Analyzing the welfare-improving potential of land in the former homelands of South Africa

Analysing the welfare-improving potential of land in the former homelands of South Africa

Stefania Lovo[1]

Abstract

This paper contributes to the debate on the role of land in reducing poverty in rural South Africa. It uses the year of arrival in the former homelands as an instrument for land access and size. This identification strategy is based on the fact that African households were forcibly relocated to the homelands during the apartheid. Due to increasing population pressure later arrivals were less likely to be assigned land. The results show that land has a large positive effect on household welfare. Because the homelands are relatively disadvantaged areas, these results provide a lower bound for the positive effects of land on household welfare.

Keywords: land, household welfare, asset index, forced removals, homelands, South Africa.

JEL: O12, Q15, Q12.

Acknowledgements: This research was conducted while I was a PhD Student at the University of Sussex. I would like to thank Robert Eastwood, and Merle and Michael Lipton for their helpful comments and suggestions.

[1] Telephone: 00447766897541, Email: s.lovo@lse.ac.uk. Grantham Research Institute for Climate Change and the Environment, London School of Economics, Tower 3, Clements Inn Passage, London WC2A 2AZ.

1. Introduction

South Africa has a large rural population mostly residing in the former homeland areas. The agriculture sector is dualistic with a well-developed commercial farming sector on one side, and a large number of subsistence farmers with access to small parcels of land on the other. While off-farm activities and government transfers are important sources of income for the rural economy, land-based activities have the potential to contribute greatly to the overall welfare of South African smallholders by employing family uneducated labor (Carter and May, 1999) and by providing goods and services, such as food and fuel, for home consumption (Shackleton et al., 2001). According to Lipton and Lipton (1993), South Africa's large endowment of labor calls for more labor-intensive agricultural production that requires a shift toward small-scale labor-intensive farming. Moreover, Eswaran and Kotwal (1986) show that landless households too benefit from a more equitable distribution of land in favor of the vast numbers of smallholders. This paper contributes to the debate on the role of land in reducing poverty in rural South Africa, which is one of main objectives of the land reforms implemented since 1997. Although the effects of a land reform extend beyond those on the direct beneficiaries, the analysis proposed here is limited to the relationship between land endowment and farmers' welfare in the former homelands[2].

The economic theory of the farm household suggests a positive relationship between land and household welfare. However, little empirical evidence is available, mainly due to the difficulties in identifying a causal relationship. This paper investigates the impact of land on farmers' welfare by drawing on historical data on migration to the former homelands. Household welfare is measured using an asset index constructed through principal component analysis (Filmer and Pritchett, 2001). Although the choice of the indicator is constrained by data availability, the asset index has also some advantages over other measures of welfare, which will be described in the following sections. The identification strategy relies on the fact that, since the introduction of the Native Land Act in 1913, South African households have been forced to relocate to the homelands. The year of arrival at the current location is used as an instrument for land endowments since later incomers were less likely to have access to land given the increasing population density in these areas. Because the analysis considers only those households that were relocated during the period under consideration, the results are not driven by systematic differences between displaced and non-displaced households.

The results confirm the positive effect of land on household welfare. Land size is positively related to household welfare to the extent that an increase of 1 hectare is expected to lift the

[2] This paper does not consider the possible negative effects related to the transfer of land away from highly productive commercial farmers. These effects are relevant when estimating the overall costs and benefits of a land reform that involves the redistribution of land from commercial to small farms.

household into a higher decile of the welfare distribution. A set of alternative specifications controls for the presence of confounding effects due to the potential correlations between the year of arrival and the location of the household, the displacement costs occurring after arrival and the quality of the land. Further specifications ensure that the results are robust against the choice of the welfare indicator and the historical sub-periods characterizing the process of segregation of the African population. Distinguishing between voluntary and forced movements, in particular within the homelands, proves difficult and hence challenges the validity of the instrument. This issue is also partially addressed by using information on the district of previous residence.

This paper proceeds as follow. Section 2 provides an overview of the existing literature investigating the relationship between land endowment and household welfare from both a theoretical and empirical perspective. Section 3 follows with a description of the historical setting underlying the identification strategy proposed in this paper. The section focuses on the main events and aspects characterizing the large-scale forced removals of the African population during the apartheid era. Section 4 describes the two datasets used in the analysis and the main characteristics of the households in the sample. Section 5 discusses the methodology used to estimate the welfare index and describes the main results. Section 6 explains the empirical strategy adopted to estimate the impact of land on household welfare and sections 7 and 8 discuss the results. Finally, section 9 concludes.

2. Land and household welfare: theory and existing empirical evidence

Several authors have highlighted the importance of land in contributing to the livelihoods of the rural South African population in both financial and social terms. Most households derive a direct utility from land-based activities from the provision of goods and services associated with livestock, food harvested for home consumption and for exchange with other goods and services. Scogings et al. (1999), for example, find that communal land areas in South Africa contribute substantially to food and economic security by providing natural resources such as wood, thatch, and clay.

The theoretical framework underlying the relationship between land and household welfare is mainly based on the standard microeconomic theory of the farm household developed by Singh et al. (1986). The household farm is considered a unitary decision maker. The focus on the household rather than the farm unit is particularly relevant in the presence of market imperfections, since consumption and production decisions are jointly determined. Eswaran and Kotwal (1986) and Finan et al. (2005), for example, use a farm household model with imperfect credit and labor market conditions and where access to credit increases with land size. Eswaran and Kotwal (1986) show how household labor allocation decisions are determined by land

endowments and that a transfer of land from larger to smaller farm households can improve welfare and output. Finan et al. (2005) demonstrate how household income is positively affected by land endowments through a direct effect (the income generated by the increased production) and an indirect effect when labor and credit markets are imperfect. The magnitude of the overall effect varies across households, in particular depending on whether the increased demand for input is matched by an increased availability of credit due to the use of additional land as collateral. This framework, however, cannot be applied to rural South Africa where land does not serve as collateral and the agricultural credit sector is underdeveloped (Fenwick and Lyne (1999) and Lovo (2012)). In the same vein, Burgess (2001) uses a theoretical household model where land generates a twofold effect on household welfare. Considering imperfections in land and food markets, the author shows that land has the potential to increase household consumption through an income effect, due to increased production, and by providing a cheaper source of food to the household.

Although the economic theory of the farm household gives support to a positive relationship between land and household welfare, there is little empirical evidence, mainly due to the difficulties in identifying the causal relationship between land and a measure of household welfare. Finan et al. (2005) analyze the impact of land on household welfare, measured by an asset index, using data on rural Mexican households for the period 1997-1998. They propose a linear and a non-parametric specification to capture the non-linearities in the relationship between land and household welfare. Although the study provides an extensive and rigorous analysis of the heterogeneous correlation between land and welfare across households, little attention is paid to the identification of the causal relation between the two. Burgess (2001), using data on Chinese households, investigates the relationship between land size and household welfare measured by food consumption expenditure and calories intake. The effect of land is identified by taking advantage of the institutional characteristics of land allocation in China.

The majority of papers examine the impact of land transfers obtained through land reforms. Besley and Burgess (2000), for example, use a panel dataset of sixteen Indian states for the period 1958-92 to find that post-independence land reforms helped reduce poverty. The potential endogeneity of the land reform variable is addressed by using the composition of past political legislatures as an instrument for land reform transfers. Other papers are particularly relevant for this study given their focus on the South African land reforms implemented since 1997. Keswell et al. (2010) exploit the quasi-experimental setting of the Land Redistribution and Agricultural Development (LRAD) program, introduced in 2001, and find a positive effect on household consumption for the beneficiaries. The impact is identified by comparing households still in the process of being granted land and households that have already received it. A previous paper by Valente (2009) looks at the impact of the LRAD program on household food security. The results show that the land reform has not been successful in reducing the food insecurity of the

beneficiaries. This is mainly attributed to high displacement costs, since the assigned land is located far from households' current location, the lack of appropriate human capital and poor access to ancillary markets. The author uses alternative techniques to deal with observed and unobserved variable biases, although no suitable instruments were available to fully address the endogeneity of the land reform variable. While the focus of the above studies lies on the distribution of privately titled land outside of communal areas, Andrew et al. (2003) discuss the role of land-based livelihoods in communal areas. They suggest that the land reform could play a crucial role in improving the livelihoods of rural households if obstacles to production are adequately addressed. Land-based activities are critical for the survival of most rural households as they provide an important source of income and other non-monetary goods and services such as food security, medicine, and shelter.

The existing empirical literature confirms the difficulties in identifying the causal relationship between land and household welfare given the non-random nature of the allocation of land and the lack of suitable instruments. In this paper, I will attempt to address this empirical issue by drawing on historical data on household migration to the homelands.

3. Historical background

Segregation in South Africa started to take shape with the implementation of the Natives Land Act in 1913 that revoked the right to own or rent land outside designated reserves from "black" Africans. During the apartheid era, which officially started in 1948, the reserves were turned into Bantustans or homelands, some of which later became "independent" states within South Africa. The population was classified into four racial groups ("black" , "white", "coloured", and "Indian"). From 1958, "black" South Africans were deprived of their citizenship, legally becoming citizens of one of the ten tribally based self-governing homelands: Lebowa, QwaQwa, Bophuthatswana, KwaZulu, KaNgwane, Transkei, Ciskei, Gazankulu, Venda and KwaNdebele. Residential areas were segregated often by means of forced removals. According to Desmond (1971), the government's objective was to move 5% of the African population from the designated "white" areas to the homelands every year. Several laws regulated the movements of the African population. The Pass law, introduced in 1923, obligated the "black" population to carry passbooks when outside the designated homelands. Following the Group Areas Act in 1950, several influx controls were introduced to monitor the number of African people allowed to live and work in white areas (Platzky and Walker, 1985). People were relocated from "white" farms, from "black spots" (area of "black" settlement surrounded mainly by "white" farmers), from small town locations and from metropolitan areas. Removals were initially conducted by direct intervention of government authorities and following arbitrary searches and checks. Later, after 1980, the public emphasis was on people moving "voluntarily". The Group Areas Act was officially abandoned in 1986, although removals continued to take place through indirect

coercion by the authorities and the security police that resorted to intimidations and threats of arrest without the legal basis. (Platzky and Walker (1985), pp 152-76). In many townships and rural areas, for example, construction projects were frozen; hospitals, schools, and other public facilities for the "black" population were relocated to the homelands as a deliberate tactic to enforce "voluntary" removals to the homelands (Murray, 1987). There are no official records of removals and often statistical data were deliberately hidden. However, according to Platzky and Walker (1985), the process of forced removals affected some 3.5 million people in the period 1960-1982 excluding those households forcibly removed within the homelands due to the implementation of the "betterment plans" described below. Desmond (1971) provides the first attempt to document forced relocations, his narrative description of removals is the result of months of traveling throughout the country. Simkins (1983) reports some quantitative estimates of population changes and movements for the years 1950, 1960, 1970, and 1980 and estimates a net inflow to the homelands of about one million people in the decade 1960-1970 that originated mostly in the rural areas outside the homelands.

[Figure 1 about here.]

Figure 1 plots the frequency of arrivals at the current location for households living in the homelands, based on information from the two household surveys described in the next section. While it shows that the date of arrival is not always accurately reported, given the high frequency of rounded decades (this issue will be addressed later in the empirical analysis), it depicts an acceleration of movements at the end of 1980s. This is in line with the fact that evictions accelerated in this period partly in response to commercial farmers' concerns about legislation aimed at improving the security and working conditions of their workers (Lyne and Darroch, 2004). The process of forced relocations also continued within the homeland territories. According to Freund (1984), the fact that homelands were initially scattered across South Africa required a consolidation program that produced another massive wave of removals. Even after this process, a further reshuffling occurred due to concerns about the ethnic hetereogeneity within the homelands. A series of "betterment plans" were implemented from 1930 onwards to control land usage; these are considered to have produced the most widespread and largest in numbers form of resettlement in South Africa. De Wet (1994) argues that, including intra-homeland relocations, at least seven million Africans have been resettled for political purposes since 1913. Under this program, designated areas were divided into distinct land use zones: residential, arable and grazing areas. Land regarded as unsuitable for cultivation was no longer available, so that in some areas people were left with less arable land than they had before or they lost their arable land altogether (de Wet, 1987). Finally, households were also removed for strategic and infrastructural reasons, for example to create space for dam projects (Woodstock and Upper Tugela) or for the clearance of South African borders (Freund, 1984). Finally, it is worth noting that forced removals did "not follow a pre-determined and predictable blueprint.

Potential victims could not entirely count on the next move of the state" (Freund, 1984 p. 52) since official removal plans often appeared in contradictory forms in different official publications.

3.1 Forced removals and access to land

The relationship between removals and access to land lies in the increasing population density in the former homelands. The total population density in South Africa almost doubled between 1970 and 1995, from almost 19 people per square km in 1970 to 34 people per square km. The situation was more dramatic in the homeland areas that constitute less than 14% of the African territory and host a large share of the population. According to Simkins (1983), only 4.3 million people (39% of the then population) lived in the homelands in 1950, a figure that rose steeply to 11.1 million in 1980 (53%). Forced removals and settlement planning were major contributors to the overcrowding in the homelands. The Qwaqwa homeland, for instance, saw its population rise from 24,000 in 1970 to 400,000 in 1983 following a period of massive relocations. It is estimated that by 1983 its population density had reached 1,000 per square kilometer (de Wet, 1994). The increased population density in the homeland areas inevitably led to increasing pressure on the available land for farming and residential purposes. Hence, those who arrived later in the homelands were less likely to have access to land and particularly to larger plots of land. These patterns are reflected in land endowment data from the Rural Survey 1997. Figure 2 shows the inverse relationship between both land access and size and the date of arrival at the new residence. This negative correlation forms the basis of the identification strategy adopted in this study.

[Figure 2 about here.]

The two surveys used in this paper and described below were conducted in 1996 and 1997, two and three years respectively after the end of the apartheid. Although land distribution has been a major concern since 1995, the first period was mainly characterized by policymaking, consultation, and the building of institutions for the delivery of a land reform. Government strategies for reconstruction and development became part of South Africa's Constitution later in 1996 and the final policy framework, the White Paper on South African Land Policy, was implemented in 1997. The available data on land in the two surveys are, therefore, most likely to be unaffected by post-apartheid land reforms. This constitutes an advantage for this analysis since the use of pre-land reform data makes information on historic migration to the homelands a better indicator of land endowment. In general, movements to the homelands can be attributed to forced removals through coercive actions, intimidation, and pressure by the public authorities and security police. Case studies discussed in Platzky and Walker (1985), the narrative evidence reported in Desmond (1971) and other anecdotal evidence suggest that no households were

inclined to move to the overcrowded and unpleasant homelands voluntarily. Further, the homeland that a household was assigned to was chosen according to their ethnic group or the language spoken (Platzky and Walker, 1985) and was, therefore, excluded from household decision-making. Moreover, an important qualification needs to be made. The empirical analysis proposed in this paper considers only those households that moved to the current location during the period under consideration. Therefore, although the results may not be generalized to the entire population of the homelands, they are not driven by systematic differences between original inhabitants and new incomers. As far as the timing of relocations is concerned, a specific time pattern cannot be identified since relocations from white rural areas overlapped with removals from urban areas, black spots, sites allocated to strategic infrastructures and for "betterment planning". Thus, the year of arrival in the homelands cannot be associated to specific causes or conditions. Moreover, because unobservable characteristics were also likely to be unknown to the authorities that enforced the relocations, they are likely to be uncorrelated with the timing of arrivals. These circumstances provide a useful setting to analyze the relationship between land and household welfare by taking advantage of the exogeneity of the year of arrival to households' welfare-generating ability and its correlation with land access and size.

4. Data

The data used in this analysis are drawn from two different datasets: the KwaZulu-Natal Development Indicators Household survey (KZN-DIHS) of 1996 and the Rural Survey of 1997. These are the only available datasets that provide information on both land and migration history. I opted to use both surveys mainly because neither of them provides exhaustive information for the purpose of this analysis. The Rural Survey 1997 provides data on the amount of land available to the household and detailed information on farming activities. However, it does not provide information on location (distance to the nearest town) and on the previous district of residence. This latter information, in particular, is useful to narrow down the focus of the analysis and provide further support for the use of the estimation strategy adopted in this study. In this regard, the KZN-DIHS 1996 provides more detailed information on migration to the homelands but is confined to a much smaller sample and provides information only on whether or not a household has access to land with relatively little information on farming activities. Because of the different types of information on land provided by the two surveys, a binary variable indicating access to land and a continuous variable indicating land size are used. The analysis is, hence, conducted separately for each dataset.

The KZN-DIHS has been conducted by the KwaZulu-Natal Provincial Government and the Human Sciences Research Council (HSRC). The complete survey covers 6500 households across the province of KwaZulu-Natal, which includes the former homeland of KwaZulu. The sample size has been reduced to consider only the households living in rural areas. This cross-

section survey has been used mainly because it provides information on both the year of arrival and the previous district of residence, which makes it possible to establish whether a household has moved from a non-homeland area. The survey provides detailed information on household living conditions and asset ownership that are useful for the construction of a welfare index. It also provides information on household consumption that will be used in one of the empirical specifications proposed below.

The analysis of the impact of land size on household welfare uses the Rural Survey 1997 conducted by Statistics South Africa, which collected information on 6,000 rural households located in the 10 former homeland territories. This cross-section survey provides information on the amount of land available to each household for farming purposes, although less detailed information is available on asset holding, income or consumption. Another drawback of this survey is the lack of information on the previous district of residence rendering a distinction between movements to and within the homelands impossible.

[Table 1 about here.]

The summary statistics of the variables used in the empirical analysis and reported in table 1 provide an overview of the main characteristics of the households considered in this study. According to the KZN-DIHS, 38% of the households living in rural areas in the KwaZulu Natal province have access to land. Among rural households residing in the former homelands, 65% of those interviewed by the Rural Survey have access to at least a plot of land. Plots are in general small with an average size of 1.41 hectares and consequently only 10% of the households produce farm products for sale, while the majority cultivates the land exclusively to provide food for home consumption. The average household size is between 4 and 5 members. Adult members have on average 5 to 6 years of education, far less than the 9 years of compulsory education introduced in 1996.

5. Measuring household welfare using principal component analysis

Household welfare is measured using an asset index[3] . This approach is used mainly to construct a similar measure of welfare across the two surveys since accurate information on consumption or income is not available in the Rural Survey 1997. Although the choice has been mainly driven by the availability of data, this approach has some advantages. An asset index captures aspects of household welfare that are usually neglected using monetary measures, for example, access to basic services such as water and electricity. Moreover, because ownership of assets is easily verified, it is expected to be more accurate than consumption expenditure data, which are usually

[3] This approach implies the validity of interpersonal utility comparisons. This assumption has, however, received some criticism. Binmore (2009) offers an interesting overview of how utility is understood by modern economists.

recorded using retrospective questions. A possible alternative approach would be to compute the total value of the assets owned by the household. However, asset prices are not available in the two surveys used in this study.

The asset index has been constructed using principal component analysis. This approach has been evaluated by Filmer and Pritchett (2001) who demonstrate its suitability for measuring household welfare. Because ownership of different assets is highly correlated across households, it is advantageous to collapse information on specific asset ownership into a single new variable (McKenzie, 2005). This artificial variable, W_1 , is obtained as the weighted sum of a set of correlated variables indicating different assets. Given the vector of asset indicators ($x_1,\ldots, x_N$), where each vector x_n contains observations on each of the *N* assets for the *H* households in the sample, the asset index is represented by the following linear combination:

$$W_1 = f_1\left(\frac{x_1-\bar{x}_1}{s_1}\right) + \cdots + f_N\left(\frac{x_N-\bar{x}_N}{s_N}\right), n = 1, \ldots, N, \quad (1)$$

where, $\bar{x}_n$ and s_n are the mean and standard deviation of each asset over all households. The variables are, therefore, standardized to have zero mean and unit variance. The weights, f_n, are chosen so as to maximize the sample variance of the linear combination. This maximizes the modeled heterogeneity across households; assets that all or none of the households hold receive small weights since they do not explain the variation in welfare across households.

5.1 The welfare index

The results of the principal component analysis show that the first component explains 33% and 29% of the total variance in the data for the KwaZulu-Natal and the Rural Survey respectively. The vector of asset indicators contains dummy variables indicating the ownership of specific assets (fridge, washing-machine, vacuum cleaner, microwave and car - not available in the Rural Survey 1997), characteristics of the house (brick structure, traditional, type of toilet) and access to utilities (electricity and water), and some numerical variables such as the number of rooms in the house.

[Table 2 about here.]

The results are reported in table 2. Considering the dummy variables, the scores can be easily interpreted. A positive score indicates that owning the asset leads to a higher welfare index. As the results show, inferior assets are assigned a negative score, as in the case of the traditional-type houses and toilets of different types not connected to the sewer system.

[Table 3 about here.]

Regarding the Rural Survey 1997, although the approach uses a reasonable range of assets, the lack of information on household non-agricultural assets, such as television and cars, could lead to an incomplete account of household living standards. Nevertheless, the asset index constructed using the Rural Survey seems to perform well when compared to an income-based measure of welfare. This is reported in the second block of columns of table 3 that shows how higher values of the asset index are associated with higher income per capita. Because information on income is provided only by categories, data on household expenditure would yield a more robust comparison, as it is done for the KZN-DIHS. Nonetheless, this comparison still provides additional support to the use of this asset index as a measure of household welfare.

6. Analysis of the impact of land on household welfare

This section outlines the empirical procedure used to estimate the relationship between land endowments and household welfare. The base empirical specification is the following:

$$w_i = \alpha + \beta A_i + \theta X_i + \varepsilon_i, \quad (2)$$

where w_i represents the asset index estimated using principal component analysis and A_i denotes land endowments and can be either a dummy variable indicating whether the household has access to land (from the KZN-DHIS 1996) or a continuous variable measuring land size (from the Rural Survey 1997). X_i is a set of household and district-level characteristics expected to affect household welfare. It includes key characteristics of the household head: gender, age, and education. The latter two variables, together with variables indicating the highest level of education in the household and the number of skilled members, are expected to capture the contribution of human capital to household welfare. The Old Age Pension Program (OAP) provides generous income transfers to African households and could bias the results if omitted[4]. The regressions, therefore, control for the presence of pension eligible members to avoid the potential endogeneity of actual pension take-up. To this end, a dummy variable is included that takes a value of one if a household member is over 60 (women) or 65 (men). Additional control measures include the number of children in different age categories, the number of unskilled members and magisterial district-level characteristics such as population density and the rate of employment. Additional variables are added to address specific empirical issues and will be discussed in the next section.

[4] Lovo (2011), using data on farm households in the KwaZulu Natal province, finds that the pension transfer has a significant impact on farm household technical efficiency.

6.1 Identification strategy

The majority of the households surveyed received their land from the local or tribal authority and about 82% do not possess title deeds. The absence of a land market could lead to the conclusion that land should be considered as an exogenous variable since households cannot easily adjust land size according to their needs. However, the presence of unobservable household characteristics that could be potentially correlated with both land endowments and household welfare challenges the exogeneity of this variable. Unobserved land quality, social status, habits, and attitudes toward agriculture, for example, are likely to be correlated with both household welfare and access to land. Moreover, it is likely that households that have experienced relatively unfavorable circumstances in the labor market are more likely to access land, thereby biasing downward the coefficient of the land variable. To address the endogeneity problem, I use the date of arrival at the current location as an instrument for land access and size. As discussed in section 3.1, the date of arrival can reasonably be considered independent of households' welfare potential. The instrumental variables (IV) regression is the following:

$$w_i = \alpha + \beta \hat{A}_i + \theta X_i + \varepsilon_i, \quad (3)$$

where $\hat{A}_i$ is obtained from a first-stage regression where the year of arrival at the current location is used as an instrument for land access and size. Although the non-negativity of the land size variable and the binary nature of the land access variable may suggest the use of a nonlinear first-stage regression, a conventional linear IV model is used as it is consistent regardless of the non-linearity of the first stage and under a broader set of assumptions (Angrist, 2001).

[Table 4 about here.]

Table 4 reveals that households that moved more recently tend to be younger. Because the age structure of the household could affect welfare and may be captured by the instrument, regressions include controls for the age of the household head and a polynomial expansion of the age of the oldest member of the household. An additional issue arises if, for example, later incomers had access to fewer job and business opportunities given the increasing population pressure in the homelands. Because this is likely to affect the probability of finding a job, it could lead to a potential correlation between the year of arrival and households' unobservable ability to generate welfare. Unfortunately it is not possible to control for household-specific employment opportunities. However, when plotting the current average shares of unemployed members per household by year of arrival, using the KZN-DIHS data (figure 3), there does not seem to be a correlation between the two, suggesting that later arrivals are not worse off in terms

of job opportunities[5]. Similar results are found using the data from the Rural Survey 1997. This can also be explained by the fact that most of the people arriving in the homelands became cross-border commuters, living in the homelands and commuting to work in ”white” areas (Murray, 1987). Further controls for local population density and employment rate should also capture the availability of job opportunities in the district of residence. Additional robustness checks are conducted and discussed in the next sections.

[Figure 3 about here.]

7. Estimation results: access to land and household welfare in the KwaZulu-Natal province

This section reports and discusses the effects of access to land on household welfare in the KwaZulu-Natal province. The results have been obtained using an initial sub-sample of 4,372 rural African households provided by the KZN-DIHS 1996 and are reported in table 5. The first two columns report the results of the ordinary least squares (OLS) estimation of equation 2 and show a positive correlation between land access and household welfare, although the effect becomes statistically insignificant when the sample is reduced to only those households that changed location during the period 1948 and 1993 (column 2). As discussed above, a potential endogeneity bias could be driving these results. For this reason, the other columns report instrumental variable (IV) estimates. In all specifications, the instrument is the year of arrival at the current location. Households that moved after 1994, i.e. after the end of the apartheid, are excluded from the analysis. The households considered are, therefore, those that moved between 1948 and 1993 since no household reports a year of arrival earlier than 1948. Unfortunately, using this instrument reduces the sample size noticeably to about 700 households. The first-stage regressions (not reported) are strong with F statistics above 10 (reported at the bottom of the table)[6] . Column 3 and subsequent specifications control for differences in age structure across households. All regressions include district council dummies to control for differences in environmental and local conditions.

[Table 5 about here.]

[5] The larger variance for the period 1950-70 is due to the lower number of observations.

[6] Given the availability of only one instrument, it is not possible to test for overidentifying restrictions. However, because any function of the instrument can potentially be a suitable instrument, using both the year of arrival and its square as instruments the model is overidentified. The overidentification test statistic reveals that the null hypothesis of joint validity cannot be rejected and increases the confidence in the instrument. However it is worth noting that the overidentification test relies on the assumption that at least one instrument is valid. Therefore in this case, if this assumption does not hold for one of the instruments it necessarily does not hold for the other. This reduces the power of the test. Because first-stage regressions are better fitted with the year of arrival only, the results reported here consider only one instrument.

The coefficient increases notably when land is instrumented with the year of arrival and the Durbin-Wu Hausman test suggests that the IV results are to be preferred to standard OLS. The downward bias of the OLS estimates could be explained by selection issues given that more disadvantaged household are more likely to engage in agricultural activities and hence the estimated effect of land on welfare may be small or even negative (Carter and May, 1999). Therefore, neglecting this source of endogeneity would yield a more pessimistic estimate of the relationship between land and welfare. The instrumental variable estimates reveal that the effect of access to land on welfare is large. Land access causes a welfare increase of about 2.5 units, which, on average, is sufficient to shift a household from the lowest to the top quintile of the welfare distribution. In the IV specifications discussed so far, about 70% of the households live in a former homeland territory. Column 4 reports the results for these households. The KwaZulu homeland comprises of a large number of non-contiguous parts spread throughout the KwaZulu-Natal province. The province created in 1994 incorporates the former homeland of KwaZulu and the surrounding province of Natal. Households in the sample are assigned to the former homeland on the basis of their magisterial district of residence. The magisterial districts belonging to the former homeland were identified based on information provided by Cox (2004) and the map that overlaps the KwaZulu homeland borders with magisterial district boundaries reported in Pauw (2005). The results reported in column 4 confirm previous findings. Although the sample size is further reduced, the instrument maintains its explanatory power. This sub-sample, however, still considers both households that moved to and within the homeland, and therefore it may include households that voluntarily changed location within the KwaZulu homeland. This issue is not expected to have a significant effect, since a large fraction of within-homeland movements are expected to be the result of government "betterment planning". According to Platzky and Walker (1985), in fact, more than a million people were moved as a result of "betterment plans" in KwaZulu from 1950 to 1985. In order to further strengthen the results, however, the estimates reported in column 5 are obtained by additionally restricting the sample to those households that migrated from non-homeland areas given the lower probability of encountering voluntary migration in this subsample. The coefficient of the land variable remains stable and significant and no relevant changes are observed on the other explanatory variables. Because the time of arrival could also have affected the location of the household with potential implications on household welfare, column 6 of table 5 controls for household road distance to the nearest town and shows similar results.

Since consumption data are included in the KZN-DIHS survey, column 7 reports the results of the same specification in column 6 where the dependent variable is food consumption per adult equivalent computed using the OECD equivalence scale[7]. When using this alternative measure of household welfare, access to land still shows a positive effect. In addition, this specification

[7] The OECD equivalence scale assigns a value of 1 to the first member of the household, 0.7 to each additional adult, and 0.5 to additional children in the household.

offers the opportunity to provide an economic interpretation of the results. Access to land has a large effect on household welfare by generating an increase in per-adult equivalent food consumption close to its median value. Finally, the last column reports the results when the same specification is applied to the Rural Survey 1997. These results appear in line with the findings obtained so far although some issues related to the Rural Survey dataset need to be further addressed as it is done in the following section. Although the main focus of this analysis is the impact of land on household welfare, some useful insights can be obtained by analyzing the effects of the other covariates. Education plays an important role in contributing to household welfare. This is shown by the positive and significant effect, throughout most of the specifications, of the education level of the household head and of the highest educational attainment among the household members. It is also reflected in the negative effect of the number of unskilled members, which likely also captures the effect of the lack of labor market opportunities for less educated household members.

8. Estimation results: land size and household welfare in the former homelands

In this section I explore the relationship between land size and welfare using data from the South Africa Rural Survey 1997. The first column of table 6 reports the estimates of the OLS estimation of equation 2 considering those households that changed location during the period 1913-1994. The dependent variable is the asset index constructed using principal component analysis and summarized in the last column of table 3. The results show a positive correlation between land size and household welfare. The remaining columns report the IV estimates. The F statistics of the first stage regressions, reported at the bottom of the table, confirm the relevance of the instrument. The IV results show that an additional hectare of land produces an increase of 0.610 units in the welfare index, which is sufficient, on average, to cause a shift to a higher decile of the welfare distribution.

[Table 6 about here.]

Column 3 reports the results when additional controls for the age structure of the household are included, namely a polynomial expansion of the ages of the oldest man and woman in the household. This is also included in the subsequent specifications. All regressions include province dummies to control for differences in environmental and other local conditions. In column 4, a variable capturing variation in land quality across districts is included and is intended to control for the potential correlation between the year of arrival and the quality of the land. Unfortunately, it does not capture plot-specific land quality but measures average maize production per hectare at district level. The results are in line with previous findings and the coefficient of the land quality index is not significant. This can be explained by the fact that land in the former homelands is, in general, of poor quality with little variation within the territory

(Desmond, 1971). Because the survey does not report the reasons for moving, one of the main concerns is that forced removals could be confounded with voluntary migration. Voluntary relocations were more likely to occur within the homelands since, as previously mentioned, conditions in the homelands were extremely unfavorable and descriptive evidence suggests that no households would voluntarily move to these overcrowded and unpleasant areas. Unfortunately, it is not possible to establish whether the household moved to or within the homeland of current residence since the 1997 Rural Survey does not provide information on the previous place of residence. It is worth noting, however, that massive forced relocations were also implemented within the homeland territories, often motivated by "betterment plans" implemented since 1930. Therefore, movements within the homelands are also likely to be the result of coercive government policies, although no direct evidence is available. To further address this problem I use the 1996 South African population census, which provides information on the year of arrival at the current location and the district of previous residence. Based on this information it is possible to exclude from the analysis those areas that have the highest percentage of intra-homeland movements and thus also feature the highest probability of voluntary movements. Table 7 reports the distribution of movements by homelands and distinguishes between "within-" and "to-" homeland migration. According to these figures, the two former homelands of Transkei and Venda have the highest percentage of within-homeland movements. In these homelands, 89% and 86% of the households that moved during the period 1913-1994 were previously residing within the same homeland. Column 5 of table 6 reports results that exclude households living in these two homelands. The estimates reported confirm previous findings although the F statistic of the first-stage regression is now lower due to the reduced sample size.

[Table 7 about here.]

A potential bias could also arise if forced removals had a direct welfare cost. This issue is partially ruled out by considering only households that arrived before the end of the apartheid, i.e. only households that have been residing in the current location for at least 3 years. A further analysis is conducted by excluding from the sample those households that arrived in the current location before 1990. Although post-arrival tangible and intangible displacement costs can directly affect household welfare, it is reasonable to expect that after at least 7 years of residence in the same location the household had overcome initial difficulties. The results reported in column 6 confirm previous findings. The coefficient of the land variable, although reduced in size is still positive and significant. This result confirms that the instrument is not capturing the effect of displacement costs associated with the length of the residence in the current location. Because figure 1 reveals that households tend to report the year of arrival in rounded decades, I drop those households that could potentially be misreporting the year of arrival (i.e., those households that arrived in 1920, 1930, 1940, 1950, 1960, 1970, 1980 and 1990). The results are

reported in column 7. The instrument improves its predictive capacity, so that the F statistic of the first stage is now above 16 with results again similar to previous findings.

[Table 8 about here.]

Similar results, reported in table 8, are also found when different sub-periods are considered, i.e. when households that moved before 1930, 1950 and 1958 are subsequently removed from the sample. These dates correspond to the main events that affected the process of forced removals: "betterment plans" were introduced in 1930, the Group Areas Act was introduced in 1950 and "black" people were officially assigned to a homeland territory in 1958. Especially the initial period 1913-1950 is characterized by lower enforcement since the official influx control was introduced with the Group Areas Act in 1950. Finally, because those homelands that obtained independence at some point, namely Transkei in 1976, Bophuthatswana in 1977, Venda in 1979 and Ciskei in 1981, were rewarded by the government through new roads, shopping centers and hotels (Platzky and Walker (1985), p 23), an additional specification (table 8, column 4) includes a dummy variable indicating whether or not the homeland obtained independence; the results are almost unchanged.

In line with the results reported in the previous section, the level of education of the household head positively affects household welfare. The number of unskilled members has a negative effect, although not always significant, probably signaling the presence of constraints in the labor market for less educated household members. The significantly positive effect of the employment rate at district level indicates how a more developed local labor market can positively influence household welfare. Finally, households with a male head are worse off in comparison to households headed by females. An explanation might be that, in rural areas, male heads usually tend to migrate to urban centers and, therefore, their presence in the household could signal a lack of off-farm sources of income. Although the paper finds a positive relationship between land endowments and welfare, it is not possible to identify how these effects are transmitted. The high share of households producing mainly for home consumption suggests that land can benefit households by providing a cheaper source of food. However, other mechanisms could be in action and cannot be disentangled without extensive further investigation.

9. Conclusions

This paper explores the relationship between land endowments and household welfare. Although the economic theory supports a positive relationship between land and welfare, little empirical evidence is available mainly due to the difficulties in identifying the causal relationship between land and measures of household welfare. The potential endogeneity of land is here addressed

using historical data on migration to the former homelands. Data on the year of arrival at the current location reveal a negative correlation between land endowment and arrival date that is in line with records of rising population pressure and increasing scarcity of land in the homelands since the introduction of the Native Land Act in 1913. The year of arrival is expected to be independent of households' unobserved ability to generate welfare. Movements to the homelands, in fact, can be attributed to the massive forced removals conducted by the central government with the aim of segregating the African population into different homelands according to their ethnic background. Movements within the homelands can also be largely explained by government "betterment plans" aimed at rearranging territories in the homelands. The empirical specification adopted in this paper assumes a linear relationship between land size and household welfare and hence the potential non-linear effects of land endowments are not captured. Finan et al. (2005), for example, argue that credit and labor market imperfections can affect the ability of households to maintain production intensity when land area increases. Therefore, the relationship between land and household welfare seems to follow a more complex pattern. Non-linear analyses, however, often require non-parametric techniques or non-linear specifications where the presence of potential endogenous explanatory variables requires the use of less conventional and more complex solutions, if possible. Nevertheless the relevance of such heterogeneous effects leaves room for further research on the relationship between land and welfare across different dimensions of the farm household. Results show the positive effect of land access and size on household welfare. A set of alternative specifications control for the presence of confounding effects produced by the potential correlation between the year of arrival and the location of the household, displacement costs and the quality of the land. This positive relationship, however, cannot be attributed to one or more transmission mechanisms, and again leaves room for further investigation. Nevertheless, these results suggest that reforms aimed at improving access to land, a major concern of post-apartheid governments, have the potential to reduce poverty. Moreover, because the households considered in this analysis are living in relatively disadvantaged and less fertile areas - the homelands - these results are likely to provide a lower bound for the positive effects of land access on household welfare.

While the focus of this paper is limited to the relationship between land and the welfare of smallholders, the effects of a land reform will, however, extend beyond those on the direct beneficiaries. A notable caveat of land reforms is that they may initially lower agricultural output due to the fact that small-scale farmers tend to be less productive than commercial farmers. Therefore, while this paper shows a clear positive relationship between land and household welfare, no attempt has been made to assess the overall societal impact of a land reform, which will also require a degree of value judgment about the trade-off between equity, efficiency and the legitimacy of a land redistribution from commercial to small farmers.

References

Andrew, M., A. Ainslie, and C. Shackleton (2003). Land use and livelihoods. In *Evaluating Land and Agrarian Reform in South Africa*, Cape Town. Programme for Land and Agrarian Studies, University of the Western Cape.

Angrist, J. D. (2001). Estimation of limited dependent variable models with dummy endogenous regressors: simple strategies for empirical practice. *Journal of Business and Economic Statistic 19* (1), 2–16.

Besley, T. and R. Burgess (2000). Land reform, poverty reduction, and growth: Evidence from India. *The Quarterly Journal of Economics 115* (2), 389–430.

Binmore, K. (2009). Interpersonal comparison of utility. In H. Kincaid and D. Ross (Eds.), *Oxford Handbook of Philosophy of Economic Science*. Oxford University Press.

Burgess, R. (2001). Land and welfare: Theory and evidence from China. Working paper, Department of Economics and STICERD, London School of Economics.

Carter, M. R. and J. May (1999). Poverty, livelihood and class in rural South Africa. *World Development 27* (1), 1–20.

Cox, K. R. (2004). Urbanization in South Africa and the changing character of migrant labour. *South African Geographical Journal 86* (1), 7–16.

de Wet, C. (1987). Betterment planning in South Africa: some thoughts on its history, feasibility and wider policy implications. *Journal of Contemporary African Studies 6* (1/2), 85–122.

de Wet, C. (1994). Resettlement and land reform in South Africa. *Review of African and Political Economy 61*, 359–373.

Desmond, C. (1971). *The discarded people: an account of African resettlement in South Africa*. Harmondsworth: Penguin.

Eswaran, M. and A. Kotwal (1986). Access to capital and agrarian production, *The Economic Journal 96* (382), 482–498.

Fenwick, L. J. and M. C. Lyne (1999). The relative importance of liquidity and other constraints inhibiting the growth of small-scale farming in KwaZulu- Natal. *Development Southern Africa 16* (1), 141–155.

Filmer, D. and L. H. Pritchett (2001). Estimating wealth effects without expenditure data - or tears: an application to educational enrollments in states of India. *Demography 38* (1), 115–132.

Finan, F., E. Sadoulet, and A. de Janvry (2005). Measuring the poverty reduction potential of land in rural Mexico. *Journal of Development Economics 77* (1), 27–51.

Freund, B. (1984). Forced resettlement and the political economy of South Africa. *Review of African Political Economy 29*, 49–63.

Keswell, M., M. Carter, and K. Deininger (2010). Poverty and land redistribution: Quasi-experimental evidence from South Africa's LRAD program. Mimeo, Stellenbosch University.

Lipton, M. and M. Lipton (1993). Creating rural livelihoods: some lessons for South Africa from experience elsewhere. *World Development 21* (9), 1515–1548.

Lovo, S. (2011). Pension transfers and farm household technical efficiency. Evidence from South Africa. *American Journal of Agricultural Economics 93* (5),
1391–1405.

Lovo, S. (2012). Market imperfections, liquidity constraints and farm household labour allocation. The case of rural South Africa. *Agricultural Economics 43* (4), 417–428.

Lyne, M. and M. Darroch (2004). Land redistribution in KwaZulu-Natal, South Africa: Five census surveys of farmland transactions, 1997-2001. Basis crsp, Department of Agricultural and Applied Economics.

McKenzie, D. J. (2005). Measuring inequality with asset indicators. *Journal of Population Economics 18* (2), 229–260.

Murray, C. (1987). Displaced urbanization: South Africa's rural slums. *African Affairs 86*, 311–29.

Pauw, K. (2005). Forming representative household and factor groups for a South African SAM. Technical paper series, PROVIDE Project.

Platzky, L. and C. Walker (1985). *The Surplus People: Forced Removals in South Africa*. Johannesburg: Rivan Press.

Scogings, P., T. de Bruyn, and S. Vetter (1999). Grazing into the future: Policy making for South African communal rangelands. *Development Southern Africa 16* (3), 403–414.

Shackleton, C. M., S. E. Shackleton, and B. Cousins (2001). The role of land-based strategies in rural livelihoods: the contribution of arable production, animal husbandry and natural resource harvesting in communal areas in South Africa. *Development Southern Africa 18* (5), 581–604.

Simkins, C. (1983). *Four essays on the past, present and possible future of the distribution of the black population in South Africa*. Cape Town: Saldru.

Singh, I., L. Squire, and J. Strauss (1986). *Agricultural Household Models*. Baltimore: Johns Hopkins University Press.

Valente, C. (2009). The food (in)security impact of land redistribution in South Africa: microeconometric evidence from national data. *World Development 37* (9), 1540–1553.

Tables and Figures

Table 1: Descriptive statistics of the main variables of interest

	(1) KZN-DIHS 1996 Mean (sd)	(2) Rural Survey 1997 Mean (sd)
Land (dummy)	0.38	0.65
	(0.49)	(0.47)
Hectares of land		1.41
		(3.57)
Education household head (dummy)	4.07	4.66
	(3.37)	(4.63)
Age of household head	49.25	56.25
	(14.23)	(16.22)
Gender of household head (dummy)	0.75	0.51
	(0.43)	(0.50)
Pension eligible members (dummy)	0.28	0.42
	(0.45)	(0.49)

Children	1.61	2.97
	(1.49)	(2.01)
Number of skilled members	0.80	1.08
	(1.15)	(1.22)
Number of unskilled members	2.20	2.00
	(1.45)	(1.31)
Average education of adult members	5.21	6.58
	(3.16)	(3.49)

Author's calculation using the KZN-DIHS and the Rural Survey.

Table 2: Scoring factors and summary statistics

	1) KZN-DIHS 1996			(2) Rural Survey 1997		
	Score *f*	Mean	Sd	Score *f*	Mean	Sd
Electricity (dummy)	0.27	0.37	0.48	0.22	0.26	0.44
Near water (dummy)	0.14	0.67	0.47	0.04	0.36	0.48
Flush toilet (dummy)	0.34	0.16	0.37	0.03	0.01	0.08
Pit latrine (dummy)	-0.27	0.75	0.43	0.46	0.71	0.45
Other toilet (dummy)	-0.02	0.09	0.29	-0.47	0.28	0.45
Brick structure (dummy)	0.31	0.19	0.39	0.45	0.47	0.5
Traditional house (dummy)	-0.28	0.66	0.47	-0.46	0.5	0.5
Rooms per person	0.14	0.63	0.38	0.22	0.93	0.71
Number of rooms (dummy)	0.02	2.45	1.23	0.24	4.75	2.52
Own fridge (dummy)	0.29	0.23	0.42			
Own washing machine	0.33	0.05	0.23			
Own vacuum cleaner	0.33	0.05	0.23			
Own microwave (dummy)	0.35	0.07	0.26			
Own car (dummy)	0.31	0.13	0.33			

Table 3: Descriptive statistics of the asset index by food consumption and income per capita

KZN-DIHS 1996		Rural Survey 1997	
Consumption pc Quartile	Welfare index Mean (sd)	Income pc Quartile	Welfare index Mean (sd)
1	-0.839	1	-0.393
	(1.092)		(1.697)
2	-0.719	2	-0.030
	(1.176)		(1.689)
3	-0.241	3	0.011
	(1.645)		(1.670)
4	2.475	4	0.451
	(3.492)		(1.693)

Table 4: Descriptive statistics of household age structure by decade of arrival

KZN-DIHS 1996			Rural Survey 1997	
Decade	Household head	Oldest member	Household head	Oldest member
1910			62.333	67.364
			(17.947)	(13.313)
1920			63.543	65.371
			(12.312)	(10.834)
1930			60.734	64.298
			(11.673)	(10.569)
1940			58.105	61.581
			(13.460)	(12.840)
1950	68.571	68.571	59.684	62.538
	(11.013)	(11.013)	(16.102)	(15.584)
1960	57.120	60.080	58.263	61.053
	(11.805)	(13.982)	(15.283)	(14.632)
1970	51.831	52.442	55.989	58.160
	(12.557)	(13.689)	(14.309)	(14.636)
1980	46.373	46.906	51.443	53.770
	(12.257)	(12.856)	(15.342)	(15.708)
1990	41.473	42.068	45.736	47.539
	(13.313)	(14.189)	(15.523)	(16.127)
Total	44.657	45.296	53.454	55.832
	(13.629)	(14.477)	(15.892)	(16.077)

Standard errors are reported in parenthesis. Author's calculation using the KZN-DIHS and the Rural Survey.

Table 5: OLS and IV regressions of the effect of access to land on household welfare

	OLS		IV						
	(1)	(2)	(3)	(4)	(5)[a]	(6)[b]	(7)[c]	(8)[d]	(9)[e]
Land (dummy)	0.234***	0.250	2.549**	2.537*	3.380**	3.813**	3.212*	122.431**	3.873**
	(0.067)	(0.194)	(1.295)	(1.301)	(1.682)	(1.821)	(1.698)	(51.736)	(1.588)
Education household head	0.190***	0.234***	0.090***	0.096***	0.116***	0.112*	0.131**	9.318***	0.043***
	(0.013)	(0.033)	(0.034)	(0.034)	(0.044)	(0.068)	(0.064)	(2.197)	(0.014)
Age of household head	0.026**	0.005	0.004	0.074	0.093	-0.069	-0.252	-6.496	-0.028
	(0.013)	(0.037)	(0.041)	(0.148)	(0.192)	(0.288)	(0.259)	(7.363)	(0.035)
Male head (dummy)	0.385***	0.507***	0.373**	0.398**	0.020	-0.371	-0.171	-7.369	0.073
	(0.061)	(0.180)	(0.190)	(0.190)	(0.323)	(0.682)	(0.636)	(15.851)	(0.137)
Pension eligible (dummy)	-0.150	-0.269	-0.139	0.303	0.336	2.082*	1.511	56.745*	-0.130
	(0.100)	(0.314)	(0.322)	(0.430)	(0.544)	(1.106)	(1.022)	(34.392)	(0.135)
Children age 1-5	-0.189***	-0.033	-0.097	-0.091	-0.198	-0.228	-0.228	-20.046**	-0.003
	(0.044)	(0.136)	(0.173)	(0.172)	(0.217)	(0.278)	(0.249)	(9.735)	(0.043)
Children age 6-17	-0.212***	-0.244***	-0.326***	-0.338***	-0.424***	-0.420**	-0.400**	-17.029***	-0.001
	(0.022)	(0.062)	(0.085)	(0.086)	(0.134)	(0.172)	(0.162)	(5.516)	(0.027)
Skilled members	0.013	0.163	0.007	0.012	-0.013	0.122	0.239	-11.024	0.069
	(0.040)	(0.116)	(0.141)	(0.140)	(0.189)	(0.250)	(0.235)	(7.419)	(0.046)
Unskilled members	-0.350***	-0.506***	-0.516***	-0.496***	-0.504***	-0.802***	-0.738***	-27.983***	-0.104**

	(0.023)	(0.071)	(0.117)	(0.118)	(0.145)	(0.239)	(0.213)	(8.069)	(0.044)
Highest level of education	0.497***	0.521***	0.454***	0.454***	0.439**	0.303	0.279	3.327	0.066***
	(0.055)	(0.135)	(0.143)	(0.143)	(0.173)	(0.263)	(0.245)	(10.236)	(0.019)
Emp rate (district)	1.146***	1.935***	1.826***	1.815***	1.059	-0.736	-1.755	-0.968	0.932***
	(0.187)	(0.509)	(0.577)	(0.579)	(1.076)	(1.644)	(1.553)	(61.172)	(0.190)
Pop density (district level)	-0.000	0.002***	0.003***	0.003***	0.004***	0.004***	0.004***	0.111**	-0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.049)	(0.000)
Road distance							-0.089***	-0.963	
							(0.027)	(1.057)	
District dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age of oldest member	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4372	750	694	694	496	199	199	198	2738
Kleibergen-Paap F stats			15.063	14.918	11.622	13.372	12.926	13.274	12.466
Durbin-Wu-Hausman			0.012	0.013	0.006	0.030	0.052	0.019	0.001

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include the squared age of the household head. Tests of overidentifying restrictions performed using both the year of arrival and its square do not reject the null hypothesis that the instruments are valid. [a] considers only households living in the homeland. [b] and [c] excludes households that moved within the homeland. In [d] the dependent variable is per capita food consumption. [e] uses the Rural Survey 1997. All regressions consider households that moved during the period 1948-1994.

Table 6: OLS and IV regressions of land size on household welfare

	OLS	IV					
	(1)	(2)	(3)	(4)	(5)[a]	(6)[b]	(7)[c]
Land (hectares)	0.011**	0.608**	0.616**	0.612**	0.934**	0.421**	0.431**
	(0.005)	(0.240)	(0.254)	(0.249)	(0.425)	(0.213)	(0.190)
Education of household head	0.061***	0.063***	0.063***	0.063***	0.072**	0.054***	0.059***
	(0.008)	(0.016)	(0.016)	(0.016)	(0.028)	(0.013)	(0.014)
Age of household head	0.028**	0.006	0.003	0.004	-0.008	0.012	0.024
	(0.011)	(0.026)	(0.033)	(0.033)	(0.057)	(0.029)	(0.027)
Gender of household head (dummy)	0.082	-0.259	-0.367*	-0.369*	-0.600	-0.239	-0.301
	(0.058)	(0.166)	(0.218)	(0.220)	(0.395)	(0.189)	(0.204)
Pension eligible members (dummy)	-0.060	-0.096	-0.065	-0.070	-0.099	-0.066	-0.069
	(0.080)	(0.134)	(0.146)	(0.146)	(0.244)	(0.129)	(0.135)
Children age 1-5	-0.027	0.022	0.024	0.024	0.091	0.019	0.031
	(0.029)	(0.052)	(0.053)	(0.053)	(0.087)	(0.046)	(0.049)
Children age 6-17	-0.024	0.001	-0.001	-0.000	0.039	-0.019	-0.002
	(0.019)	(0.032)	(0.032)	(0.032)	(0.058)	(0.025)	(0.029)
Number of skilled members	0.085***	0.067	0.063	0.063	0.035	0.059	0.040
	(0.031)	(0.050)	(0.055)	(0.055)	(0.087)	(0.047)	(0.051)
Number of unskilled members	-0.073**	-0.052	-0.057	-0.057	-0.046	-0.078**	-0.096**
	(0.029)	(0.039)	(0.040)	(0.040)	(0.068)	(0.038)	(0.042)

Highest level of education	0.058***	0.030	0.029	0.029	-0.005	0.053***	0.044
	(0.013)	(0.034)	(0.034)	(0.034)	(0.059)	(0.019)	(0.029)
Labor market dev index (district level)	0.979***	1.774***	1.786***	1.717***	1.469**	1.431***	1.543***
	(0.129)	(0.479)	(0.495)	(0.421)	(0.654)	(0.363)	(0.357)
Population density (district level)	0.000**	0.001*	0.001*	0.001*	0.002*	0.001	0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Land quality index				0.063	0.314	0.056	0.023
				(0.126)	(0.222)	(0.123)	(0.103)
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age of oldest members	No	No	Yes	Yes	Yes	Yes	Yes
Observations	2736	2736	2736	2736	2136	2359	2244
Kleibergen-Paap F statistics		12.398	11.016	11.391	6.325	12.914	12.692
Durbin-Wu-Hausman (p-value)		0.000	0.000	0.000	0.000	0.021	0.004

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include the squared age of the household head. Tests of overidentifying restrictions performed using both the year of arrival and its square do not reject the null hypothesis that the instruments are valid. [a] excludes the homelands of Venda and Transkei, [b] Period 1913-90, [c] excludes rounded decades.

Table 7: Movements of households in former homelands

Former homelands	% moved within the	% moved from other
KwaZulu	56	44
Bophuthatswana	62	38
KaNgwane	34	66
KwaNdebele	19	81
Transkei	89	11
Ciskei	43	57
Venda	86	14
Ganzankulu	63	37
Lebowa	73	27
Qwaqwa	22	78

Source: author's calculation from the South Africa Census 1996.

Table 8: Additional results on the effect of land size on household welfare

	1930-1994	1950-1994	1958-1994	1950-1994
	(1)	(2)	(3)	(4)
Land (hectares)	0.609**	0.543**	0.492**	0.558**
	(0.248)	(0.230)	(0.197)	(0.242)
Education of household head	0.063***	0.062***	0.069***	0.064***
	(0.016)	(0.016)	(0.016)	(0.017)
Age of household head	0.009	0.018	0.020	0.019
	(0.033)	(0.031)	(0.030)	(0.032)
Gender of household head (dummy)	-0.367	-0.396*	-0.324	-0.403*
	(0.227)	(0.228)	(0.204)	(0.237)
Pension eligible members (dummy)	-0.057	-0.052	-0.043	-0.040
	(0.149)	(0.148)	(0.143)	(0.150)
Children age 1-5	0.024	0.033	0.031	0.037
	(0.055)	(0.055)	(0.052)	(0.058)
Children age 6-17	0.005	-0.012	-0.012	-0.014
	(0.033)	(0.032)	(0.031)	(0.032)
Number of unskilled members	-0.044	-0.052	-0.049	-0.054
	(0.041)	(0.042)	(0.042)	(0.043)
Number of skilled members	0.069	0.052	0.040	0.051
	(0.056)	(0.055)	(0.054)	(0.056)
Highest level of education	0.030	0.032	0.035	0.031
	(0.035)	(0.035)	(0.032)	(0.036)
Labor market dev index (district-level)	1.747***	1.719***	1.625***	1.751***
	(0.432)	(0.413)	(0.369)	(0.434)
Population density (district-level)	0.001*	0.001*	0.001**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Land quality index	0.058	0.020	0.013	0.050
	(0.125)	(0.126)	(0.117)	(0.156)
Independence (dummy)				-0.234
				(0.308)
Observations	2649	2450	2328	2450
Kleibergen-Paap F statistics	10.878	10.073	11.002	9.279
Durbin-Wu-Hausman (p-value)	0.000	0.001	0.000	0.001

All regressions include the squared age of the household head. Tests of overidentifying restrictions performed using both the year of arrival and its square do not reject the null hypothesis that the instruments are valid.

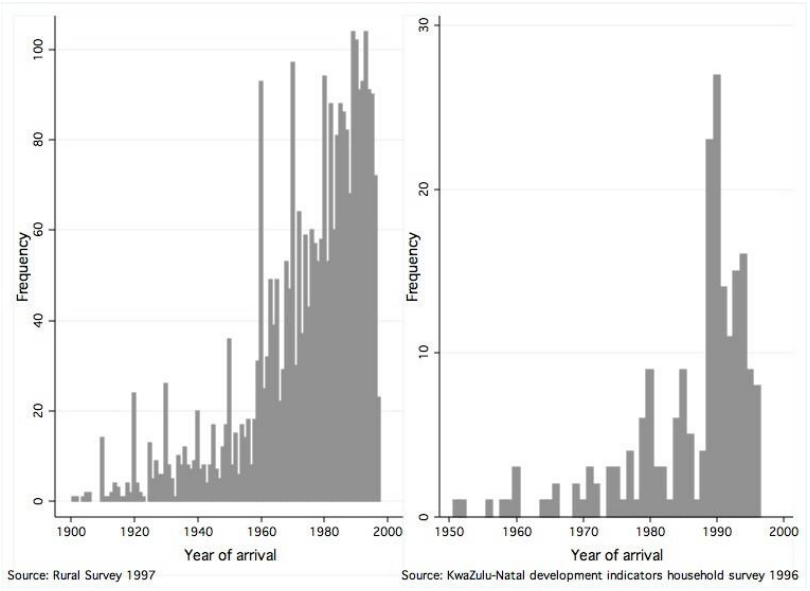

Figure 1: Distribution of arrivals in the homelands

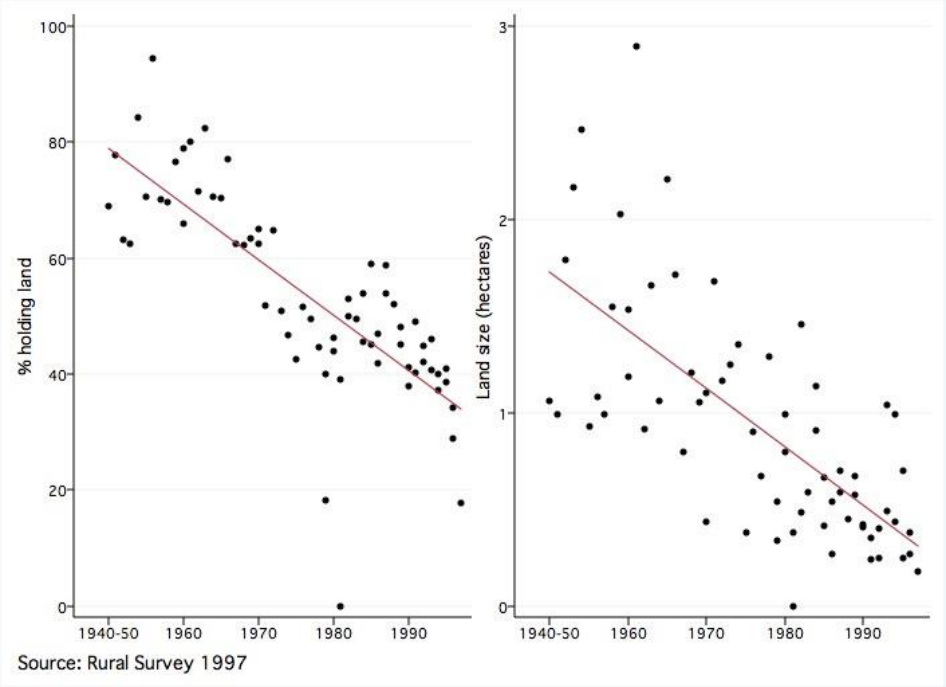

Figure 2: Percentage of household holding land and land size by year of arrival

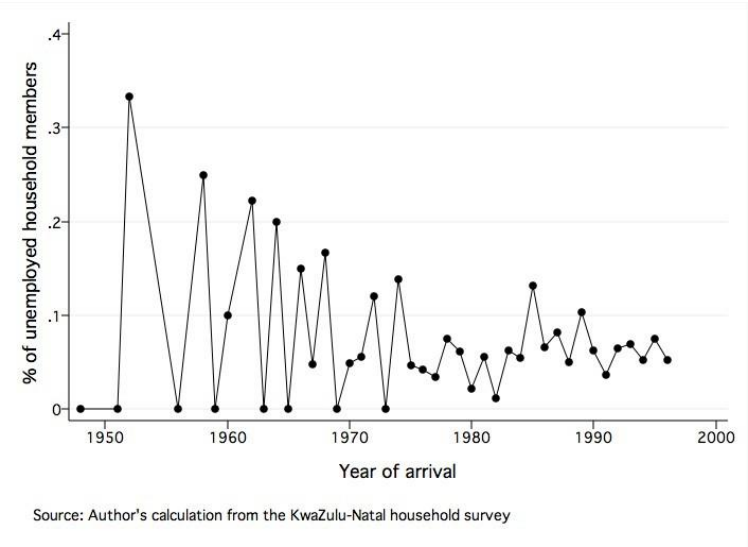

Figure 3: Average share of unemployed people in the household by year of arrival (KwaZulu-Natal province, 1996)