adult children the age distribution of household heads would decrease together with an increase in the prevalence of three generation households.

As a summary of the previous discussion, Table 1 displays the conjectured changes in households and headship patterns and locates them according to two axes: the first is the causative social transformation at the origin of the change. The second is the dimension of the change, either in demographic conditions or in actual preferences and ideologies about families. We distinguish four demographic conditions that can exert pressure on households (fertility, mortality, health and migration), and two targets for individual preferences (timing of marriage and household extension).

The first and most important caveat is that, although it is theoretically feasible that all four events could change both preferences and demographic regimes, for our purposes only a few associations are justified. Thus, HIV/AIDS and the breakup of apartheid may, in the long run, affect marriage preferences and even the choices of household living arrangements. But their demographic effects are dominant in the short run and this is what we emphasize in our investigation. These problematic relations are flagged with a question mark ("?") in the table or with a qualification ("long run"). Second there are associations that could go in opposite directions. We do not know, for example, how the

patterns of headship will change as a result of the pension system. It may well be that the observed changes are contingent on the nature of preexisting conditions. Third and finally, the associations are not spatially uniform. Quite obviously we would expect the outcomes associated with HIV/AIDS to be more visible in areas most affected by HIV/AIDS. By the same token, some of the consequences of the break up of apartheid will be felt in areas experiencing heavy outflow of migrants and other consequences, perhaps of opposite nature, in areas experiencing heavy migration inflows. Similarly, we may find that comparable pressures in household configuration and headship can be exerted by more than one demographic condition, especially those triggered by HIV/AIDS or by the breakup of apartheid, thus complicating the identification of the effects of each condition.

DATA SOURCES

Our examination of patterns of change in household configuration and headship relies primarily on the analysis of a 10% sample of the 1991 census of the Republic of South Africa conducted under apartheid and 10 percent samples of the first two censuses conducted in post-apartheid South Africa in 1996 and 2001.

The 1991 census of the population of the Republic of South Africa (RSA) is well known for its *apartheid*-induced distortions in coverage which produced significant underenumeration especially in the self governing territories (SGTs), i.e. the six homelands which remained part of the RSA after "independence" was granted to the four TBVCs (Orkin 2000). Moreover, in many urban townships, informal settlements, and rural areas that fell into the SGTs, where residents were overwhelmingly African, mapping was not uniformly available and many areas were not demarcated into census enumeration areas. Teams of enumerators "swept" through some of these areas without prior demarcation or lists. In other areas, considered inaccessible due to political unrest or other reasons, dwellings were counted using aerial photographs, and population characteristics imputed using household densities obtained from sample surveys. In perhaps the most extreme demonstration of the impact of apartheid on official statistics, when areas covered by aerial photographs and sample surveys were found with an unexpected number of women (wives and children of male migrant workers were barred

from cohabiting with their husbands in areas of migration destination) women were reclassified as males. This resulted in the reclassification of 250,000 women in these areas (Orkin 2000). Even after various adjustments, the underenumeration of the black African population in the 1991 census was estimated at 17% (Zuberi and Khalfani 1999). The granting of "independence" to the TBVCs further complicates the comparability of data sources in the 1990s, because in 1991 the TBVCs conducted their own censuses. The TBVCs were reintegrated into South Africa between 1992 and 1993, and provincial boundaries redefined to yield nine provinces.

Both the 1996 and 2001 counted the whole South African population and standardized methodologies of data collection for all areas (Cronje and Budlender 2004). For the present analysis, we used the version of the 2001 census with imputed missing data. Statistics South Africa offers users of 2001 census data a combination of two kinds of imputations for the 2001 data: "logical" imputations, where "a consistent value is calculated or deduced from other information relating to the individual or household" and "hotdeck" imputations (Statistics South Africa 2001). We are not aware of any imputation of missing data undertaken to correct the 1996 census data we use.

Our focus on household dynamics restricts the analyses to the population enumerated in households and excludes the population living in hostels and institutions. 6.6% of the population enumerated in the 1991 census and 4% of the population enumerated in the 1996 census lived in hostels or institutions. The percentage of the 2001 population living in institutions was 1.37%.[3]

Issues of census comparability

There are several important issues related to our ability to compare censuses over time. First, the empirical geographic basis of the 1991 census is different from those of the 1996 and 2001 censuses. Whereas the 1996 and 2001 censuses covered the entire country, the 1991 census excluded the former TBVCs. Where needed, we were able to

[3] In the 1991 census, the population living in hostels and institutions was enumerated as individuals who, according to type of dwelling categorization, lived in hostels or retirement rooms. In the 1996 census, individuals living in hostels and institutions were administered an individual questionnaire, not a household questionnaire. We also excluded 32,973 cases (or 0.9% of the total 1996 census population) who were reported as living in households but who were administered an individual questionnaire. For these cases, relationship to household head was missing

use a version of the 1996 census subsetted to the same geographic areas as the 1991 RSA census, which excludes the population residing in the former TBVC states, and compare the 1991 census population with the 1996 population purged of the fraction of the population enumerated in the former TBVCs. Second., the definitions of what constitutes a household and a household head changed over time. A household in the 1991 census was defined as "a person or a group of persons (*whether related or not*) who usually occupy a dwelling or part thereof and who provide themselves with food and other essentials for living or have made arrangements for such provision" (Central Statistical Service 1991). Live-in domestic workers were classified alongside their employers' households as unrelated members. In the 1996 and 2001 censuses, a household is "a person or a group of persons who occupy a common dwelling and who provide themselves jointly with food and other essentials for living." Domestic workers are classified as separate households (Statistics South Africa 1998, 2004).

In the 1996 and 2001 censuses, the household head is defined as the person identified as such by him/herself or another household member. In the 1996 census, s/he is defined as "the person who assumes responsibility for decision-making in the household" without specifying responsibility for decision-making with respect to what (Statistics South Africa 1998). In the 2001 census, the head is defined as the "main decision maker who owned or rented the dwelling or the person who was the main breadwinner, as chosen by the household… If two people are equal decision-makers, or in a household of totally unrelated persons, the older or oldest can be named as the household head" (Statistics South Africa 2004). In both censuses, a person who assumes decision-making responsibility as the head of household in the absence of the designated head is regarded as the acting head. From the scarce documentation available for the 1991 census, it is less clear what a household head is.

All three data sets contain information on the relationship of each member to household head. But the number of relationships provided in each census varies. The 1991 census has the smallest number of relationships to household head (spouse, child,

other family, unrelated), with the most notable absence being the category of grandchild. The 1996 and 2001 censuses are richer in details.[4]

To increase our ability to capture a broader range of household types, we imputed the relationship of grandchildren of head in the 1991 census by estimating the proportion of "other family" who are grandchildren of head in a nationally representative survey conducted on a date close to 1991 and applying this proportion to 1991 data to obtain grandchild status.[5] We then degraded the 1996 and 2001 data by ignoring information unavailable in the 1991 census, so that, beside household head, the only relations to head used to construct household types were spouse, child, grandchild, other family, and unrelated.

Main indicators

Household types: The most important effects of massive migration flows and the full impact of HIV/AIDS will leave imprints on family relations, ties and organization. Household configurations are only one aspect of family life and, in many cases, perhaps not even the most important. However, with the available census data it is only possible to focus on households rather than kinship networks and families. Only those kinship relations realized within the physical boundaries of a residential dwelling, according to the census definition of household, can be satisfactorily captured. On the one hand, these are likely to miss much of the universe of kinship relations individuals participate in. On the other, changes and adjustments of residential arrangements, including

[4] The 1996 census question on relationship to household head includes Head/acting head of household, husband/wife/partner, Son/daughter/stepchild/adopted child, Brother/sister, Father/mother, Grandparent, Grandchild, Other relative (e.g. in-laws), Non-related person. In addition to these categories, the 2001 census has three additional categories for Parent-in-law, Son/daughter-in-law and Brother/sister-in-law.

[5] The closest data source to the 1991 census is the South Africa's Living Standard Measurement Survey (LSMS) conducted by the South Africa Labour and Development Research Unit at the University of Cape Town in association with the World Bank in 1993. The imputation procedure was carried out as follows: 1. We prepared a three-way table which cross-tabulates relation to head in 10-year age-categories with 10-year age of head categories in the 1993 LSMS data. 2. For age-of-relation to age-of-head cells where the proportion of grandchildren was greater than 80% in 1993 data, a 100% grandchildren status was imputed to 1991 data. 3. For cells where the proportion of grandchildren was between 10% and 80%, logit regression models were fitted to 1993 data with the binary dependent variable 0/1 for grandchildren, and sex, marital status and age as independent variables. The parameter estimates thus obtained were used to calculate the probability of being a grandchild in 1991. There probabilities were greater than 0.5, grandchild status was imputed. The success rate of imputation of grandchild status was evaluated by implementing this procedure based on 1993 data on 1996 census data where grandchild status is known. Success rate of imputation was 86.94%.

accommodation of non-family members and the establishment of non-kinship relations, are important ways in which an individual experiences the erosion of traditional family organization induced by the various forces under examination, and should be examined as such.

Although there are a number of compelling typologies of household configuration, we chose to define a set of classes or types that, in theory, should be uniquely sensitive to the phenomena under study. We distinguish the following classes or types

1. Solitary type, consisting of an individual living alone.
2. Couples consisting of an individual living with his or her spouse/partner, no children.
3. Incomplete nuclear households consisting of a single parent and his/her children
4. Nuclear households, consisting of parents and children.
5. Extended households, include three generations households.
6. Skipped generation households consisting of grandparents and grandchildren but no adult children, with or without any other family member
7. Complex households – any of the above with one or more non-related person.
8. Other – residual category.

The classification we adopt here is designed to captures real changes mainly associated with the impact of the epidemic and changes in migration flows. This is reflected in our use of the "skip-generation household" and the "incomplete nuclear household" two categories that are seldom used in conventional classifications of household types.

In this paper we follow conventional historical demography practice and focus on the distribution of total households by type rather than on the distribution of the population by type of households. While these metrics generally lead to similar conclusions, the latter is excessively sensitive to differences in fertility regimes that could mask or (artificially) reveal shifts in household regimes.

Age-specific headship rates: Headship rates are defined as the proportion of individuals in a given sex and age category who are designated as household heads. As we will show later, headship rates are analogous to prevalence rates and lead to similar interpretational difficulties. They are a function of the actual age-sex and composition

trait-specific headship rate and the population distribution by age, sex and other population composition characteristics.

RESULTS

The discussion of results is in two parts. In the first part, we examine evidence of effects of each of the four social events on the various outcomes of interest using findings from other researchers in the area. In the second part, we use data from the 1991, 1996 and 2001 censuses to assess changes in household types and headship rates and to explore potential mechanisms involved.

Findings from other research

Evidence for the effects of breakup of apartheid on household configuration:

Earlier studies of labor migration under apartheid already identified migration as a source of household fragmentation. Murray's (1980) examined evidence of the impact of migrant labor on household structure in the rural periphery of southern Africa from surveys conducted in Botswana, Lesotho and the TBVCs. His findings highlight diverse household composition and frequent shifts in household membership, often leading to the disintegration of nuclear households, conjugal instability, illegitimacy, and the rearing of children by grandparents and other kin. These changes, however, have not weakened the existence of extended households, consisting of three or more generation, only that they often include an unmarried daughter with her children. In a later study, Murray examines case studies from the same areas. He identifies female-headed households as a dominant form of living arrangement in migrant labor societies, and skipped generation households linked to "female absentees outside an extant conjugal relationship" (Murray 1987:243).

Spiegel's (1986) study of 30 households in a Transkei village in today's Eastern Cape Province finds that labor migration is often associated with the need to place dependents in fostering relationships. But another purpose of fostering, especially of a first born child, was to provide help, financial or with domestic tasks, to elderly relatives, especially maternal grandparents, an indication that skip-generation households are part of traditional residential arrangements. A 1977 census conducted in the same village

found that 34.4% of the 296 households in the village included one or more children whose fathers and mothers were not part of the domestic unit.

A 1992 household survey of three Transkei villages in Eastern Cape Province revealed that widespread male migration to industrial centers of South Africa has led to an increase in proportion of female headed household, often with a large number of dependents. Altogether, 62% of the 96 households in the survey were headed by women, with the following breakdown: 7% by never-married women, 21% by wives of migrants, and 34% by widows. The high incidence of widowhood was related to the large age difference between spouses and higher male mortality rates. Economic hardships often forced migrants' wives into migratory labor, leaving elderly women in charge of caring for their unmarried daughters and their sons' children (Siqwana-Ndulo 1998).

Summarizing evidence from recent studies and two qualitative surveys on the impact of labor migration on South African black households, Smit (2001) points to several forms of living arrangements triggered by the intensification of labor migration in the post-apartheid period. Female-headed households are identified as a prevalent form of household living arrangement, because wives of migrant workers remain in rural areas to protect the rights to land. They either live alone with their children in incomplete nuclear households, or are absorbed into the extended family. Once husbands are settled in urban areas, they may facilitate the migration of their wives mostly to participate in domestic service. Migration of both parents usually results in the formation of skipped-generation households in rural areas, where grandparents become responsible for the care of grandchildren, or less frequently in the fostering of these children by their father's brother, whom they will address as "father." Though apparently more rare, instances of children and their mothers joining their fathers in the cities are also cited.

Although most studies do not provide enough quantitative evidence to rank the prevalence of various types of living arrangements at any point in time, nor do they permit to contrast present and past patterns of household organization and headship, they are indicative of some of the main patterns of change we hypothesized as a consequence of the relaxation of migration restriction: Among these, reunification of husband and wife in migration receiving areas (less frequently with children), an increase in skipped

generation households, and a widespread prevalence of female headed households in migration sending areas.

Evidence for the effects of HIV/AIDS: With the exception of a few studies on the direct economic costs for individuals and households (Ainsworth and Over 1999), most research on the effects of the African epidemic on families and households focus on particular members of families, such as mothers or children, and on the impact of adult male deaths which raise widowhood and orphanhood. Studies on the impact of HIV/AIDS on widowhood have focused on traditional behaviors such as widow inheritance in exposing women to HIV infection, and the changes in such traditional arrangements due to the epidemics in Uganda (Mukiza-Gampere and Ntozi, 1995). Ntozi et al. (1999a) found that stigmatization of AIDS widows in Uganda influenced their movements upon the loss of their spouse. Less healthy widows were more likely to leave their late husbands' homes and seek care in their natal villages, while healthier AIDS widows were more likely to remarry or form new sexual partnerships.

Community studies provide evidence for the effects of the epidemic on household organization (Barnett and Blaikie 1992; Boerma et al. 1999; Ntozi and Zirimenya 1999; Urassa et al. 1997). In Uganda's Rakai district, two or three generations with at least one orphan, and individuals living alone were more common in AIDS-affected households than unaffected ones, and in a significant fraction of households containing AIDS victims, grandparents cared for orphans (Barnett and Blaikie 1992). The burden of AIDS mortality and morbidity for households is shared by household members in a strict hierarchy. In Uganda, care of AIDS orphans was left to the surviving parent, then to grandparents, followed by older orphans, step-parents or members of the extended family such as uncles. Paternal orphans were more likely to be fostered by uncles than cared for by their mothers, because children belong to their father's lineage (Ntozi et al. 1999b). Grandparents were the main care providers to AIDS orphans in a study in Zimbabwe (Foster et al. 1995). Data from the Kisesa community study show that terminally ill people travel back to rural homes in seek of care by the extended family (Urassa et al. 2001). Elderly parents are the most likely caregivers of their infected children because parents are the most sympathetic and are most likely to be informed of their children's AIDS diagnosis first (Ntozi 1997). Strikingly, similar patterns of caregiving were found

in Thailand (Knodel et al. 2001) where 27% of adults with "symptomatic" AIDS were cared for by a parent. Two-thirds of the adults who died of an AIDS-related disease had lived with or next to a parent by the terminal stage of illness, and a parent, usually the mother, had acted as a main caregiver for about half. For 70%, either a parent or other older-generation relative had provided at least some care. The vast majority of parents were aged 50 or more and many were 60 or older.

In South Africa, Merli and Palloni (forthcoming) find an increasingly strong association during the 1990s between the provincial level of HIV and the share of the elderly who live with a double-orphaned grandchild under 15 suggesting that the fall in the number of healthy children and the growing loss of children to AIDS experienced by South African elderly living in South African provinces badly hit by the HIV/AIDS epidemic may have increased the propensities of grandparents to take in their grandchildren to ease the burden on their sick adult children or to care for their orphaned grandchildren.

Changes in headship rates have been found to be a prominent household feature in areas heavily affected by the AIDS epidemic. In Uganda, Ntozi and Zirimenya (1999) found an increase in male-headed households and a corresponding decline in female-headed households between 1992 and 1995, a pattern that could be the result of the depletion of the pool of widows by remarriage. A very “untraditional” phenomenon, married women heading households, was no longer unusual, as “inherited” widows continued to stay in their late husbands’ homes or decided to marry one of their late husband’s relatives. The researchers also found a decline in the proportion of households headed by individuals in the age groups mostly affected by the AIDS epidemic and a corresponding increase in the proportion of households headed by the elderly.

These studies suggest that changes in household composition as a result of HIV/AIDS are contingent on the prevailing cultural and social environment. This is especially the case for widowhood. The joint death of parents leads to higher prevalence of orphanhood and therefore to either increased fosterage or higher prevalence of skip generation households and older headship rates. Thirdly, to the extent that illness of an adult head or his/head death prompts migration to join another household its effects is to increase extension of households and to age the age distribution of heads.

Evidence for the effects of modernization: Studies of labor migration under *apartheid* emphasize the role of apartheid policies in changing the economic function of Southern African households, from loci of agricultural production to bases for the reproduction of labor for South Africa's gold mines and industrial development (Marwick 1978; Martin and Beittel 1987). These findings are consistent with theories of modernization since they suggest that the influence of apartheid was to promote, in those areas most affected by it, a transition from traditional family arrangements to relations that are close to what would be observed in a society dominated by a modern family system. But there are other changes in the making that could be attributed the growing influence of modernization. For example, Hosegood and Preston-White (2002) uncover a shift toward a pattern of earlier initiation of unions. Using data from the African Center Demographic Information System, they show striking age patterns of marital and sexual partnerships: very high proportion of never married women and men by age 45-49, much higher than what is seen nationwide in South Africa or in neighboring countries, and a significant prevalence of widowhood already among young adults, and high proportion of non-marital partnerships, especially among young people and young women in particular.

One interpretation offered by the authors to account for this phenomenon links it to HIV/AIDS: establishing earlier conjugal partnerships is a way for young women to secure their boyfriends' sexual fidelity through co-residence thus shielding them from HIV infection. But other explanations include increasing cost of bridewealth and stronger agency played by young couples in marriage transactions and decision making. The latter can only take place if there is an ideological shift favoring individualism, a key dimension of modernization.

Evidence for the effects of pension system: Pension sharing within poor households is reported for Zulu communities in KwaZulu Natal communities. An inquiry conducted among 50 grandmothers in 1995 showed that the majority received state old-age pension. All grandmothers lived with extended families, most in three-generation households. Their pension was mainly used to cover their own and their co-resident household members' basic needs, most often those of grandchildren but also of unemployed adult children, or of unmarried daughters with children living in the same household (Møller and Sotshongaye 1996). Although this study does not directly

describe the process of adult children joining their elderly parents' households or viceversa with the purpose of pension sharing, its findings support the idea that pensions "act as a magnet for economically weaker family members who form multigenerational households around female pensioners" (Møller and Sotshongaye 1996:17).

Household types and female headship rates in South Africa: 1991-2001.

We first review changes in the distribution of households by type and identify drastic shifts in the direction of reduction of incomplete nuclear households, especially those headed by women, significant declines in nuclear households and modest increases in extended households and skip-generation households. Because changes in the distribution of households by type are more likely to be associated with changes in the distribution of female headed households, we next evaluate changes in female headship rates and model the probabilities of being a female head between 1991 and 2001 as a function of selected characteristics.

Configuration of households: Figures 1 and 2 display the distribution of households by type for all population groups and for Africans in 1991, 1996 and 2001, and separately for male and female heads. There are several important regularities in these figures. The first is that the change in the distribution of households by type is greater between 1991 and 1996 than between 1996 and 2001. The second is that incomplete nuclear household arrangements decrease sharply but much more so among females than among male heads. Indeed, most of the shift in the distribution of households over the 1990s is accounted for by reductions among incomplete nuclear households headed by women. The third is that temporal changes in household distributions are more marked among female-headed households than among male-headed households, and especially among African female heads. While the period between 1991 and 1996 is characterized by a large drop in incomplete nuclear households, a rise in skipped generation and extended households and of solitary households, most notable in the period between 1996 and 2001 is a rise in the prevalence of solitary households, and among Africans, a rise in couples with no cohabiting children.

Are these changes consistent with our expectations? At least some of the increase in solitary households between 1991 and 1996 can be explained by different definitions

of households in the two censuses, because domestic workers in 1991 were incorporated in the households of their employers. This is also mirrored by the decline in the prevalence of complex households. Most of the remaining changes are consistent with changes expected to follow the lifting of migration restrictions. Because we do not expect the effects of HIV/AIDS to be felt in the first intercensal period as the rise in AIDS mortality is likely to follow 1996 due to a long period of incubation between HIV infection and the onset of AIDS, the increases in skipped generation and extended households and the drop in nuclear households we observe in the first intercensal period are likely to be due to the lifting of migration restrictions.[6] Family reunification upon the lifting of migration restrictions may explain the large drop in incomplete nuclear households between 1991 and 1996. Further reduction in the prevalence of incomplete nuclear households headed by women and the increase in solitary households and households composed by couples with no cohabiting children observed in the 1996-2001 period are consistent with a rise in female migration in the latter half of the 1990s. There is little evidence from these data about how households adjusted to the rise in AIDS mortality. HIV/AIDS is likely to lead to the dissolution of nuclear households and the reinforcement of skipped generation and extended households. However, we observe very little if any change in the prevalence of these household types especially among Africans who are the fraction of the South African population hit hardest by the HIV/AIDS epidemic.

In sum, household distributions have shifted between 1991 and 1996 promoting a higher prevalence of skip-generation and extended households eroding the dominance of incomplete households headed by women. Although we found no increase in extended and skipped generation households during the latter part of the 1990s, the prevalence of incomplete nuclear households has continued to decline during this period, but it has been met by an increase in the proportion of women living alone. The bulk of all changes in household distribution by type are associated with changes among female heads and it is to these that we now turn.

[6] We also considered the possibility that these changes may be due to the different coverage of the 1991 and 1996 censuses. However, when we compared the distribution of households estimated in the 1996 census with that estimated from a version of the 1996 census purged of the TBVCs, the difference was too small for this coverage issue to explain the changes in household composition between 1991 and 1996.

Increase in female headship rates: Age specific female headship rate by year for all South African women and for black South African women are shown in Figures 3 and 4. These figures show an overall increase in female headship rates between 1991 and 2001. In each year, the rates increase steadily by age, reach a maximum at age 70 and then decline, while for African women, this decline starts at somewhat younger ages. While the increase with age is probably the result of changes in marital status and fewer opportunities to reside with children and other family members as age advances, the decline at the older ages is consistent with increased co-residence with adult children or other family members. This age pattern is consistent with those observed in other developing countries (Arias and Palloni 1999). The increase in female heads over time appears to be proportionately larger at younger and mid-adult ages than at older ages. This is surprising especially in light of the previous finding of changes in the distribution of households away from those that are traditionally headed by women, such as incomplete nuclear households.

What are then the mechanisms responsible for the observed increase in female headship rates between 1991 and 2001, and how are they related to the process of macrosocial transformations experienced by the South African population during this period?

The age specific headship rate is given by the following expression:

$$H(x,s,i,t) = \sum_{\forall i} C(x,s,i,t)\rho(x,s,i,t),$$

where C(x,s,i,t) is the age-trait specific distribution of the population of sex s at time t, ρ(x,s,i,t) is the age-traitspecific propensity of being a head and H(x,s,t) is the observed headship rate for people age x , of sex s at time t.

Changes in the overall female headship rates over time will be due to changes in the age-specific proportion of women with different traits i in different years and are driven by demographic changes and by changes in the age-trait-specific propensity of women to be female heads. For example, shifts in the distribution of the population by marital status occurs because of changes in rates of first marriage, changes in the proportion of women who live with their own spouses and changes in the proportion of women who live with their own children. But the attribution of the increase in female

headship rates to a shift in the distribution of population by marital status or a shift in marital-status specific propensities to be household head or both requires the identification of the type of compositional change involved. Female propensities to be head vary greatly by marital status. For example, increasing levels of divorce among women or lower rates of first marriage, both leading to increases in headship rates, may also reflect increasing propensities to lead a household. On the other hand, an increase in female headship due to increases in widowhood following a rise in male mortality implies change in the female population composition by marital status. But even when an increase in widowhood explains an increase in female headship, propensities to be a head, not composition may bring about such increase. Take the context of HIV/AIDS mortality: rising male mortality is expected to affect the proportion of women who are widowed and, other things being equal, to increase the proportion of women who are heads. However, stigma associated with HIV/AIDS may increase the propensity of widows to live alone, a departure from traditional living arrangements according to which widows remarry or rejoin their natal kin upon the loss of their spouse.

The distribution of female-headed households by type may decrease female headship rates if there is a shift away from households, such as incomplete nuclear households, where female headship is traditionally highest, as may be the case with family reunification following the lifting of migration restrictions in South Africa. But shifts in the distribution of female headed households may increase female headship rates if female migration increases the fraction of women living in solitary households. Similarly, an increase in female headship rates may be due to shifts in propensities of women to head their own households if, as a result of modernization, unmarried women leave the parental home prior to marriage to establish their own.

Changes in headship rates may also result from changes in the composition of the population by province of residence, e.g. shifts in the population distribution between predominantly rural provinces which are traditionally areas of outmigration and predominantly urban provinces which are typical destination of migrants from rural areas. Thus changes in headship rates may be induced by migration when women migrate to urban areas and become household heads. But changes in headship rates by province may also be associated with differential propensities to be a female head if rural-urban

migration brings about an erosion of the traditional economy that supports the patriarchal family system. Similarly education is expected to change ideologies about family formation rules, with preference for later marriage and nuclear living arrangements upon marriage among better educated women, while less educated women may be more likely to experience early childbearing and household headship.

Demographic factors responsible for changes in household headship are also expected to differ greatly by population group, with Africans bearing the brunt of the effects of migration and mortality induced by the disintegration of the apartheid system and the HIV/AIDS epidemic.

The decomposition of the growth of female headship rates in South Africa during the 1991-1996 period and the 1996-2001 period into a component due to shifts in population composition and a component due to shifts in propensities is carried out by formulation of a logit model which models the probabilities of being a female head as a function of age, marital status, education, province, population group and household type.

We decompose the overall growth in the headship rate within a multivariate regression framework and forgo alternative approaches such as the calculation of an indirectly standardized index of headship (Burch et al. 1987). The calculation of this index by each of the characteristics that we posit are associated with observed changes in female headship would have been too cumbersome.

Explaining the growth in the female headship rates in South Africa, 1991-2001.

Formulation of a logit model: Because the values of the headship rates correspond to probabilities attaining values within the (0,1) interval, we formulate a model for their logit transformation. The advantage of this is that the logit of the probability of being a head takes all the values between - ∞ and $+\infty$.

$$Logit Y_x = \alpha + \beta * Logit(z_x),$$

where $\text{Logit}Y_x$ is the logarithm of the ratio of the probability of being a head to the complement of this probability[7] and $\text{Logit}(z_x)$ is the logit of a chosen set of standard probabilities of being a head in the same age group. For the standard, we select the average of the age-specific headship rates in 1991, 1996 and 2001 census. This model can also be expressed as:

$$\text{logit } Y(x) = a + bx + \beta(\text{logit } z_x),$$
where $(a + bx)$ is α.

The parameters α and β change the level of the standard probabilities as follows: α is an indicator of the headship "level" affecting headship at all ages in the same direction. $\alpha > 0$ implies higher levels of headship. β represents the slope of the headship function. A value $\beta > 1$ leads to higher values of the probabilities of being a head at ages above the median (approximately) and to lower values at ages below the median. As the parameter decreases below 1 the reverse occurs. The covariates, x, are assumed to affect the value of α, not the value of β. Covariates included in this model are marital status, education, province of residence, population group and household type.

Models are fitted for all South African women ages 10 and older and separately for black South African women. For each of these two groups, we first fit models without controls for household type. When controls for household type are introduced, women in solitary households are excluded because solitary households predict the probability of being a head perfectly.

The effects of α and β on the standard female headship schedule, estimated from logit models with no other covariates are illustrated in Table 2.

Consistent with the growth in headship rates over time we observed in Figures 3 and 4, higher α values in later years imply increases in the level of headship over time among all South African women. β values above 1 in 1991 imply that the probability of being a head in 1991 is higher at ages above the median than at ages below the median, while in 1996 and 2001 this probability varies less by age. Among African women, a β

[7] This is identical to the formulation of Brass's logit system of mortality. However, the interpretation that we provide to the coefficients is subject to some inaccuracy because, unlike the probability of dying in a

equal to 0.89 in 1996 implies an age pattern of headship tilted towards ages below the median. Values of α are lower (i.e. lower levels of headship) in models which exclude women living alone because these are, by definition, household heads. Slightly higher values of β imply a somewhat older headship schedule relative to the standard and are consistent with the older headship schedule implied by the exclusion of women living alone, who are likely to be younger.

The heterogeneity of the β parameter across census years is in agreement with our expectations regarding the impact of the lifting of migration restrictions, which encouraged the adoption of household headship by women in a broader age range either because of their husband's migration or because of their own migration, as well as with our expectations regarding the effects of HIV/AIDS if the elderly assume the responsibility of caring for their sick children or their orphaned grandchildren.

Tables 3a and 3b display the regression coefficients for models fitted to all South African women for 1991, 1996 and 2001. These results reveal the following important patterns: First, in all three years, the coefficients for marital status are the largest and they are in the expected direction. Divorced, widowed and unmarried women are much more likely to be household head than married or cohabiting women. The second is that the probability of being a head is highest among African women. The third is that the effect of education is in the expected direction only in 1996 with more educated women less likely to be household head. In 1991 and 2001 the probability of being a head rises as education increases. Under apartheid, less educated women whose husbands were absent due to migration may have resided with their extended families, but by 2001, higher female education may have increased women's opportunities for migration and hence for household headship. The fourth pattern is the higher probability of being a head displayed by women living in Eastern Cape and Limpopo, two provinces which have been traditionally sending migrants to the urban centers of Western Cape and to the mines of Gauteng. Note however that in 1991, while the coefficient for Limpopo is very high, the one for Eastern Cape is not. Eastern Cape is the region of South Africa where two of the four former TBVCs, Transkei and Ciskei, are located. These results suffer from the limited coverage of this province population in the 1991 census.

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life table, the headship rate does not necessarily have an upper limit equal to 1.

In Table 3b, which controls for household type, the coefficients for household type are equal to or greater than the other coefficients, including those of marital status. The coefficient of women who head incomplete nuclear households is the largest, followed by women heading skipped generation households and less conventional types of households, which we have labeled "other."

We also run models for African women. The patterns emerging from the estimated coefficients for these models (not shown) are consistent with those observed for models fitted to all South African women, with the exception that the estimated coefficients of marital status are somewhat smaller in each year. This is due to the fact that contrasts with the reference category (married women) are not as stark among African women because of a larger fraction of married women who head households in the African population than in other population groups.

Decomposition of overall change in headship rates as a function of selected characteristics: We use logit models to decompose changes in headship rates over time and assess the relative contribution of the effects of changes in individual propensities and of changes in population composition to the overall change in headship rates between 1991 and 1996 and 1996 and 2001. To decompose the change between 1991 and 1996, we proceed as follows: We first substitute the coefficients of 1991 with those of 1996, and then we substitute the means of the logit of the standard age schedule of headship and of the dummies of the covariates in 1991 with those in 1996. We then repeat this operation substituting coefficients and means in 1996 with those of 1991.

Change over time is expressed as:

$$\{[P_3(a,b,c,d,e,f) - P_1(A,B,C,D,E,F)] + [P_2(A,B,C,D,E,F) - P_4(a,b,c,d,e,f)]\}/2 = \delta\text{-effects} + \varphi\text{-effects} + \mu\text{-effects},$$

where the δ-effects refer to the effects of changes over time in the composition of the population by marital status, education, province, population group, and household type, the φ-effects refer to the effects of changes over time in the estimated coefficients of marital status, education, province, population group, and household type, and the μ-effects refers to changes over time in the parameters α and β.

$P_1(A,B,C,D,E,F)$ and $P_3(a,b,c,d,e,f)$ express the probability to be a female head in 1991 and the probability to be a female head in 1991 standardized to reflect the population composition or propensities by age, education, marital status, province, population group and household type estimated in 1996. $P_2(A,B,C,D,E,F)$ and $P_4(a,b,c,d,e,f)$ express the probability to be a female head in 1996 and the probability to be a female head in 1996 standardized to reflect the population composition or propensities estimated in 1991, where $P_i = \frac{e^{\alpha+\sum\beta x}}{1+e^{\alpha+\sum\beta x}}$.

To assess the contribution of each single factor to the total difference in coefficients and to the total difference in means we let one factor vary at a time while keeping all others constant, so that:

$$\alpha\text{-effect} = \{[P_3(a,B,C,D,E,F) - P_1(A,B,C,D,E,F)]+[P_2(A,B,C,D,E,F) - P_4(a,B,C,D,E,F)]\}/2$$
$$\beta\text{-effect} = \{[P_3(A,b,C,D,E,F) - P_1(A,B,C,D,E,F)]+[P_2(A,B,C,D,E,F) - P_4(A,b,C,D,E,F)]\}/2,$$

where the α-effect is the effect for age and the β-effect is the effect for education. The effects of the other variables are similarly derived (Das Gupta 1993:29).[8]

Table 4 displays the results of the decomposition carried out for all South African women, with models without and with controls for household type. The top panel shows results for the 1991-1996 decomposition and the bottom panel shows results for the 1996-2001 decomposition. Table 5 shows corresponding results of the decomposition carried out for African women only. In each table, composition effects are listed in the left-hand panel and propensity effects are listed in the right-hand panel. The first column of each panel lists the percentage contribution to the overall change in headship rates due to composition or propensity effects, while the remaining columns show the size of the contribution of composition and propensities by each of the variables in the models.[9] Among the propensity effects, we also estimate the effect of the intercept, which reflects

[8] A similar decomposition approach was carried out by Arias and Palloni (1999) to explain the changes in female headship rates in Latin America, with the difference that they only estimated $P_1(A,B,C,D,E,F)$ and $P_3(a,b,c,d,e,f)$.

[9] The contribution of composition or of propensities by each of the variables in the model do not sum up to the total difference. The generally small residuals represent the interaction effects between composition and propensities.

propensities to be head a function of unobservable factors which we cannot measure and account for in the models and are reflected in the reference categories of the dummy variables in the models.

From Table 4 it is clear that the contribution of propensity effects to the overall increase in the headship rate in both periods dwarf the contribution of composition effects. For the 1991-1996 period, we estimate that about 80% of the total increase in overall female headship experienced by all South African women is attributable to propensity effects while the remaining 20 percent is attributable to composition effects. The size of the composition effects is remarkably smaller than that of propensity effects. Propensity to be head is strongly and positively affected by population group, while education, provincial residence and to a lesser degree marital status reduce the propensity to be head. This is consistent with the change in size and sign of the coefficients in Tables 3a. Apartheid kept men separated from their rural families and the contrast between outmigration and immigration provinces in terms of female headship probabilities was starker in 1991 than in 1996. With the introduction of controls for household type (second row of top panels), the overall increase in propensity to be head is reduced by propensities by household type, and the effect of province diminishes. This finding is consistent with the shift between 1991 and 1996 away from households traditionally headed by women, especially incomplete nuclear households, a type of living arrangement more frequent in areas of outmigration. The size and the sign of the effect of the intercept suggest that propensities by unobservable factors contribute importantly and positively to the increase in propensity to be household head.

The results of the decomposition of changes between 1996 and 2001 indicate a somewhat greater role played by changes in population composition: 66 percent of the increase in female headship rates between 1996 and 2001 is contributed by increases in propensities, the remaining 36 is due to population composition. Compared with the composition effects estimated for the second half of the 1990s, education more strongly affects the increase in female headship due to changes in composition. Propensities by education also affect positively propensities to be head. This is consistent with increased educational opportunities for all women in the post-apartheid period and increased opportunities for female migration.

These results reveal a strong effect of propensities by population group on the increase in the probability of being a head. Table 5 shows results of the decomposition carried out for African women. The top left panel shows that between 1991 and 1996, keeping propensities constant, changes in population distribution alone would reduce the female headship rates by 17 percent. The contribution of composition effects has turned more negative after the exclusion of women living alone, because this implies the exclusion of a fraction of household heads. Compositions by marital status and by household type are responsible for the negative contribution of composition effects to the overall change in female headship. We suspect that the negative effect of marital status is related to an anomalously low level of widowhood in the 1996 census relative to the 1991 census, especially among African women.[10] The contribution of propensity by marital status is positive, however, suggesting increasing propensities to head households by marital status between 1991 and 1996. The propensity to head is strongly and negatively affected by province, but this effect is dampened by the introduction of controls for household type, pointing at the lower propensity to be head implied by the decline in female-headed incomplete nuclear households as experienced by African women living in provinces of out-migration. Most striking among the effects of propensities to head households between 1991 and 1996 is the effect of the unobservable factors summarized by the intercept. These unobservable factors are African women's main route towards increases in female headship between 1991 and 1996. Their effect is strengthened in models which exclude women living in solitary households, an implication that propensities to head households by unobservable factors pertain especially to women who head other types of household.[11]

During the period 1996-2001, 65% of the increase in headship rates among black South African women is due to changes in propensities, while the remaining is due to changes in composition. Increases in propensities by marital status significantly

[10] Levels of widowhood are particularly low in the 1996 censuses, lower than in 1991. This low level of widowhood in the 1996 census is surprising because the HIV/AIDS epidemic was more advanced in 1996 than in 1991. We doubt the quality of the 1996 census data on marital status. A comparison of the female age-specific widowhood rates estimated from the 1991 census, 1996 census, and the 1996, 1997, and 1998 October Household Surveys has shown lower widowhood rates in 1996 than in any of the other data sources, leading us to suspect underreporting of widowhood in the 1996 census.

[11] The magnitude of these effects did not change when we carried out the decomposition with the version of the 1996 census reduced by the absence of the population of the former TBVCs.

contribute to the overall increase in propensities in the latter half of the 1990s, even after controlling for household type. We have previously posited that the burden of HIV/AIDS mortality and morbidity borne by women may drive up female headship as women are widowed by AIDS or because they are left with the care of their sick spouse/partner. Similarly, modernization may induce young unmarried women to establish their own separate households because of individual preference for this type of living arrangements. Finally, migration may increase African women's propensities to head households by marital status in the following ways: it may encourage migration of unmarried women to urban areas or it may leave the responsibility to head households to married women whose husbands have migrated. Although the effect of propensities by unobservable factors on the overall increase in female headship rates is not as large as in the period between 1991-1996 among African women, in the latter half of the 1990s, it is comparable or greater in size than the effect of marital status, depending on whether or not we control for household type in the model.

DISCUSSION AND CONCLUSIONS

We have described changes in the distribution of households by type and the growth in female headship rates in South Africa over the 1990s using three consecutive censuses conducted before and after major macrosocial transformations engulfed South African society: the end of apartheid and the onset of the HIV/AIDS epidemic. The scale of these events, together with forces of modernization and the indirect effect of welfare policies directed at improving the well-being of the elderly must have transformed the social landscape of South African families and households and induced specific adaptations in terms of observable changes in residential arrangements and headship patterns. To interpret these changes we have formulated a simple framework which associates them with large-scale societal transformations. With this framework we have hypothesized the direction of changes in the distribution of households by type as well as in age and gender patterns of household headship and have drawn a distinction between various dimensions of change, namely demographic conditions and individual preferences and ideologies about families and households. Using data from three South African censuses taken five years apart, our description of trends and patterns of household configuration and

headship has focused on two periods, the 1991-1996 period and the 1996-2001 period. The post-apartheid lifting of migration restrictions has likely shaped changes in living arrangements during both periods. However, although HIV/AIDS morbidity may have induced special accommodations already by the middle of the 1990s, it is in the second half of the 1990s that we expect the full impact of AIDS mortality.

The first notable finding from the description of changes over time in the distribution of households is a decline in incomplete nuclear households, a type of household traditionally headed by women, an increase in the prevalence of solitary households, a drop in extended and skip-generation households. The bulk of these changes have occurred in the first half of the 1990s, though the decline in incomplete nuclear households and the increase in solitary households have continued through the latter part of the 1900s, especially among women. All these changes are consistent with our posited effect of the lifting of migration restriction with the demise of apartheid and only partially with the onslaught of HIV/AIDS. The second main finding is an increase in female headship rates at all ages over the 1990s, but especially at young and mid-adult ages which has occurred despite the shift away from household traditionally headed by women.

The decomposition carried out to assess the contribution of demographic composition and propensities to shifts in female headship rates has shown that propensities effects dwarf population composition effects. The bulk of these changes in all cases are associated with shifts in status-specific female headship rates not to changes in the composition of women by status. Thus, for example, the increase in overall female headship rates between 1996 and 2001 is not a function of changes in the distribution of women by marital status as much as it is the result of the increase in marital-status specific female headship rates. Paradoxically, South African women's route towards increases in female headship between 1991 and 1996 and to a lesser extent between 1996 and 2001 consist in part of a departure from a propensity to head incomplete nuclear households to greater propensities to head other types of households, and, especially among Africa women, of greater propensities for female headship by unobservable factors that could not be accounted for in our models. . The increase in propensity for female headship by unobservable factor pertains especially, but is not limited to, female

heads living with other household members. These changes are consistent with the intensification of migratory flows over the course of 1990s, if women, because of migration of their husbands or partners, are left to head households and take care of dependents, or if they themselves become migrants taking advantage of the lifting of migration restrictions in the post-apartheid era.

The nature of the shifts in female headship in the latter half of the 1990s could be consistent with household responses to the HIV/AIDS epidemic, especially since marital status explains a significant fraction of the increase in propensities for female headship, a pattern consistent with increases in widowhood, or women left with the care of their sick partner. However, even after identifying the role played by propensity by marital status, we find that comparable pressures in household headship that could be exerted by HIV/AIDS could also be the outcome of migration which increases male temporary absences or of young women's earlier separation from the parental home induced by modernization. These alternative explanations complicate the identification of the effect of HIV/AIDS as distinct from those of other conditions.[12]

The solution to the problem of identification of causal pathways hinges on having access to richer and better information such as longitudinal studies which allow the estimation of less ambiguous indicators of behaviors and communities. Conventional sources, such as censuses, reduce the analytical options to a handful of indicators that can only sustain weak inferences. In the absence of more appropriate data sources, future steps towards maximizing the use of census data for the purpose of identifying the effects of HIV/AIDS and of migration on household configuration and headship patterns will include the use of province as a piece of identifying information. There is a great variation among South African provinces in terms of prevalence of HIV and intensity and direction of migratory flows. The advantage of census data is that they are uniquely suited to accommodate the performance of decomposition by sub-national unit without loss of statistical power.

[12] In future analyses, we may be able to gain further insights on the attribution of changes in propensity by marital status to a given macro-social transformation by further decomposing the trait-specific propensity effect into the effect of each dummy. This procedure can be used to identify the composition and/or propensity effects of the dummies of any of the variables which display the largest effects.

In future analyses we will also assess the extent to which our results are influenced by the exclusion from each census of people living in hostels and institutions by re-classifying and reincorporating these observations into each census as individuals living alone. This reclassification is likely to affect most significantly the distribution of household types in the 1991 census, especially that of male-headed households. We will also assess the sensitivity of our results to the imputation of missing data in the 2001 census by utilizing a version of the 2001 census unadjusted for missing data.

One important implication of the findings from the present analysis is that the scale of the transformations that have engulfed South African society during the 1990s was so potent that, in only a decade-time, it has induced a revolution in preferences and ideologies about family relations and obligations, household configuration and headship, by far faster that the gradual shift in the distribution of household brought about but the process of modernization in other historical and contemporary societies.

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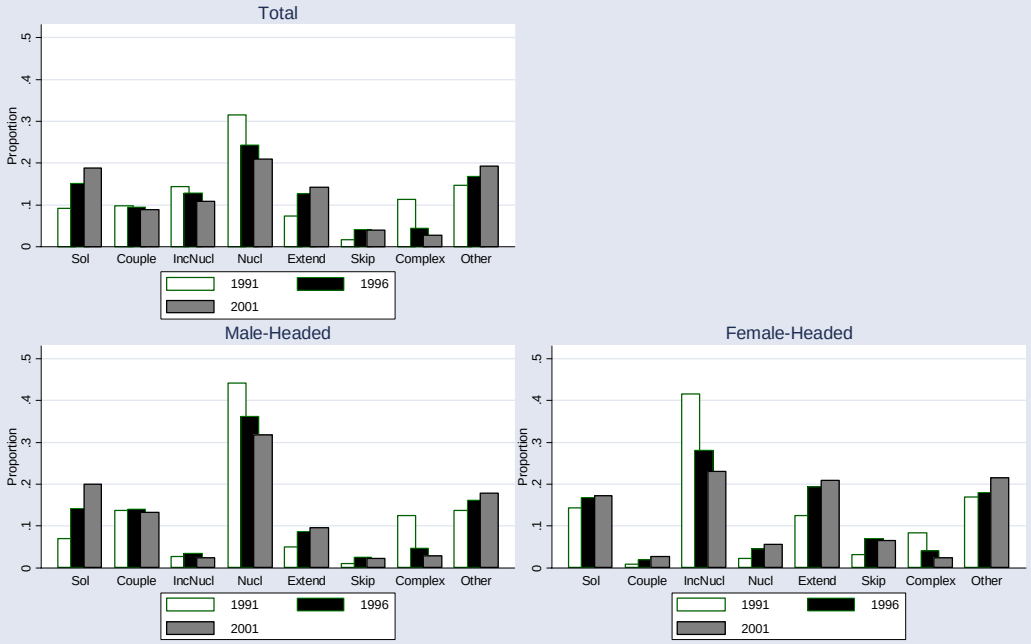
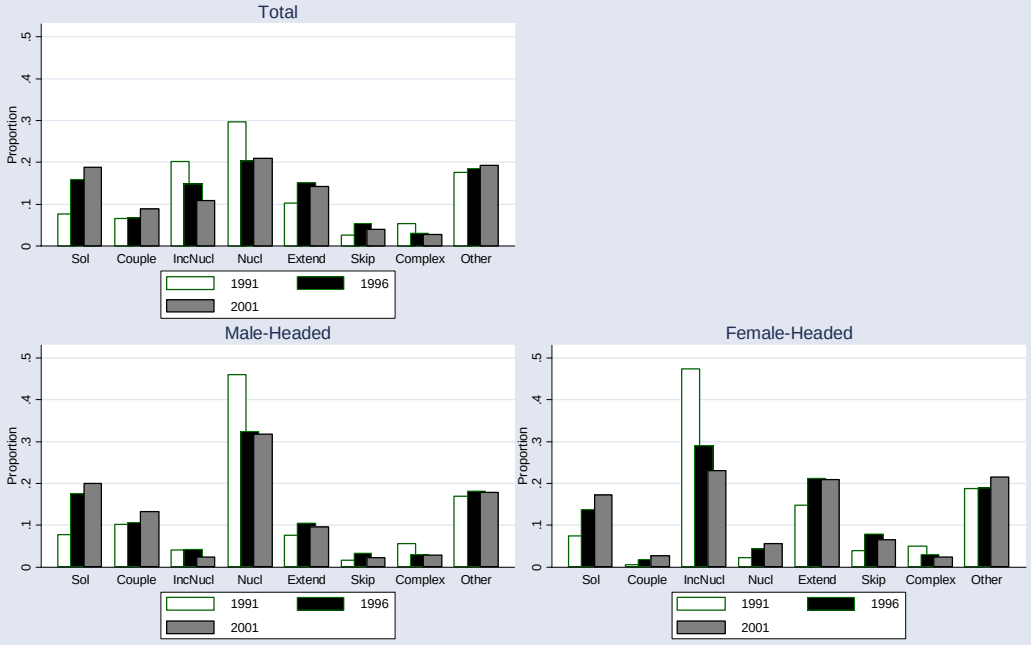
Figure 1. Distribution of households by type, 1991-2001. South Africa, all population groups.



Sources: RSA 1991 census; SA 1996 census, 10% sample; SA 2001 census, 10% sample

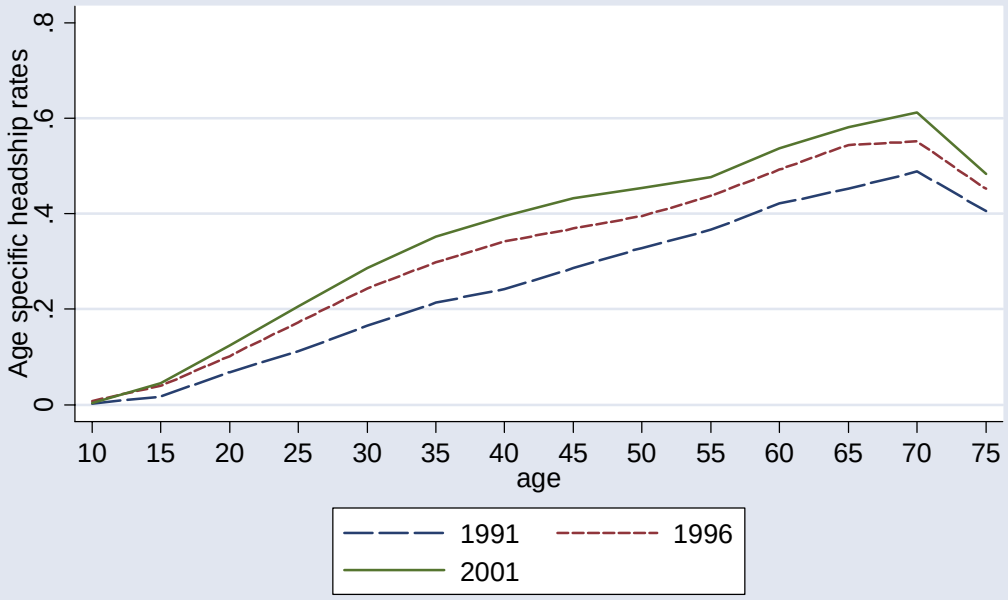
Figure 2. Distribution of households by type, 1991-2001. South Africa, Africans.



Sources: RSA 1991 census; SA 1996 census, 10% sample; SA 2001 census, 10% sample

Figure 3. Female age-specific headship rates,1991-2001

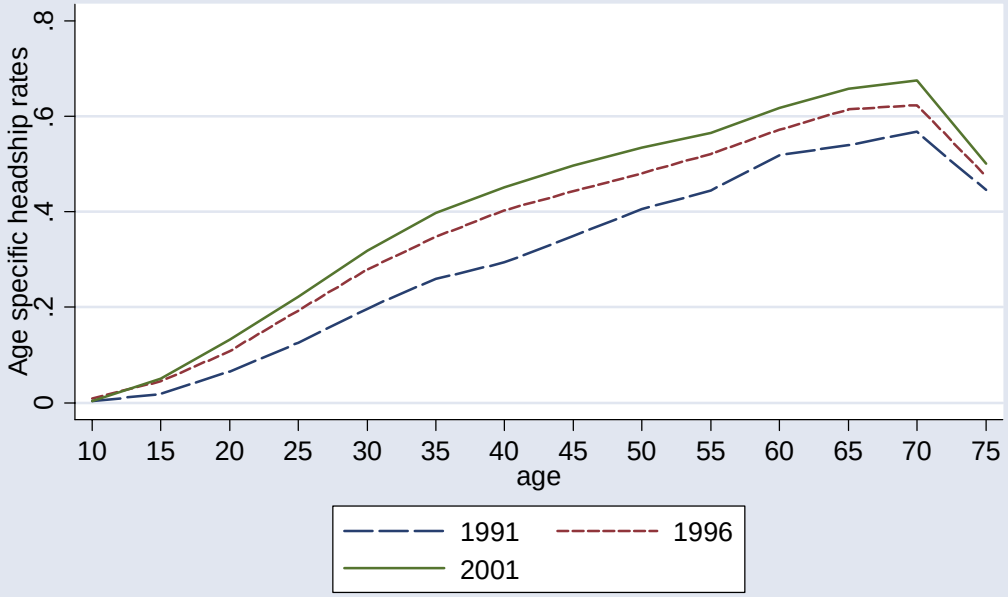
South Africa, All Women



Source: RSA 1991 census; SA 1996 census, 10%sample; SA 2001, 10% sample

Figure 4. Female age-specific headship rates,1991-2001

South Africa, African Women



Source: RSA 1991 census; SA 1996 census, 10%sample; SA 2001, 10% sample

Table 1. Hypothetical relation between social transformations and changes in demographic regimes and preferences								
	Social Transformation							
	End of apartheid and lifting of migration restrictions		**HIV/AIDS**		**Modernization**		**Pension System**	
	Household (HH) type	***Headship patterns***	***HH type***	***Female headship***	***HH type***	***Female headship***	***HH type***	***Female headship***
Dimension of change								
I. Demographic								
Migration	Less extended hh; More hh formed by couples with no children; More solitary hh; More skip-gen hh.	Younger heads; Fewer female heads.						
Fertility			Long-run		Long run		?	
Mortality			More orphans; More widows; More skip-gen hh;	More fem heads (younger heads); Older heads.	Long run		?	
Health status	?	?	More extended households	Older heads	Long run		?	
II. Preferences								
Household extension	?	?	?		Less ext'ed hh	Younger heads	More ext'ed hh	Older/ younger heads
Later/less marriage	?	?	?		More solitary hh	More and younger female heads	?	
A question mark (?) indicates we have no basis to make a prediction for the associated outcome and event								

Table 2. Effect of alpha and beta on standard schedule of female headship. South Africa, 1991-2001.

	Models which do not control for household type					
	All women			African women		
	1991	**1996**	**2001**	**1991**	**1996**	**2001**
alpha	-0.25	0.05	0.30	-0.30	-0.06	0.24
beta	1.12	0.98	1.02	1.09	0.89	0.99

	Models which control for household type					
	All women			African women		
	1991	**1996**	**2001**	**1991**	**1996**	**2001**
alpha	-0.39	-0.10	0.16	-0.36	-0.19	0.11
beta	1.14	1.02	1.08	1.14	0.94	1.05

Sources: 1991 RSA census, 10% sample. 1996 South Africa census, 10% sample. 2001 South Africa census, 10% sample.

Table 3A: Estimated coefficients from a logit model predicting female headship. South Africa, all women.

	1991		1996		2001	
Variable	*b*	*se*	*b*	*se*	*b*	*se*
Logit (std)	.971**	.013	.958**	.003	1.029**	.003
Primary	.089**	.031	-.006	.007	.066**	.007
Middle	-.026	.037	-.026**	.008	.018*	.007
High school	.565**	.055	-.020*	.009	-.017*	.008
Tertiary	.221**	.069	-.036**	.007	.239**	.010
(No education)						
Unmarried	.552**	.034	.592**	.006	.769**	.006
Divorced	2.47**	.047	2.237**	.012	2.130**	.012
Widowed	2.27**	.034	2.05**	.009	1.979**	.008
(Married)						
Eastern Cape	.038	.060	.333**	.011	.102**	.010
Northern Cape	.093	.062	-.084**	.019	-.025	.018
Free State	-.076	.081	-.191**	.014	-.165**	.013
KwaZulu Natal	.546**	.055	-.052**	.011	-.089**	.010
North West	-.195	.124	-.099**	.013	-.154**	.012
Gauteng	-.266**	.050	-.176**	.011	-.018	.010
Mpumalanga	.238**	.052	-.033*	.014	-.019	.012
Limpopo	1.190**	.052	.374**	.012	.238**	.011
(WesternCape)						
African	.491**	.036	1.069**	.009	1.008**	.009
Coloured	.075**	.034	.2028**	.013	.216**	.012
Indian	-.951**	.040	-.416**	.019	-.279**	.019
(White)						
Intercept	-1.690**	.051	-1.350**	.013	-1.131**	.012

Note: **p<0.01, * p<0.05

Table 3B: Estimated coefficients from a logit model predicting female headship. South Africa, all women

	1991		1996		2001	
Variable	*b*	*se*	*b*	*se*	*b*	*se*
Logit (std)	1.122**	.017	1.019**	.0039	1.100**	.0035
Primary	.122**	.036	-.003	.0085	.054**	.007
Middle	-.005	.045	-.027**	.008	.040**	.0075
High school	.610**	.07	.001	.0102	-.027**	.009
Tertiary	.128	.081	-.027**	.0083	.176**	.0118
(No education)						
Unmarried	-.582**	.045	-.184**	.0076	-.041**	.0067
Divorced	1.520**	.055	1.430**	.0137	1.268**	.0126
Widowed	1.427**	.039	1.427**	.0097	1.429**	.009
(Married)						
Eastern Cape	-.006	.079	.297**	.0138	.152**	.0122
Northern Cape	.080	.076	-.017	.0228	.039	.0204
Free State	-.112	.098	-.174**	.016	-.068**	.0150
KwaZulu Natal	.373**	.071	-.024	.0139	.032*	.0123
North West	-.039	.197	.048**	.015	.032*	.0139
Gauteng	-.189**	.072	-.145**	.0141	.058**	.0121
Mpumalanga	.238**	.069	.057**	.0165	.109**	.0145
Limpopo	.878**	.069	.307**	.0149	.247**	.0134
(WesternCape)						
African	.619**	.045	1.401**	.012	1.279**	.0124
Coloured	.484**	.046	.771**	.0165	.696**	.0154
Indian	-.581**	.047	-.048	.0240	-.043	.0234
(White)						
Couple	.371**	.13	.348**	.0168	.231**	.0140
Incomp nuclear	4.696**	.10	3.422**	.0110	3.178**	.0098
Extended	2.215**	.111	1.050**	.0105	.498**	.0091
Skipped	2.475**	.131	1.547**	.0140	.961**	.0121
Complex	1.937**	.108	1.280**	.0150	.838*	.0161
Other	2.174**	.111	1.370**	.0111	1.155**	.0094
(Nuclear)						
Intercept	-3.71**	.132	-2.840**	.0188	-2.182**	.0174

Note: **p<0.01, * p<0.05

Table 4. Decomposition of changes in the estimated probability of female headship. South Africa, 1991-1996 and 1996-2001: All population groups

1991-1996 period

Composition Effects								Propensity Effects								
Percent due to effect	Total diff.	Age	Education	Marital	Province	Pop Group	HH Type	Percent due to effect	Tot diff	Intercept	Age	Education	Marital	Province	Pop Group	HH Type
20.6	1.1	0.2	0.3	-0.5	-0.3	1.1		**79.4**	4.2	3.8	0.1	-1.4	-0.3	-2.7	4.8	
10.3	0.5	0.4	0.2	-0.6	-0.2	0.9	-0.8	**89.7**	4.1	6.7	0.8	-1.0	0.9	-1.3	5.0	-7.1

1996-2001 period

Composition Effects								Propensity Effects								
Percent due to effect	Total diff.	Age	Education	Marital	Province	Pop Group	HH Type	Percent due to effect	T.D.	Intercept	Age	Education	Marital	Province	Pop Group	HH Type
34.3	1.3	1.0	-0.3	0.2	-0.1	0.2		**65.7**	2.5	2.8	-1.0	1.0	0.8	-0.4	-0.6	
23.4	0.8	1.1	-0.2	0.1	-0.1	0.1	-0.7	**76.6**	2.7	6.5	-0.8	0.6	0.4	0.2	-1.1	-3.2

Sources: 1991 census; 1996 census, 10% sample; 2001 census, 10% sample.

Table 5. Decomposition of changes in the estimated probability of female headship. South Africa, 1991-1996 and 1996-2001: Africans

1991-1996

Composition Effects							Propensity Effects							
Percent due to effect	Total diff.	Age	Education	Marital	Province	Hh type	**Percent due to effect**	Total diff.	Intercept	Age	Education	Marital	Province	HH Type
-17.1	-0.8	0.4	0.1	-0.8	-1.1		**117.1**	5.7	11.7	0.4	-1.8	0.9	-5.2	
-38.0	-1.5	0.5	0.0	-0.8	-0.5	-1.4	**138.0**	5.4	13.8	1.0	-1.3	1.7	-1.7	-8.7

1996-2001

Composition Effects							Propensity Effects							
Percent due to effect	Total diff.	Age	Education	Marital	Province	Hh type	**Percent due to effect**	Total diff.	Intercept	Age	Education	Marital	Province	HH Type
34.9	1.3	1.0	-0.2	0.1	-0.1		**65.1**	2.5	1.7	-1.2	1.2	1.9	-1.1	
25.1	0.8	1.1	0.0	0.1	-0.1	-0.6	**74.9**	2.5	4.6	-1.0	0.8	1.2	-0.1	-3.0

Sources: 1991 census; 1996 census, 10% sample; 2001 census, 10% sample.