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# **Household formation and service delivery in post-apartheid South Africa: Evidence from the Agincourt sub-district 1992-2012**

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## **Abstract**

South Africa has seen a rapid rate of new household formation since 1994. The same period has also seen an impressive roll-out of housing and services. These interact since new household formation delays the elimination of backlogs. Based on data from the Agincourt study site and a novel decomposition technique we suggest that service delivery may actually fuel new household formation.

*Key words:* South Africa, Agincourt, household formation, RDP housing

*JEL codes:* C42, D19, I38

# 1 Introduction

The end of apartheid led to changes on many fronts: economic, social and political. Discriminatory measures were repealed and there was a major expansion of services to people and areas that had previously been deprived of them (Bhorat and van der Westhuizen 2013, Dinkelman 2011, Gaunt 2005). One of the changes that has attracted less attention was a sustained burst of household formation, which led to a marked reduction in average household size. Wittenberg, Collinson and Harris (2017) point out that new household formation and service delivery interact in complicated ways. They argue that new household formation undercut the ability of the service delivery roll-out to meet its targets; backlogs were not eliminated as fast as they otherwise would have been, or as Harris, Collinson and Wittenberg (2017) put it, service delivery was chasing a “moving target”. The mechanisms by which average household size has come down have, however, not been adequately explored in South Africa. Many different social processes are likely to bear on it: demographic ones such as mortality, fertility and age of childbearing (Burch 1970), but also social and economic processes that affect the affordability and desirability of living alone (Börsch-Supan 1986, Ermisch and Salvo 1997, Haurin, Hendershott and Kim 1993). Household size can be seen as prism through which these social processes are refracted.

Because of these complex interactions one needs rich data to pick some of these processes apart. At the national level we know of no dataset that spans the postapartheid period that would enable us to do so. We do, however, have an extraordinarily rich data source that allows us to analyse these changes in detail in a local area. The MRC/Wits Rural Public Health and Health Transitions Research Unit (Agincourt) has been collecting information on all households and individuals in a rural area in the east of South Africa since 1992. The data from this Health and Demographic Surveillance System site (HDSS) enables us to go beyond the broad national changes to examine how the process of household size reduction has worked in detail. So while household size is the prism through which broader social developments are refracted, the MRC/Wits Agincourt HDSS provides the spectroscope through which we can isolate some of the component processes. In particular we will explore how household size reduction has occurred in different sub-populations of the study site. We will suggest that in fact service delivery, in particular housing construction under South Africa’s Reconstruction and Development Programme (RDP), has encouraged new household formation. So, ironically, successful service delivery has undercut the ability of the development programmes to eliminate the backlogs.

The contribution of this paper are fourfold. Firstly we provide new evidence on the process by which household size has come down. Secondly, we adapt a decomposition presented by Wittenberg et al. (2017) to deal with subpopulations. This

methodological contribution is likely to be of interest in other contexts. Thirdly we show how local processes and local data can be triangulated with national evidence to provide new insights on broader developments. Finally we highlight the way that service delivery seems to have fed back to household formation – a connection that, as far as we are aware, has not been mentioned in the literature thus far.

The plan of this discussion is as follows. In the next section, we briefly review some of the literature that has examined South Africa’s national data. Section 3 describes the data that we use in more detail. We describe our broad approach in Section 4, leaving the technical details to an appendix. Section 5 provides the results of our analysis. We provide an interpretation of these trends in Section 6. We conclude by reflecting on what these local processes may suggest about national developments and their implication for policy.

## **2 Household change and services in South Africa**

### **2.1 Households and household size**

Wittenberg et al. (2017) discuss the literature dealing with households and household change in South Africa. Much of it has focused on the question whether South African households are becoming more nuclear or “westernised” (Ziehl 2001, Amoateng and Kalule-Sabiti 2008). Some of the literature (Russell 2003b, Russell 2003a) has queried whether the instruments used in measuring household size (the census or sample surveys) adequately cover the complexity of the social connections between people. The problem lies, in particular, with the fact that social surveys tend to take a snap shot of where people are located at a point in time and do not indicate that people tend to move between households and locations. Posel, Fairburn and Lund (2006) point out the importance of such rural-urban linkages in the context of analysing employment and migration behaviour.

Wittenberg et al. (2017) contend that despite the problems, the available data still allow for a meaningful analysis of changes in the country, particularly when data from demographic surveillance sites is used where the definition of membership is arguably more appropriate. They show that household size decreased by about one full member between 1994 and 2012 and suggest that much of this happened at the point where households leave one location and before they set up at another. While they make the case that the reduction in household size is a real phenomenon, they do not discuss why this might have happened.

There are several candidate explanations. The increased mortality associated with the HIV epidemic or the decrease in the fertility rate (Moultrie and McGrath 2007) would all be expected to produce declines in the average household size in the

long run. Nevertheless the mechanism by which this process would work would not be the one in which new household formation outstrips the population growth rate, which is the pattern that Wittenberg et al. (2017) find in their analysis. Instead, as we argue below, deaths and births are processes that are likely to reduce the household size of existing households, not prompt the formation of new ones. Furthermore a rapid rate of household formation is puzzling given that economic conditions in the late 1990s were arguably tough. Economic approaches to the analysis of the household emphasise that the decision to set up an independent household would tend to go up with income (Börsch-Supan 1986, Ermisch and Salvo 1997, Haurin et al. 1993). In tough economic conditions the reverse would occur: dependent children will delay moving out of the parental home, or might even move back. Indeed one strand of the South African labour literature has argued that unemployment has led to higher levels of co-residence with pensioners than might otherwise have been the case for these sorts of reasons (Klasen and Woolard 2009).

Given these difficulties it is important not only to produce analyses that can confirm what has happened to South African households, but that can also point to some of the mechanisms that might have produced that outcome.

## 2.2 Housing and service delivery

There is also a voluminous literature dealing with the roll out of services. Bhorat and van der Westhuizen (2013) show, using national survey data, that there has been a marked increase in the acquisition of assets by South African households after the end of apartheid. They point particularly to policies such as the roll-out of electricity and the provision of free basic services (such as sanitation) as leading to marked improvements in non-money metric measures of well-being. Gaunt (2005) provides a discussion of the expansion of access to electricity, while Dinkelman (2011) discusses some of the social and economic impacts of the electrification of rural South Africa.

Wittenberg et al. (2017) also comment on the scale of the electrification programme. They show that were it not for the rapid rate of new household formation, the number of new connections would have wiped out the backlog completely. Harris et al. (2017) caution against excessive triumphalism by pointing out that alongside new connections there are also disconnections experienced in every period. Nevertheless the net increase in connections over this period has been impressive - a net increase of 5% per annum sustained over the eighteen year period 1994 to 2012 (Wittenberg et al. 2017, p.1318).

There has also been an impressive increase in the number of new houses built during this time. According to South Africa's Department of Human Settlements, 3.7 million new "housing opportunities" were created in the twenty years between

1994 and 2014 of which 2.8 million were new housing units, the rest being serviced sites (Department of Human Settlements 2014, p.27). A performance review of the three year period 2010/11 to 2012/13 suggests that the official delivery counts are likely to be overstated (Rhizome Management Services 2015, p.5). The Executive Summary released together with the report (National Treasury 2015, p.3) commented: “It is not entirely clear why the reported numbers exceed the actual delivery, although there appears to be at least some double counting of the separate processes required for the delivery of a single unit, such as site preparation and the building of top structures.” Despite such measurement problems, even if the actual building programme amounted to only half of the reported number it would still be a highly impressive achievement and should have reduced the housing backlog substantially, but as with electricity, the process of new household formation means that new dwelling construction is also “aiming at a moving target”. One of the key issues that we wish to explore is how such new housing construction interacts with new household formation.

## **3 The Data**

### **3.1 The Agincourt Health and Demographic Surveillance System**

The data from the Agincourt Health and Demographic Surveillance System has been used in many studies to investigate household change in South Africa (e.g. Wittenberg and Collinson 2007, Schatz, Madhavan, Collinson, Gómez-Olivé and Ralston 2015), because it provides fine-grained information over a long time period. The MRC/Wits Agincourt Unit was established in 1992 initially with the aim of addressing issues around the decentralisation of health services and to provide accurate information for planning (Tollman 1999, Tollman, Herbst, Garenne, Gear and Kahn 1999). Agincourt was selected in part because it reflected many of the key developmental challenges. The area lacked a functioning vital registration system, thus making on-going demographic surveillance appropriate. Furthermore, the area formed part of the previous Gazankulu homeland and therefore exhibited many of the characteristics of these areas: a lack of infrastructure and a population that has been subject to forced removals and betterment planning (for a discussion of some of these processes see Niehaus 2001). For our purposes the site is particularly interesting, since it is close to the Mozambique border and has a significant subpopulation of Mozambican refugees. These refugees arrived in the late 1980s during Mozambique’s civil war. They come from the same language group as the South Africans, but they form a distinct subpopulation. Indeed, many of them live in villages which consist predominantly of refugees. Furthermore in 1999 a new

housing development was built under South Africa’s Reconstruction and Development Programm (RDP). The RDP village is a settlement of formal cement-brick houses which was fully settled by 2002. As such the study site is a microcosm of many of the processes that we think happened elsewhere.

In our empirical work we create a four-fold categorisation of subpopulations: Mozambicans living in refugee villages; South Africans living in “South African” villages; Mozambicans living in “South African” villages and the RDP village.

The refugee villages date back to the 1980s and are all located on the fringes of the study area, furthest removed from infrastructure and from economic activities. Not coincidentally they are also located on the border of the Kruger National Park. Indeed most of the refugees came through that park from Mozambique. The “South African villages” go back to the 1950s and 1960s when the villages were laid out in terms of “betterment schemes”. Within this category we distinguish between households headed by a South African citizen<sup>1</sup> and households headed by a non-South African (mainly Mozambican). The latter would be mainly ex-refugees that have managed to resettle themselves in more central locations.

### **3.2 The Health and Demographic Surveillance System data**

The Agincourt HDSS monitors key demographic events and socio-economic variables in the Agincourt sub-district. A baseline census was conducted in 1992 and since 1996 there have been census rounds annually. The main demographic, health and socio-economic variables measured routinely by the HDSS include: births, deaths, in- and out-migrations, household relationships, resident status, refugee status, education, antenatal and delivery health-seeking practices (Kahn, Tollman, Collinson, Clark, R., Clark, Shabangu, Gómez-Olivé, Mokoena and Garenne 2007, Kahn, Collinson, Gómez-Olivé, Mokoena, Twine, Mee, Afolabi, B.D., Kabudula, Khosa, Khoza, Shabangu, Silaule, Tibane, Wagner, Garenne, Clark and Tollman 2012). Circular migrants are accounted for by including on the household roster non-resident members who retain significant contact and links with the rural home (Collinson 2010). The “Share common pot” definition of a household is thus expanded to include the temporary migrants who would normally share the same pot on return.

A panel dataset was constructed for this analysis, using HDSS data. In order to do this it is important to identify households that persist from one period to the next. We use the household definition that is built into the structure of the HDSS, i.e. households in two periods are the same if they are in the same location and if their membership overlaps. The same definition was used in earlier analyses

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<sup>1</sup>There are a few records where we cannot determine the citizenship of the head of the household. These cases have been pooled with the “South African” households.

of household change within the area (Wittenberg and Collinson 2007, Wittenberg et al. 2017). It is worthwhile noting that this implies that migration of entire families therefore always implies household dissolution.

## 4 Methods

The starting point for our analysis is a decomposition presented by Wittenberg et al. (2017). They show that if one has a panel dataset of households one can break up aggregate changes in any household measure (such as household size) into three effects:

- Within household changes
- Changes in the measurement due to differences between dissolving and newly formed households, which the authors dub the “replacement effect”
- A term which represents the impact of net new household formation, which they call the “dilution effect”

Intuitively the dilution effect becomes important if the balance between established households and new ones is constantly shifting towards the new ones and if these also happen to be different on the outcome (e.g. smaller household size) than the established ones. The technical details are given in the appendix (Section A).

We want to use this technique in order to investigate changes within Agincourt at a more fine-grained level. In particular we are interested in how dynamics within the subpopulations in the Agincourt area play themselves out. In order to do this we cannot apply the decomposition as is, because the importance of the subpopulations shifts over time. In the appendix, section A.1 we develop a way in which the decomposition can be applied to dynamic subpopulations within an area. The decomposition allows us to attribute parts of the “within”, “replacement” and “dilution” effects to the different subpopulations. Intuitively, we freeze the sizes of the different subpopulations at their initial levels for the disaggregated decomposition. This means that our decomposition acquires a fourth term, which represents the part of the change in household size which is driven by the changing balance between the different subpopulations.

## 5 Results: Changes in household size in rural South Africa

### 5.1 Describing the patterns

If household size is coming down then net new household formation rates must exceed the population growth rate. Another way of looking at the changes over the period is therefore to look at aggregate household formation and dissolution processes. We cannot track these on national datasets since these do not follow households over time, but it is possible to do so with our Agincourt data. That situation is depicted in Figure 1. The annual household growth rate hovers around 2%, but this aggregate hides considerable turnover – the new household formation rate is around 6% per annum, with around 4% of households dissolving per annum. The latter rate has come down since 2000, which may be also due to better tracking of households within the study site. We note a big increase in household formation (and dissolution) at the time that the first RDP village was constructed in the study site. There is also an increase in the population growth rate at this point of time, although to a smaller extent. We will return to a consideration of this case later. It does raise the point that dynamics within subpopulations affect the aggregate trends.

In Table 1 we provide information on the evolution of four settlement/household types within the Agincourt district. We distinguish between three kinds of villages: the “South African villages”, the “refugee” villages and the RDP settlements. Within the first settlement type we distinguish between “South African” and “Mozambican” households. It is evident that household size has come down in each community. Furthermore the population in the refugee areas has declined, suggesting that households and individuals have been leaving these communities and settling elsewhere – at least some of them in the “South African” villages. Figure 2 shows that this process of moving out of the refugee villages has not been a linear one. Indeed it appears that new households have formed in these areas since 2000. Figure 2 also captures the emergence of the two RDP settlements: the first one built in 1999 and the second in 2009.

### 5.2 Decomposing the changes

The decomposition of the change in household size for Agincourt is given in Table 2. The first two columns provide the decomposition for the area as a whole. Our results mirror those shown in Wittenberg et al. (2017) They show that aggregate household size decreased by just over a person. When we look at households that remain within the site from one period to the next, we see that on average they

do not lose any members. This means that the entire change in household size is driven by the process of household dissolution and re-formation. 20% of the decrease is due to the “replacement effect”, i.e. due to the fact that households that dissolve are slightly larger than newly forming households. The other 80% of the reduction is due to “dilution” – new households are smaller than the pre-existing ones and have formed at a rate considerably higher than the replacement rate.

In the other columns of Table 2 we provide the analogous decompositions treating each of the four subpopulations as closed. As in Table 1 we observe that household size dropped in the South African villages as well as in the refugee settlements. The RDP settlements obviously do not see a reduction in household size, since average household size was undefined (set at zero for our calculations) at the beginning of our analysis. We see dilution effects in all subgroups, i.e. new household formation happened everywhere and in all cases was a factor in bringing down average size. Interestingly South African households in South African villages actually shed almost a quarter of a person. In all the other subpopulations the “within household change” is positive. Note that this is not trivially true for the RDP village, since it is measured on households that we observe more than once. It suggests that initially only one or two people moved into the newly constructed houses and that they were eventually joined by new household members (immigrants or new births). The positive replacement effect in the RDP village suggests that the small pioneer households in these settlements did not only grow *in situ*, in many cases they would have dissolved.

In the case of all other subgroups the replacement effect is negative suggesting that dissolving households were generally bigger than newly forming ones – strongly so in the case of the refugee villages. This suggests that much of the reshaping of households happened in the process of household dissolution and new formation. As noted in our earlier discussion migration (even local moves) become household dissolutions in the way that we define households. It appears that in the process of moving, families “slough off” some members who set up new households.

### 5.3 Disaggregating the decomposition

We apply the aggregate decompositions to the four subpopulations within the Agincourt area. These decompositions are given in Table 3. The left hand side of the table provides the disaggregation given in formula 2. The first column provides the change in household size (already reported in Table 2). The second column gives the weighted contribution of the subpopulation to those overall trends<sup>2</sup>. It is

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<sup>2</sup>It is  $w_{i,0} (\bar{y}_{i,t} - \bar{y}_{i,0})$ , i.e. the first term of the disaggregation given in equation 2 in the appendix.

evident that the reduction in average household size among South Africans living in South African villages are quantitatively the most important factor in reducing the overall household size. Altogether 0.628 of the total reduction in household size can be attributed to reductions in this subpopulation. Nevertheless important contributions come from the Mozambican households too. Since the RDP settlements did not exist at the beginning of the period they don't contribute here. The overall change due to changes in household size within these subpopulations adds up to 0.970 which is almost the entire observed reduction.

The third column reports the change in weights. It is evident again that South African households in South African villages and households in refugee villages have become less important over time. Column four reports the contribution to overall change due to shifts between subpopulations. This is the fourth term of the new disaggregated decomposition reported in the appendix<sup>3</sup>. The biggest contribution by far is the RDP village. It indicates that the construction of the RDP village has helped to bring overall household size by 0.09. This is due to the fact that the average household size among residents in this village is so much smaller than in other subpopulations.

Although the other terms are all small, they are nevertheless revealing. The contributions for South Africans in South African villages is positive. This indicates that the overall reduction in household size would have been bigger if the share of this subpopulation had not shrunk. The positive contribution for Mozambicans in South African villages is due to the fact that this is a growing part of the population overall but these households are also bigger than average.

The right hand part of Table 3 then decomposes the contribution to overall change given in column 2, back into "within household", replacement and dilution effects, as shown in equation 3. The results of that decomposition suggest the following:

- The dilution effect within the different subpopulations is the biggest contributor to the overall reduction in household size, accounting for around 71% (0.74) of the total effect.
- Replacement within subpopulations accounts for another 21% of the reduction. This is almost entirely due to the break-up of larger households among Mozambicans (in both refugee villages and South African ones) and their replacement with smaller ones.
- The South African households within the South African villages seem to have been actively shedding members over this period. The Mozambican

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<sup>3</sup>It reports the  $\bar{\delta}_{i,t}(w_{i,t} - w_{i,0})$  terms in equation 2.

households within the South African villages, by contrast, seem to have been absorbing members.

The most important insight to be gained from these is that there is considerable diversity within the study site. Larger households within the refugee settlements are dissolving. There is the rapid formation of smaller households within the South African villages and within the RDP village. South African households within the South African villages are shedding members, while Mozambican households within these villages and households in the RDP village are absorbing members.

## 6 Explaining the shifts

In the previous section we observed that the overall reduction in household size was fuelled by the rapid rate of household formation. Furthermore this can be observed across different subpopulations within the Agincourt area. This raises the question as to what could have led to these developments. There are four candidate explanations:

- Measurement changes
- Demographic changes
- Economic changes
- Social changes

We present a quick discussion of these, in turn.

### 6.1 Measurement changes

There has been some scepticism about whether the rapid increase in the number of households as measured in national surveys (particularly in the case of one person households) is “real” or an artefact of changes in measurement. For instance Kerr and Wittenberg (2015) have pointed to changes in sampling practice over time. Nevertheless the Agincourt field process have run in the same way for a long period. Furthermore the household membership criterion is flexible, so it is not the case that geographically stretched households would be captured twice. There is little doubt that the increase in the number of households measured in the Agincourt area is real. This is an example of the triangulation of a national dataset with longitudinal surveillance data from a sub-population.

## 6.2 Fertility and mortality

The HIV pandemic led to increases in mortality in the Agincourt area also. These deaths occur within households and would not be expected to lead to new household formation. It is also not the case that abandoned orphans would be forced to set up new and smaller households. Wittenberg and Collinson (2007) looked carefully for evidence of child-headed households and found little evidence that these existed. Instead they found an increase in the number of other relatives within Agincourt households. The fostering of orphans would therefore actually lead to a predicted **increase** of household size within established households.

Similarly a reduction in fertility would, over time, lead to a reduction in average household size but this would occur because established households do not acquire new members (new births) at the same rate that other households are losing members that transit out (e.g. due to death or marriage).

The pattern of household size reduction that we observe in the Agincourt study site and across subpopulation types is therefore not one that seems to be driven by these demographic processes.

## 6.3 Economic factors: land and services

As noted in the introduction, the rapid rate of household formation is remarkable, given that economic conditions were unfavourable. Indeed economic conditions in the Agincourt area were not any better than nationally. Labour market modules (added to several of the census rounds) since 2000 show high levels of unemployment, particularly in the resident rural population (e.g. Collinson, White, Ginsburg, Gómez-Olivé, Kahn and Tollman 2016).

While incomes might have militated against household formation there were, in fact, economic factors that would have made new household formation much easier. In particular the costs of access to land and housing seem to have come down strongly. Extreme cases are the RDP villages within the Agincourt area, where houses were essentially allocated for free through a list system, i.e. a form of rationing. We can get some idea of what sort of individuals have taken possession of these houses by looking at the age structure revealed in Figure 3. It is clear that the houses are occupied by younger children (up to age 12) and adults in their twenties and early thirties. The age pyramid might suggest a settlement of mainly “nuclear” households, but the situation is more complex as is shown in Figures 4 and 5.

Figure 4 shows that compared to newly formed South African households, there were many more single person households in the RDP houses up until the mid-2000s. Figure 5 suggests that “nuclear” families might have been fractionally more common in the RDP villages than in the South African villages, but the most

common types were households that were neither nuclear nor couples or one-person households. Indeed the complexity has increased over time.

Anecdotal evidence suggests that some of these “households” might really be seen as subsidiaries of bigger households existing elsewhere in the site. Some families seemed to be putting some of their younger members into the RDP houses as a way of establishing title to an asset that the government was providing free of charge. This raises all the questions about the nature of households introduced above (Russell 2003a). At one extreme one might therefore suppose that these are all “sham” entities, i.e. that within the family there may have been a change in living arrangements, but no substantive change in the social relationships. At the other extreme one could suppose that the external opportunity provided by the government has released some pent-up demand for privacy, which has led to the fissioning of some existing households. The truth is likely to be somewhere between: with some of these “households” more on the independent part of the continuum and others more on the subsidiary one. Undoubtedly there will also be many households somewhere in between, i.e. where the change in living arrangements *does* imply a reconstitution of existing social relationships, without these necessarily being severed, however. Indeed, it is interesting to note that many of the single person households that were established in the early parts of the RDP village must have been joined by other people, because Figure 5 shows a marked reduction in the proportion of one-person households over time. So although the RDP village is special, it probably exemplifies some of the processes occurring elsewhere.

Indeed there have been other innovations in the local housing market. Collinson, Garenne, Tollman, Kahn and Mokoena (2000), for instance, document the movement of individuals to the adjoining area of Mkhuhlu. This shift was enabled by the breakdown of the “traditional” controls on the development of land. Given that Mkhuhlu had better access to employment, this led to significant local migration. Even within the Agincourt site the power to allocate land has shifted away from the chiefs and headmen to development committees. One of the constraints on new household formation has thereby become loosened.

The reduction in size of the refugee villages can most readily be explained in terms of onward migration to destinations that have better access to services and jobs. Some of the exodus would undoubtedly have been to Gauteng and other areas where job opportunities are concentrated. A move to one of the “South African” villages might, however, also be part of a household strategy to improve access to services. Indeed Cross and Harwin (2000) have argued that there is extensive migration **within** South Africa’s rural areas and that much of this can be explained in terms of improving access to publicly provided infrastructure. The migration to Mkhuhlu referred to above (Collinson et al. 2000) is another example

of this strategy. This raises the question why the refugee villages made a partial “comeback” after 2000, as shown in Figure 2. Interestingly this was the period where services (particularly electricity) began to be rolled out in the site, including these more peripheral areas.

The broad trends summarised above can all be fitted into a set of economic explanations in which access to land, services and jobs feature prominently. Within the class of these accounts there are two broad competing explanations. It is clear that apartheid artificially reduced the supply of land and services to the majority of the population. It is therefore possible that the rapid rate of household formation is simply due to the release of this pent-up demand. On the other hand, it is possible that certain new policy initiatives of the new government (such as the RDP housing schemes) may have themselves stimulated demand. Our information suggests that both of these may be true. The fact that the rapid rate of household formation predated the creation of the RDP village suggests that there were independent processes leading to the reduction of household size. The creation of the RDP village certainly helped this process along. It seems clear that some of the “household formation” processes around the RDP village were fairly distinctive, as shown by the peak in household formation and dissolution shown in Figure 1. On the other hand, a comparison (in Figure 4) between the newly formed households within the South African villages and those in the RDP housing scheme suggests that the processes were part of the same continuum.

The economic accounts draw attention to the fact that changes in the cost of resources are likely to also change behaviour. We would expect households to act in ways to take advantage of the opportunities that opened up to them with the political, social and economic changes that occurred since 1994. Changes in living arrangements and hence household size follow as a consequence.

## 6.4 Changing preferences

Of course people will only take advantage of cheaper land to move out, if they (in some sense) prefer to live separately to living with a larger household. More generally, we noted earlier that there is a debate among sociologists whether African families are becoming more “nuclear” (Ziehl 2001, Russell 2003b, Russell 2003a). The patterns of household formation and dissolution discussed above would certainly suggest that couples or other “minimal household units” (Ermisch and Overton 1985) are leaving larger households and setting up independently.

These patterns cannot reveal, however, whether these changes in living arrangements reflect real changes in the underlying social relationships. As Russell has argued, people are embedded in long-lasting social relationships. Taking a snapshot across these relationships is not guaranteed to reveal the full set of connections. People may be part of an extended family system, even though they spend many

years of their life in what looks like a “nuclear” household.

These objections undoubtedly have considerable validity. It is possible that we are observing a moment in which households are reshaping themselves. For instance, it is possible that the “refugee” households are sending out small “scout parties” that try to establish themselves in new locations and that larger households may reconstitute themselves around them in due course. Indeed the strong “within household change effect” among Mozambican households in South African villages might hint at such a process. Nevertheless it is also possible to overplay this sort of objection. What makes our study site interesting is precisely that it allows us to track households over several years. Furthermore it is at the “rural” end of the continuum. Russell’s objection makes most sense in the context of urban migrants that are analysed without taking due cognisance of their rural social relationships<sup>4</sup>. Our data set includes the urban migrants provided that they are still identified as household members by the rural household.

Furthermore there are good grounds for believing that rural households may have been under considerable internal social strain. In the late 1980s the Bushbuckridge area saw considerable political conflict which took the form *inter alia* of generational conflict (Niehaus 2001). The “youth” of the area was seen as rejecting many of the “traditional” values of their elders. Given this background one might have expected some changes in the living arrangements.

Besides the generational dimension, there may very well also be a gender dimension. In the old “bantustan” areas, women had no rights to land or housing except through men. With the establishment of democracy in 1994 that pressure on women to stay with a male partner or parent would have been reduced. At the same time the “development controls” implicit in the traditional authority system weakened. The combination of those two forces may also have led to changes in household living arrangements.

## 7 Conclusion

The empirical evidence from this paper suggests that there are two linked mechanisms operating in the Agincourt area which served to bring down aggregate household size:

- the provision of free housing (in the shape of the RDP village) induced strong household formation. Some of this may have been “bogus” (households sending some members to stake claims to available infrastructure), but certainly not all of it.

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<sup>4</sup>Even in that context successive cross-sections should capture individuals at all stages of this process.

- the reconstitution of households to gain better access to services, such as the move out of “refugee” villages

Changes in land rights (particularly of women) may also have played a role. Conflicts around traditional systems of control (of the older generation over the younger; and men over women) may have made setting up of new households more attractive. Arguably all of these forces were also operating nationally over this period. The roll-out of RDP housing, water, sanitation and electricity infrastructure in the late 1990s are likely to have fuelled new household formation. Apartheid was a system that was based on extensive location controls. The end of apartheid removed these. The extension of rights to women and other marginal groups, particularly in the rural areas, would have enabled these to create new living arrangements for themselves.

One of the contributions of this paper is to highlight once more how triangulating national trends with high quality local data can provide new insights. Concerns about an increase in prevalence of single-person households in the national data were partly allayed through the Agincourt longitudinal population data showing overall household size coming down, but not fuelled by increasing single person households, which were an artifact of a new household definition used in the national data collection. A further contribution has been to develop a novel decomposition technique that enables us to pick apart the different dynamics associated with RDP housing, refugee integration into South African communities and developments within the South African subpopulation itself.

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## A Appendix: Decomposition of household change

We first present the decomposition from Wittenberg et al. (2017). We follow their discussion closely. First we partition households in a particular period (say period  $t$ ) into those that will survive to the following year (we label these households as  $S$ ) and those that will dissolve (labelled  $D$ ). Secondly we categorise the households in the following year ( $t + 1$ ) into those that have continued from the previous period (labelled  $C$ ) and newly formed households (labelled  $N$ ). We assume that we are interested in a particular household outcome (say household size), labelled  $y$ .

So let  $\bar{y}_t$  be the average household size in year  $t$ ,  $\bar{y}_t^S$  be the average size among households in period  $t$  that will survive to year  $t + 1$ ,  $\bar{y}_{t+1}^C$  be the average size of those same households in period  $t + 1$ ,  $\bar{y}_t^D$  be the average among households dissolving in year  $t$  and  $\bar{y}_{t+1}^N$  be the average among households newly formed in year  $t + 1$ . Then we have

$$\begin{aligned}\bar{y}_t &= (1 - \theta_t) \bar{y}_t^D + \theta_t \bar{y}_t^S \\ \bar{y}_{t+1} &= (1 - \phi_{t+1}) \bar{y}_{t+1}^N + \phi_{t+1} \bar{y}_{t+1}^C\end{aligned}$$

where  $\theta_t$  is the proportion of households surviving to period  $t + 1$  in the population at time  $t$  and  $\phi_{t+1}$  is the proportion of households in period  $t + 1$  that have continued from the previous period. Writing the change in household size within households that we observe in both periods as  $\Delta \bar{y}_{t+1}^S$ , i.e.

$$\Delta \bar{y}_{t+1}^S = \bar{y}_{t+1}^C - \bar{y}_t^S$$

then the change in average household size can be decomposed as

$$\Delta \bar{y}_{t+1} = \theta_t \Delta \bar{y}_{t+1}^S + (1 - \theta_t) (\bar{y}_{t+1}^N - \bar{y}_t^D) + (\theta_t - \phi_{t+1}) (\bar{y}_{t+1}^N - \bar{y}_{t+1}^C) \quad (1)$$

Wittenberg et al. (2017) label the three terms of this decomposition:

- The *within household change* effect  $\theta_t \Delta \bar{y}_{t+1}^S$
- The *replacement* effect  $(1 - \theta_t) (\bar{y}_{t+1}^N - \bar{y}_t^D)$ , since the difference  $\bar{y}_{t+1}^N - \bar{y}_t^D$  represents the effects of new households replacing ones going out of existence
- The *dilution* effect  $(\theta_t - \phi_{t+1}) (\bar{y}_{t+1}^N - \bar{y}_{t+1}^C)$ , since  $\theta_t - \phi_{t+1}$  is non-zero only if there is a net change in the number of households and the term  $\bar{y}_{t+1}^N - \bar{y}_{t+1}^C$  reflects how newly formed households differ from surviving ones. In a period of rapid household formation, the continuing households become a decreasing fraction of the entire population of households. Their contribution to the overall mean household size therefore becomes diluted by the new households.

## A.1 Disaggregating the change in household size

We now assume that the overall population is divided up into  $k$  different subpopulations. each likely to have their own household change dynamics. This means we can also write the mean as

$$\bar{y}_t = w_{1,t} \bar{y}_{1,t} + w_{2,t} \bar{y}_{2,t} + \dots + w_{k,t} \bar{y}_{k,t}$$

where we assume that we have  $k$  different types,  $w_{i,t}$  is the weight of subpopulation type  $i$  at time  $t$  and  $\bar{y}_{i,t}$  is the mean household size of subpopulation type  $i$ . We can therefore write the change from the baseline (at  $t = 0$ ) as

$$\begin{aligned} \bar{y}_t - \bar{y}_0 &= w_{1,0} (\bar{y}_{1,t} - \bar{y}_{1,0}) + w_{2,0} (\bar{y}_{2,t} - \bar{y}_{2,0}) + \dots + w_{k,0} (\bar{y}_{k,t} - \bar{y}_{k,0}) + \\ &\quad \bar{y}_{1,t} (w_{1,t} - w_{1,0}) + \bar{y}_{2,t} (w_{2,t} - w_{2,0}) + \dots + \bar{y}_{k,t} (w_{k,t} - w_{k,0}) \end{aligned}$$

The first set of terms, viz.  $w_{i,0} (\bar{y}_{i,t} - \bar{y}_{i,0})$  represents the contribution to the overall change in household size if the relative importance of households of type  $i$  had stayed constant at their initial level. The second set of terms, viz.  $\bar{y}_{i,t} (w_{i,t} - w_{i,0})$  shows the impact of the changing distribution of household types. It turns out that these terms are more interpretable if we write each mean  $\bar{y}_{i,t}$  as the sum of the overall mean  $\bar{y}_t$  plus the group-specific deviation from that mean  $\bar{\delta}_{i,t}$  i.e.

$$\bar{y}_{i,t} = \bar{y}_t + \bar{\delta}_{i,t}$$

We can now rewrite the second set of terms as

$$\begin{aligned} \sum_{i=1}^k \bar{y}_{i,t} (w_{i,t} - w_{i,0}) &= \sum_{i=1}^k (\bar{y}_t + \bar{\delta}_{i,t}) (w_{i,t} - w_{i,0}) \\ &= \sum_{i=1}^k \bar{\delta}_{i,t} (w_{i,t} - w_{i,0}) \end{aligned}$$

The last equality follows because the weights have to add up to one in each period so  $\bar{y}_t \sum_{i=1}^k (w_{i,t} - w_{i,0}) = 0$ . Our revised disaggregation formula is therefore

$$\bar{y}_t - \bar{y}_0 = \sum_{i=1}^k w_{i,0} (\bar{y}_{i,t} - \bar{y}_{i,0}) + \sum_{i=1}^k \bar{\delta}_{i,t} (w_{i,t} - w_{i,0}) \quad (2)$$

The term  $\bar{y}_{i,t} - \bar{y}_{i,0}$  just represents the changes in household size within subpopulation  $i$ .

Now observe that the change in household size in each subpopulation can be decomposed as in the previous section, i.e. the change between succeeding periods

can be broken up into within household, replacement and dilution effects:

$$\begin{aligned}
\bar{y}_{i,t} - \bar{y}_{i,t-1} &= \theta_{i,t-1} \Delta \bar{y}_{i,t}^S + (1 - \theta_{i,t-1}) (\bar{y}_{i,t}^N - \bar{y}_{i,t-1}^D) + (\theta_{i,t-1} - \phi_{i,t}) (\bar{y}_{i,t}^N - \bar{y}_{i,t}^C) \\
\bar{y}_{i,t} - \bar{y}_{i,0} &= \sum_{k=0}^{t-1} \theta_{i,t-k-1} \Delta \bar{y}_{i,t-k}^S + \sum_{k=0}^{t-1} (1 - \theta_{i,t-k-1}) (\bar{y}_{i,t-k}^N - \bar{y}_{i,t-k-1}^D) + \\
&\quad \sum_{k=0}^{t-1} (\theta_{i,t-k-1} - \phi_{i,t-k}) (\bar{y}_{i,t-k}^N - \bar{y}_{i,t-k}^C) \tag{3}
\end{aligned}$$

In this formula we have subscripted all the terms (including the proportions  $\theta_{i,t}$  and  $\phi_{i,t+1}$  with  $i$  to make it clear that we are treating the subpopulation as a closed population in its own right. This means that the first set of terms in equation 2 (i.e. with fixed weights) can be decomposed so as to apportion part of the overall change firstly to processes that occur within households in each subpopulation, and secondly to household dissolution and formation processes that occur within these subpopulations. The second or residual part in equation 2 (given by the terms involving the changing weights) reflects processes involving shifts between the subpopulations, i.e. changes in the composition of the overall population.

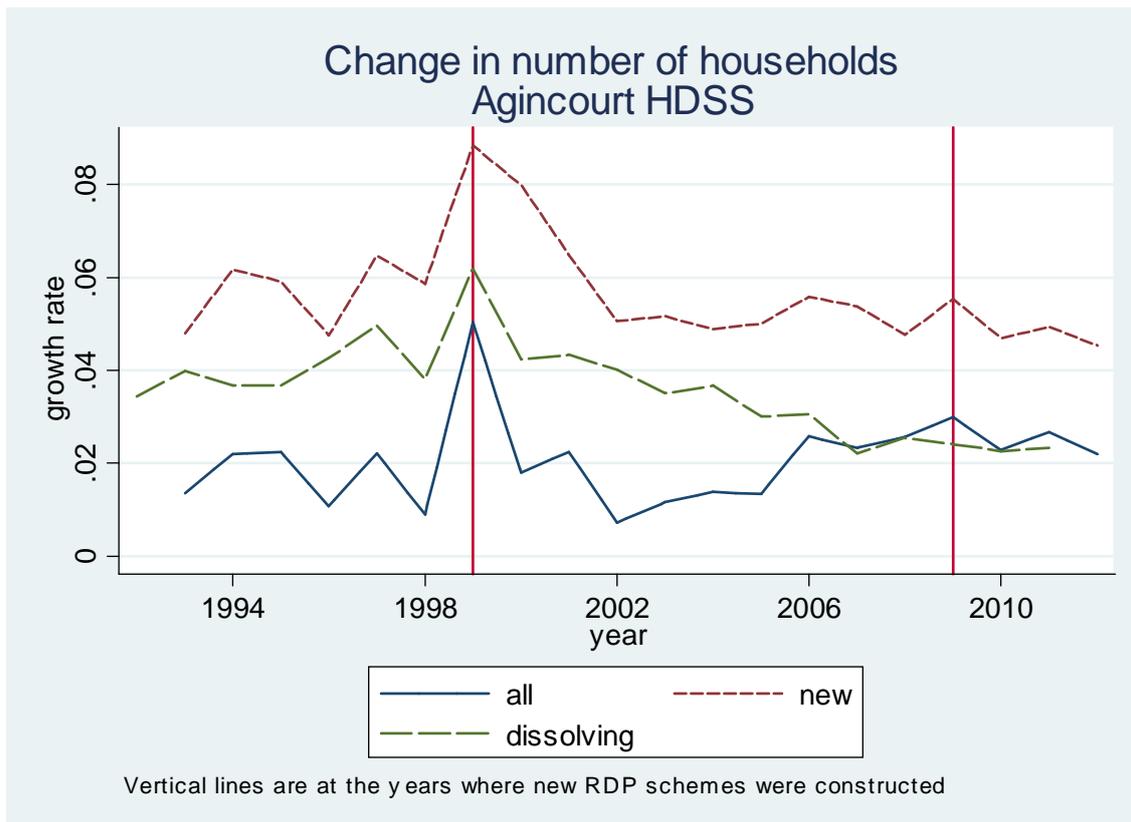
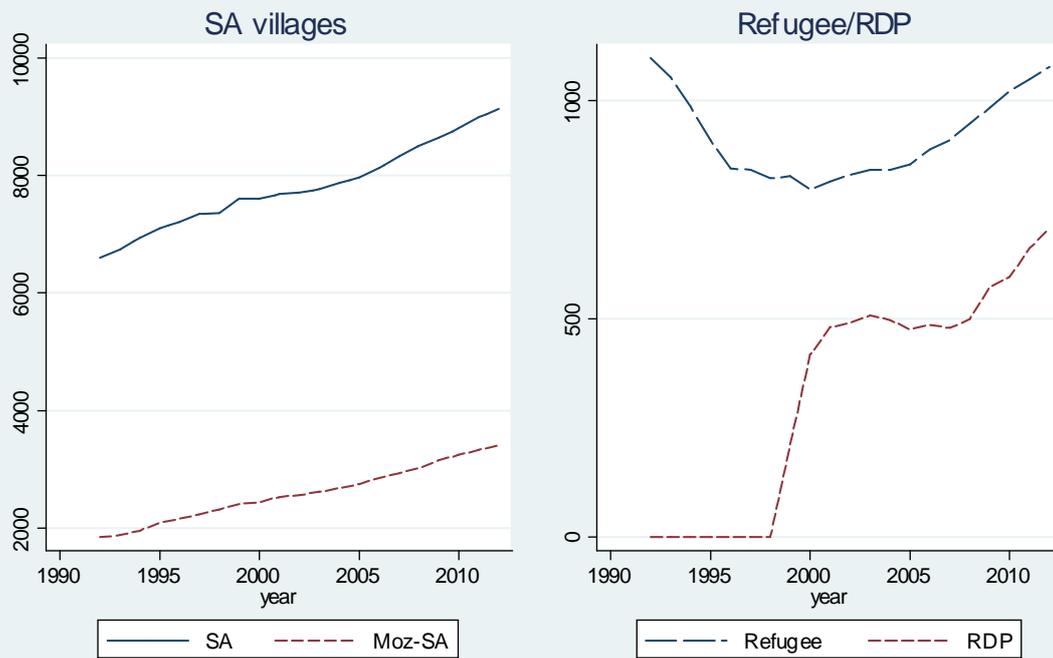


Figure 1: Aggregate household dynamics in Agincourt

## Total number of households by Village Type and Nationality



Moz-SA refers to Mozambican headed households in South African villages

Figure 2: South African villages (left panel) have grown steadily while refugee villages (right panel) lost households until 2000 since when they have recovered somewhat

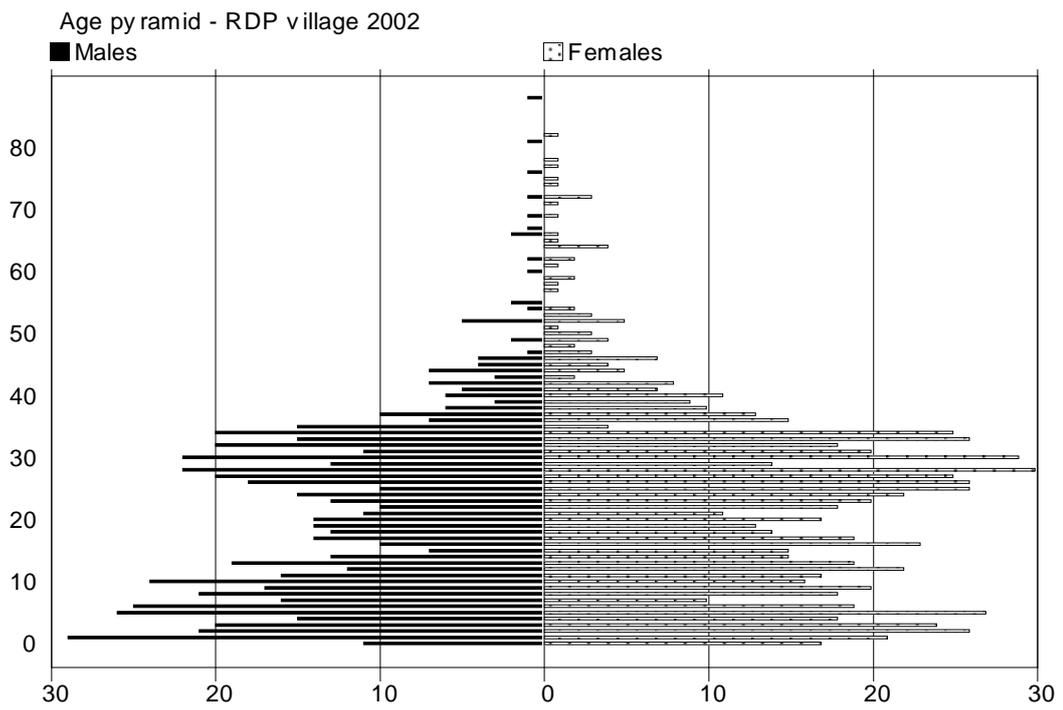
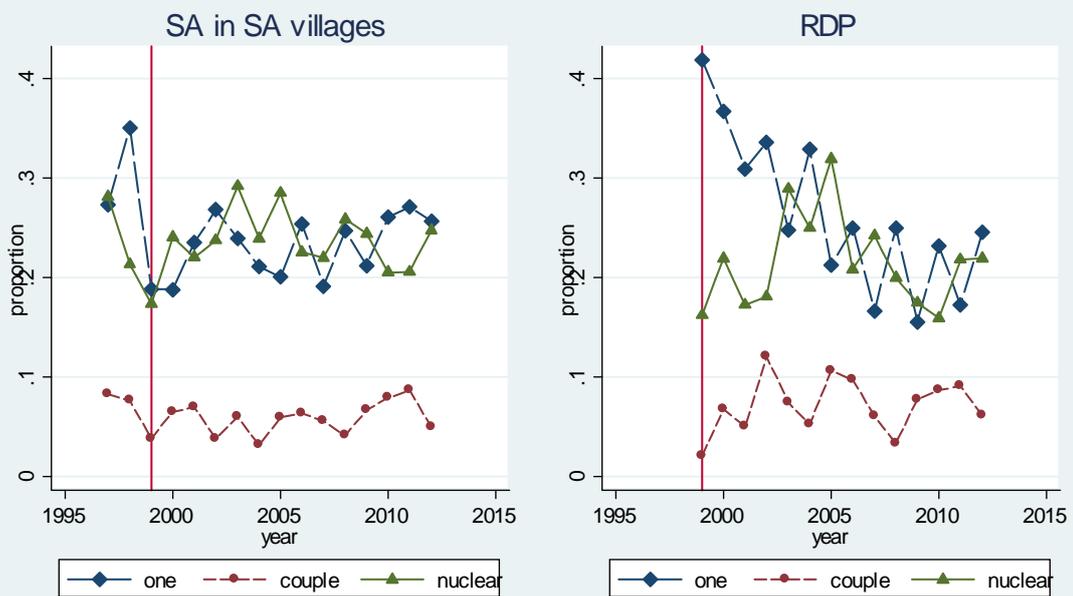


Figure 3: Age pyramid of the RDP village

### Household types among newly formed households SA villages vs RD



Couples - Head and spouse, Nuclear - Head, spouse and at least one child but nobody else  
Vertical line is at 1999, the year the first RDP village was occupied

Figure 4: One person households were over-represented in the RDP village initially when compared to newly formed households in the South African villages

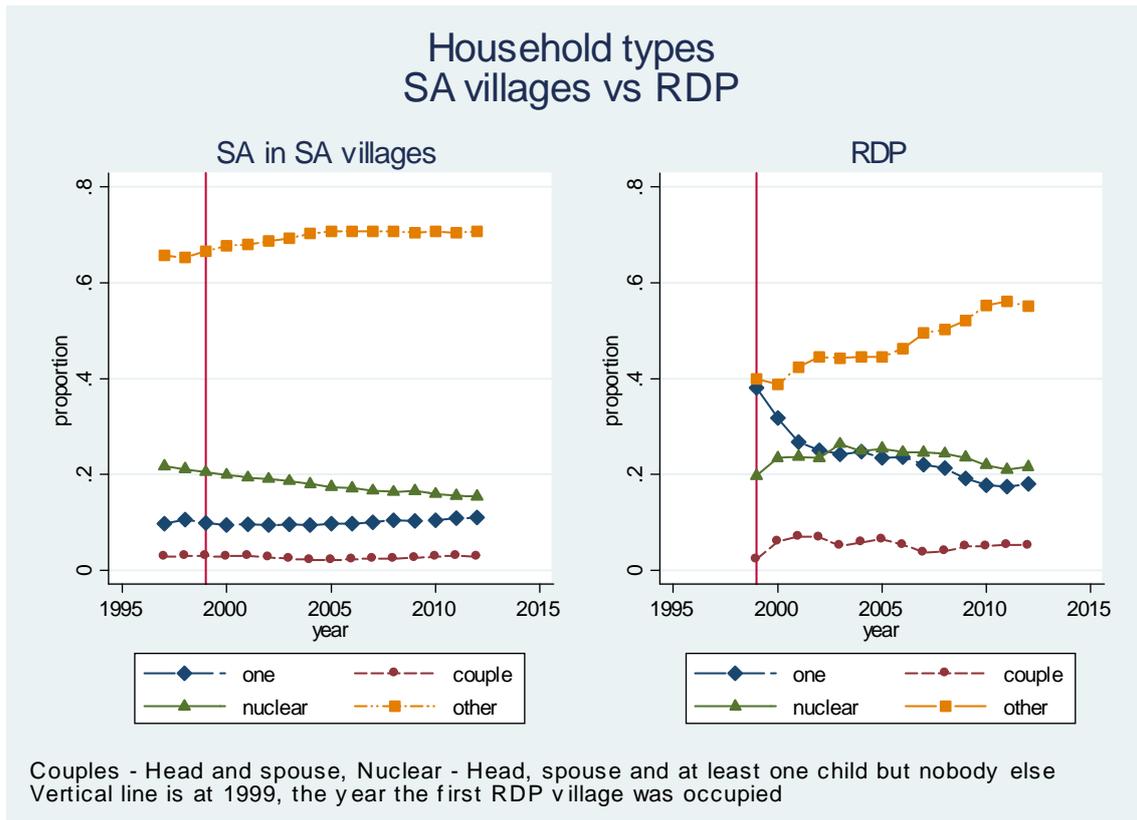


Figure 5: “Other” types of households, including multi-generational, siblings only, skip-generational and single parent ones predominate in the RDP villages in all years.

**Table 1: Population and household dynamics in Agincourt**

	1994				2012			
	Households	Proportion	Population	Household size	Household	Proportion	Population	Household size
<b>Overall</b>	9881	1.000	64467	6.524	14341	1.000	78713	5.489
SA in SA	6942	0.703	43586	6.279	9144	0.638	49236	5.385
Moz in SA	1954	0.198	14241	7.288	3412	0.238	20763	6.085
Refugee	985	0.100	6640	6.741	1077	0.075	6138	5.699
RDP	0	0	0		708	0.049	2576	3.638

**Table 2: Decomposing change in household size in the Agincourt area 1994-2012**

	<b>Overall</b>	<b>%</b>	<b>SA in SA vi</b>	<b>%</b>	<b>Moz in SA</b>	<b>%</b>	<b>Ref vill</b>	<b>%</b>	<b>RDP</b>	<b>%</b>
within effect	0.035141	-3.4%	-0.23159	25.9%	0.584893	-48.6%	0.321031	-30.8%	3.861947	106.1%
replacement effect	-0.22061	21.3%	-0.03808	4.3%	-0.35893	29.8%	-1.1681	112.1%	1.395414	38.4%
dilution effect	-0.8502	82.1%	-0.62441	69.8%	-1.4288	118.8%	-0.19488	18.7%	-1.61894	-44.5%
total change	-1.03567		-0.89408		-1.20284		-1.04195		3.638418	

Table 3: Disaggregating the change in household size							
	Change in		Change in		Contribution to decomposition		
	hhsizes	$w^*(y_t - y_0)$	weight	$d^*(w_t - w_0)$	within	replacement	dilution
	(1)	(2)	(3)	(4)			
SA in SA	-0.894	-0.628	-0.065	0.007	-0.163	-0.027	-0.439
Moz in SA	-1.203	-0.238	0.040	0.024	0.116	-0.071	-0.283
Refugee	-1.042	-0.104	-0.025	-0.005	0.032	-0.116	-0.019
RDP	3.638	0	0.049	-0.091			
Overall	-1.036	-0.970		-0.066	-0.015	-0.214	-0.741



The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy. In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.

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