

How different are Immigrants in South Africa? An analysis of home ownership and housing conditions

May 14, 2011

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Abstract

This paper analyzes how immigrants differ from natives regarding their home property ownership and access to basic services. The paper also examines the factors that affect property ownership in terms of their demographic characteristics and consumption levels. Accurate data on immigrants in South Africa is not easily available. We use recently collected household survey data on migration and remittances. The survey was implemented in South Africa in 2009 and surveyed 2,026 households and a total of 7,671 household members. The data were collected in two provinces in South Africa - Gauteng and Limpopo - that have the largest population of immigrants from the main corridors. The migration and remittances household survey in South Africa, allows us to construct a profile of immigrants in these two provinces. This paper explores the possibility that family and individual characteristics may affect home ownership of immigrants. We thus first apply a regression framework to estimate how far observed immigrant's property ownership differ from natives and how much can be explained by their family background characteristics. Then we adopt propensity score matching methods to control for migrants' selection on observable characteristics. The estimates indicate that even after controlling for selection on observable factors, like demographics and poverty status, immigrant households are much less likely to own their residence than comparable native households, and they generally experience worse conditions of living on a series of other housing indicators, including access to safe water.

JEL Classification: F22, J61, R23, O55

Keywords: *international migration, immigrants, South Africa, Africa, housing ownership, immigrants and natives.*

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1. Introduction

There is a large literature on the economic assimilation of immigrants starting from the pioneering work of Chiswick (1978) and the seminal contribute of Borjas (1985). In general, however, questions about immigrant differences compared to native populations in developing countries have remained nearly unasked in the face of hundreds of articles about immigrant assimilation. Do immigrants acquire assets at the same rates as natives do in developing countries? In this paper we analyze differences between immigrants and natives regarding homeownership in South Africa.

The literature suggests that housing is an important component of wealth for many individuals. However immigrants have homeownership that is much below that of natives in developed countries (Alba and Logan, 1992; 1995, Coulson, 1999; Painter, et al, 2001; Constant, Robert and Zimmerman, 2007). While there is evidence and a number of studies on this phenomenon in the United States, Canada, Germany and other developed countries, there is little empirical evaluation of the relationship between immigrants and home ownership and access to services in developing countries. In this paper we examine two inter-related questions:

- (1) Is there a gap between the housing quality of immigrants and natives in South Africa?
- (2) How do the differences in a number of characteristics, such as, household size, marital status, age, and location influence homeownership?

The paper relies on newly collected micro-level household survey data for South Africa to assess the extent of the home-ownership gap between natives and immigrant households, and it contributes to the existing migration literature in two respects. Firstly,

empirical evidence on the factors which influence home-ownership in developing countries is scarce. Providing empirical evidence on the situation of immigrants in South Africa could help to design policies to improve the living conditions of the immigrants. Second, research on the differences in the access to services indicates differences about the quality of living conditions of the immigrants.

Both the estimates obtained after adopting a binary Probit model and Propensity Score Matching methods reveal that immigrant households are less likely to own their house or apartment than comparable native households. The results show that the probability of an African immigrant household to own a house or apartment is about 37 percentage points lower than the corresponding probability of comparable South African households.

The rest of the paper is organized as follows. The next section reviews the literature on home-ownership of native and immigrant households. Section 3 describes the data used for the empirical analysis and explains the estimation strategy. The estimation results are presented in Section 4, and Section 5 concludes.

2. Literature Review

This section provides a review of the literature on the issues of immigration and homeownership. One set of studies analyze the issue of adaptation into a society as an explanation for homeownership. This literature indicates that the process of adaptation into society is a function of catching up to status of native households (Gordon, 1964; Alba and Nee, 1997). Recent research has examined the wealth levels of immigrants in various developed countries against those of similarly situated natives. The noteworthy among these are Shamsuddin and DeVoretz (1998) and Zhang (2002) for Canada, Cobb-Clark and Hildebrand (2006) for the United States, Gibson, Le and Stillman (2007) for New Zealand, and Sinning (2007) for Germany.

Self-selection and selective immigration opportunities in rich nations make immigrants non-representative either of the populations in sending or receiving countries. These very factors may contribute to differences in the wealth accumulation and composition of native-versus foreign-born populations in developed countries. For instance, the wealth disparities between the native- and foreign-born may reflect differences in their earnings which in themselves are caused by differences in their educational attainment (Chiswick 1978; Borjas 1987). But there are also known to be differences in the income and wealth of similar natives and immigrants. Lacking fall-back resources in their adopted developed countries, immigrants can be expected to save more than similarly situated natives. Yet, Amuedo-Dorantes and Pozo (2002 and 2006) find that immigrants have lower precautionary savings than natives. Sinning (2007) shows the immigrants' higher ability to diversify portfolios across countries allows them to reduce income risk and in the process the need for precautionary savings. Bauer et. al. (2007) argues that social norms in the sending countries may affect immigrants' preferences, including attitudes towards risk, and impact their wealth accumulation and diversification behavior.

In contrast to the above insights on the wealth differentials between native- versus foreign-born in developed countries, very little is known about the wealth levels of immigrants in developing countries. It is also unknown if any observed differences in the level of their wealth can be explained by the immigrants' socioeconomic and demographic characteristics. One way to analyze if an immigrant has achieved a socioeconomic status comparable to that of native-born population, and more generally to assess immigrants' assimilation in the receiving country is to measure home ownership rates. Our research attempts to fill this gap by assessing the magnitude of the differences in homeownership rates between immigrants and natives in South Africa, while addressing the issue of selection bias in migration status.

3. Description of Data and Empirical Strategy

The aim of our analysis is to empirically investigate the following questions: Are there large home-ownership disparities between native-born and foreign-born households in South Africa? How do immigrants fare compared to natives with respect to access to basic services and the conditions of the dwelling in which they live? We start this section with a description of the data.

3.1 Data

We use data from a recent South Africa migration household survey conducted as part of the African Migration project of the African Development Bank and the World Bank (Plaza, Navarrete and Ratha, 2011). The data were collected in two provinces of South Africa, Gauteng and Limpopo. According to the latest available provincial population estimates of South Africa (Statistics South Africa 2010), Gauteng, with a population of over 11 million inhabitants, is the highest populated among the nine provinces of the country (22.4 percent of the total population of South Africa), while Limpopo is the fourth highest populated province with nearly 5.5 million inhabitants covering 10.9 percent of the total country's population.

With an estimated overall population of 49.99 million, of which 79.4 percent of African origin, in the past ten years the country has experienced increasing in-flows of international migration from some other Southern African countries (e.g. Zimbabwe and Botswana), while at the same time still experiencing a certain degree of xenophobia towards these migrant groups.

We turn to provide a profile of households headed by African immigrants and those headed by native South Africans, and compare the housing conditions of the two groups, in addition to that of the small group of non African immigrants. We consider several dimensions of housing conditions: the tenure status of the dwelling; the type of dwelling; the

major construction material of the exterior walls; the number of separate rooms (excluding bathrooms, corridors, and storage areas); access to safe water, sanitation and electricity. In the first part of the analysis we see how immigrants and natives score in terms of a number of covariates, including demographic, human capital and geographical variables, as well as a generated indicator of household expenditure-based poverty. Secondly, we check whether there are significant differences in housing conditions between the two groups, both without controlling and controlling for the same set of covariates. Lastly, we use propensity score matching methods to provide unbiased estimates of the effect of being an African immigrant on housing conditions. Note that propensity score matching addresses the problem of the endogeneity of the immigrant status variable (that is, migrants are not a random group from the population, but are selected on the basis of observable and unobservable factors), but with reference only to observable characteristics. We do not attempt to correct for selection on unobservables because we do not have suitable instruments at our disposal. Table 1 describes the variables that we used in the analysis.

3.2 Profile of African Immigrants and Natives

Although the total number of households in the data set is 2,026, we were not able to assign a migration status to one household, since the information about the place of birth of the household head, and the other household members, was missing in this case. Table 1 presents the migration status of the household head. It shows that 15 percent of the households are headed by an immigrant from within Africa, while less than 1 percent are headed by an immigrant from outside. The remaining households have a native head. Among Africa-born immigrants the vast majority (75 percent) come from Zimbabwe and Mozambique, in order of importance.

Table 2 shows that migrant households are smaller in size and are less likely to have children. Immigrant heads are more likely to be male, never married and are younger. They are more likely to be Muslim but overall less likely to be religious. In terms of ethnicity, they are almost all non Afrikaans or SePedi, while approximately half of native heads belong to these two predominant ethnic groups and half of them belong to other ethnic groups. In terms of education, the results show a mixed picture, with migrant heads more likely to have completed some education, but less likely to have achieved postgraduate education than natives. African immigrants are less likely to be employed full-time or inactive, and more likely to be employed part-time, self-employed or unemployed. African immigrants are slightly less likely to live in Gauteng and in urban areas. Finally, African immigrants are slightly less likely to be extremely poor (that is, to fall below the lower poverty line), but overall are more likely to be poor since they are much more prone to fall between the lower and the upper poverty line than natives.

Table 1. Migration Status of the Household Head

Migration Status	Frequency	Percent
Native	1,695	83.70
Born abroad, within Africa	311	15.36
Born abroad, outside Africa	19	0.94
Total	2,025	100
Country of birth, if born abroad within Africa	Frequency	Percent
Zimbabwe	160	51.45
Mozambique	73	23.47
Democratic Republic of Congo	14	4.50
Malawi	11	3.54
Lesotho	9	2.89
Ethiopia	8	2.57
Nigeria	8	2.57
Swaziland	6	1.93
Botswana	4	1.29
Ghana	4	1.29
Somalia	4	1.29

Zambia	4	1.29
Namibia	2	0.64
Uganda	1	0.32
Burundi	1	0.32
Cameroon	1	0.32
Other Africa, missing	1	0.32
Total	311	100

Table 2. Mean of the Covariates by Immigration Status (African Immigrants and Natives)

Covariate name	Head is African Immigrant	Head is Native
Hhsize	2.8264 (1.9532)	3.9611 (2.1328)
Has1_2child	0.2540	0.4077
Has3_8child	0.0804	0.1581
Hasnochild	0.6656	0.4342
Male	0.7556	0.5882
Married	0.4148	0.5121
Engag_union	0.1383	0.1021
Wid_div_sep	0.0547	0.1823
Nevmarried	0.3923	0.2035
Muslim	0.0710	0.0166
Christian	0.7258	0.8306
Traditional	0.0710	0.0551
Notreligious	0.1290	0.0966
Oth_ethnic	0.9838	0.5195
Age16_29	0.4248	0.1116
Age30_44	0.4020	0.3564
Age45_59	0.1242	0.3188
Age60_74	0.0261	0.1707
Age75_98	0.0229	0.0424
Noeduc	0.1130	0.1650
Primary	0.2226	0.1656
Middle	0.1794	0.1553
Secondary	0.3522	0.3583
Higher	0.1328	0.1558
Empl_full	0.2839	0.3961
Empl_part	0.1452	0.0668
Selfempl	0.2290	0.0867
Inactive	0.0548	0.2384
Unempl	0.2871	0.2119
Gauteng	0.4791	0.5074
Urban	0.6463	0.6724
Extremepoor	0.3583	0.3806
Moderpoor	0.2866	0.1531

Nonpoor	0.3551	0.4663
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The above results are overall confirmed when we adopt a multivariate framework and thus estimate the simultaneous effect of the covariates on the probability of being an African immigrant using a probit model. The estimated marginal effects, and the corresponding standard errors, that we obtained from the model are reported in Table 3. Although in terms of the sign and significance of the effect of the covariates, overall the multivariate analysis confirms the findings of the bivariate analysis, we find differences in the effect of marital status and education, with the multivariate analysis showing that African immigrants are more likely to be married and less educated (although the effect of education appears to be weak). In fact, when we re-run the same probit model on different age cohorts we find that being married has a positive and significant effect only when the regression is run on younger (than 30 years old) heads, showing that the positive effect of being married within the full sample may be driven by younger heads. On the other hand, the effect of education remains overall consistent with that showed by the regression run on the full sample, so we conclude that African immigrants have lower levels of education compared to natives, although the effect appears statistically rather weak.

Table 3. Probit Analysis of the Determinants of Being an African Immigrant

Covariate name	Marginal effects	Robust standard errors
Hhsize	-0.0129***	0.0041
Has1_2child	-0.0255***	0.0106
Has3_8child	-0.0059	0.0159
<i>Hasnochild</i>	<i>Base category</i>	<i>Base category</i>
Male	0.0269***	0.0098
Married	0.0240**	0.0113
Engag_union	0.0037	0.0142
Wid_div_sep	-0.0081	0.0140
<i>Nevmarried</i>	<i>Base category</i>	<i>Base category</i>
Muslim	0.1494***	0.0680
Christian	0.0080	0.0113
Traditional	0.0301	0.0292
<i>Notreligiuos</i>	<i>Base category</i>	<i>Base category</i>

Oth_ethnic	0.1597***	0.0138
Age16_29	<i>Base category</i>	<i>Base category</i>
Age30_44	-0.0439***	0.0114
Age45_59	-0.0776***	0.0153
Age60_74	-0.0595***	0.0116
Age75_98	-0.0363**	0.0104
Noeduc	0.0229	0.0220
Primary	0.0305*	0.0211
Middle	-0.0036	0.0147
Secondary	-0.0133	0.0117
<i>Higher</i>	<i>Base category</i>	<i>Base category</i>
Empl_full	-0.0227**	0.0107
Empl_part	0.0003	0.0134
Selfempl	0.0454***	0.0228
Inactive	-0.0397***	0.0101
<i>Unempl</i>	<i>Base category</i>	<i>Base category</i>
Gauteng	-0.0221**	0.0104
Urban	-0.0033	0.0104
Extremepoor	0.0354***	0.0144
Moderpoor	0.0652***	0.0214
<i>Nonpoor</i>	<i>Base category</i>	<i>Base category</i>
Number of observations	1877	
Wald chi2 statistic	273.83***	
Pseudo R2	0.3978	

Notes: (1) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

3.3 Housing Conditions and Migration Status

Table 4 shows that while the vast majority of native households own the dwelling in which they reside, the majority of immigrant households from within Africa live in a rent-free/subsidized house or in rented accommodation. The percentage of African immigrant households that live in shacks is quite high compared to native households, and the difference is statistically significant. The proportion of African immigrant households that live in dwellings made of bricks is also significantly lower than that of native-headed households. The number of rooms in immigrant households tends to be lower than that of native households. Furthermore, access to safe water, sanitation and electricity is significantly higher for natives, relative to immigrants from within Africa. Thus, overall, in terms of

housing, households of African immigrants experience significantly worst conditions relative to native households.

Table 4. Housing Conditions and Migration Status of the Head – Full Sample (n=2,025)

Housing indicator	Native	Immigrant from within Africa	Immigrant from outside Africa
<i>Tenure status of dwelling</i>			
Owned	1,439 (84.90%)	117 (37.62%)	16 (84.21%)
Rent-free or subsidized from employer or relatives	58 (3.42%)	43 (13.83%)	-
Rented	187 (11.03%)	151 (48.55%)	3 (15.79%)
Other ¹	11 (0.65%)	-	-
<i>Total</i>	<i>1,695 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>
<i>Dwelling type</i>			
Single family house	1,341 (79.16%)	124 (39.87%)	15 (78.95%)
Apartment in a building	58 (3.42%)	41 (13.18%)	2 (10.53%)
Room or rooms in a house	138 (8.15%)	61 (19.61%)	2 (10.53%)
Shack	150 (8.85%)	82 (26.37%)	-
Other	7 (0.41%)	3 (0.96%)	-
<i>Total</i>	<i>1,694 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>
<i>Major construction material of the exterior walls</i>			
Bricks/Stones	1,451 (85.6%)	206 (66.24%)	19 (100%)
Wood	28 (1.65%)	12 (3.86%)	-
Mud	33 (1.95%)	11 (3.54%)	-
Pre-fabricated	5 (0.29%)	1 (0.32%)	-
Eternit/Tin	156 (9.20%)	80 (25.72%)	-
Other	22 (1.3%)	1 (0.32%)	-
<i>Total</i>	<i>1,694 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>
<i>Number of separate rooms</i>			
No separate room	129 (7.62%)	50 (16.08%)	1 (5.26%)
1 room	136 (8.03%)	95 (30.55%)	1 (5.26%)
2 rooms	188 (11.10%)	62 (19.94%)	-
3 rooms	221 (13.05%)	30 (9.65%)	4 (21.05%)
4 rooms	215 (12.70%)	27 (8.68%)	-
5-7 rooms	510 (30.12%)	37 (11.90%)	12 (63.16%)
8+ rooms	294 (17.37%)	10 (3.22%)	1 (5.26%)
<i>Total</i>	<i>1,693 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>

¹ Among the 11 native-headed households who responded ‘Other (specify)’ to the question on the tenure status of the dwelling, only 4 specified the tenure status of the dwelling and the answers were: “Do not own the stand where the shack is”; “Looking after the sister’s dwelling”; “Stay for free”; “Waiting list”.

<i>Access to safe water</i>			
Yes	1,421 (83.83%)	221 (71.06%)	19 (100%)
No	274 (16.17%)	90 (28.94%)	-
<i>Total</i>	<i>1,695 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>
<i>Access to sanitation</i>			
Yes	1,264 (74.57%)	202 (64.95%)	19 (100%)
No	431 (25.43%)	109 (35.05%)	-
<i>Total</i>	<i>1,695 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>
<i>Access to electricity</i>			
Yes	1,510 (89.09%)	231 (74.28%)	19 (100%)
No	185 (10.91%)	80 (25.72%)	-
<i>Total</i>	<i>1,695 (100%)</i>	<i>311 (100%)</i>	<i>19 (100%)</i>

Notes: (1) The Pearson chi² p-value is lower than 0.001 for all variables in the above table, after dropping immigrants from outside Africa.

3.4 Housing conditions Gaps

To investigate the determinants of housing conditions, including home-ownership, and in particular the effect of migration on housing conditions, a series of binary Probit models are estimated. Thus, one key dependent variable in this paper is the ownership status. After restricting the observations to household heads and excluding all observations with missing values on one of the variables used in the analysis, the data set of the model specification contains 1,467 observations in the model of homeownership and 1,877 households in all the other models.

The probit regression of homeownership is estimated using the following specification:

$$\Pr(H_i = 1) = \alpha_i + \beta \text{MIGRANT}_i + \delta_i x_i + \varepsilon_i \quad (1)$$

where H_i is the binary outcome variable for home-ownership. The explanatory variables X_i comprise, demographic, socioeconomic, geographical variables and household composition characteristics.

Socioeconomic characteristics (education, employment status and poverty level) represent individual-specific explanatory variables, which are usually utilized in empirical research on home-ownership (Coulson 1999). Indicator variables for different age levels are considered

because the relationship between the age of the household head and the outcome variables might be nonlinear. We also included household size and marital status to investigate possible effects of the household composition.

The estimates comprise different specifications. In the empirical analysis, seven different specifications of equation (1) are estimated. The first model estimates the effect of the explanatory variables on the probability of living in a shack; the second model considers the probability that the household owns the dwelling, conditional on living in a house or in an apartment, thus, here we run the regression only on the sample of those whose dwelling is a single family house or an apartment in a building; the third model estimates the effect on the probability of living in a house made of bricks/stones; the fourth model focuses on the probability of having a separate room (this refers to separate living/dining rooms, or separate bedrooms); the fifth, sixth and seventh model estimate the effect of the explanatory variables on the likelihood of having access to safe water, access to sanitation, and access to electricity, respectively.

4. Results

This section reports the estimates from different specifications of the binary Probit models described above, as well as the propensity score matching used to correct for migrants' selection on observable characteristics. We present the results of seven separate probit models that we ran for the different dimensions of housing conditions described above, using the same set of covariates that we used in the regression of the determinants of migration status, along with the migration status variable.

Table 5 reports the joint distribution of each dependent variable and immigration status of the household head, after dropping all the non-African foreign born heads from the sample, and after dropping all the missing values in each corresponding model. First of all, we

observe that even after dropping all the missing values, the proportions of African immigrants (15%) and natives (85%) remain the same as when we consider the full sample of 2,025 households (see Table 1). The only exception is when we run the model of house ownership, in which case we have 149 immigrants and 1318 natives out of 1467 observations, and this takes the proportion of African immigrants down to 10%, as opposed to 90% natives, in this case. Secondly, when we compare the results in Table 5 with those in Table 4 we can see that the percentages displayed in Table 5 for each indicator of housing conditions are very similar to those reported in Table 4, which means that the reduction of the sample did not affect the relationship between the dependent variables and our key explanatory variable of interest, namely, whether the head of the household is native South African or African foreign born.

Table 5. Housing Conditions and Migration Status of the Head - Reduced Samples

Dependent variable	Native	Immigrant from within Africa
<i>Dwelling type</i>		
Shack=1	137 (8.63%)	78 (27.08%)
Shack=0	1,451 (91.37%)	210 (72.92%)
<i>Total # obs. Used In regression=1,876</i>	<i>1,588 (100%)</i>	<i>288 (100%)</i>
<i>Tenure status of dwelling, if dwelling is a house or an apartment</i>		
Ownshouse=1	1,131 (85.81%)	54 (36.24%)
Ownshouse=0	187 (14.19%)	95 (63.76%)
<i>Total # obs. Used In regression=1,467</i>	<i>1,318 (100%)</i>	<i>149 (100%)</i>
<i>Major construction material of the exterior walls</i>		
Stones=1	1,364 (85.84%)	186 (64.58%)
Stones=0	225 (14.16%)	102 (35.42%)
<i>Total # obs. Used In regression =1,877</i>	<i>1,589 (100%)</i>	<i>288 (100%)</i>
<i>Number of separate rooms</i>		
Has_seproom=1	1,468 (92.44%)	239 (82.99%)
Has_seproom=0	120 (7.56%)	49 (17.01%)
<i>Total # obs. Used In regression =1,876</i>	<i>1,588 (100%)</i>	<i>288 (100%)</i>
<i>Access to safe water</i>		
Access_water=1	1,336 (84.08%)	203 (70.49%)
Access_water=0	253 (15.92%)	85 (29.51%)

<i>Total # obs. Used In regression =1,877</i>	<i>1,589 (100%)</i>	<i>288 (100%)</i>
<i>Access to sanitation</i>		
Access_sanit=1	1,185 (74.58%)	185 (64.24%)
Access_sanit=0	404 (25.42%)	103 (35.76%)
<i>Total # obs. Used In regression =1,877</i>	<i>1,589 (100%)</i>	<i>288 (100%)</i>
<i>Access to electricity</i>		
Access_electr=1	1,414 (88.99%)	214 (74.31%)
Access_electr=0	175 (11.01%)	74 (25.69%)
<i>Total # obs. Used In regression =1,877</i>	<i>1,589 (100%)</i>	<i>288 (100%)</i>

Notes: (1) The Pearson chi2 p-value is lower than 0.001 for all the dependent variables.

Tables 6 and 7 report the estimated marginal effects for the determinants of housing conditions. The results of the multivariate analysis overall confirm those from the simple bivariate analysis of housing conditions and migration status. African immigrants are more likely to live in shacks and less likely to own the house or apartment in which they reside, and are also less likely to live in a dwelling made of bricks or stones and to have a separate room. African immigrants are also less likely to have access to safe water and electricity, while the effect of access to sanitation is negative but not significant. The strongest effect is found by far for the variable of home ownership, with African immigrants being 36.67 percentage points less likely than natives to own the house or apartment in which they live.

Table 6. Marginal Effects for the Determinants of Housing Conditions – Dwelling

Variable name	Dep. Var.=shack	Dep. Var.=ownhouse	Dep. Var.=stones	Dep. Var.=has_seproom
African_fb	0.0432*** (0.0190)	-0.3667*** (0.0536)	-0.071*** (0.0281)	-0.0302* (0.0200)
Hhsize	-0.0147*** (0.0042)	0.0256*** (0.0082)	0.0215*** (0.0065)	0.0042 (0.0044)
Has1_2child	0.0022 (0.0131)	0.0395* (0.0233)	-0.0028 (0.0215)	0.0030 (0.0146)
Has3_8child	0.0802*** (0.0380)	0.0149 (0.0435)	-0.0970** (0.0473)	0.0070 (0.0225)
<i>Hasnochild</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Male	0.0048 (0.0110)	-0.0586** (0.0224)	-0.0065 (0.0191)	-0.0353** (0.0132)
Married	-0.0101 (0.0132)	0.0495* (0.0297)	0.0220 (0.0225)	0.0137 (0.0163)

Engag_union	0.0653*** (0.0254)	-0.0540 (0.0426)	-0.0773** (0.0345)	-0.0603*** (0.0273)
Wid_div_sep	-0.0025 (0.0165)	0.0337 (0.0325)	0.0311 (0.0257)	0.0060 (0.0209)
<i>Nevmarried</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Muslim	-0.0278 (0.0175)	-0.0432 (0.0729)	0.0677 (0.0318)	-0.0725 (0.0664)
Christian	-0.0104 (0.0160)	-0.0823*** (0.0238)	0.0480* (0.0287)	-0.0511*** (0.0133)
Traditional	0.0303 (0.0304)	0.0615 (0.0364)	-0.0439 (0.0437)	-0.0546 (0.0508)
<i>Notreligiuos</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Oth_ethnic	0.0232** (0.0108)	-0.0615*** (0.0200)	-0.0606*** (0.0174)	-0.0418*** (0.0124)
<i>Age16_29</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Age30_44	-0.0270** (0.0120)	0.0991*** (0.0237)	0.0296 (0.0222)	-0.0095 (0.0180)
Age45_59	-0.0508*** (0.0121)	0.1286*** (0.0230)	0.0588** (0.0235)	-0.0013 (0.0205)
Age60_74	-0.0550*** (0.0106)	0.1123*** (0.0241)	0.0608* (0.0273)	0.0074 (0.0264)
Age75_98	-0.0429** (0.0108)	0.1168*** (0.0203)	0.0591 (0.0347)	-0.0523 (0.0538)
Noeduc	0.4320*** (0.1038)	-0.1257** (0.0605)	-0.2926*** (0.0657)	-0.0932*** (0.0394)
Primary	0.3627*** (0.0936)	-0.0868** (0.0487)	-0.2153*** (0.0556)	-0.0773*** (0.0334)
Middle	0.3725*** (0.0956)	-0.0704* (0.0463)	-0.2030*** (0.0536)	-0.0335 (0.0276)
Secondary	0.1372*** (0.0487)	-0.0836*** (0.0298)	-0.0632* (0.0351)	0.0055 (0.0196)
<i>Higher</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Empl_full	-0.0341*** (0.0122)	-0.0655** (0.0296)	0.0440** (0.0216)	-0.0262 (0.0169)
Empl_part	-0.0129 (0.0132)	-0.0403 (0.0478)	0.0121 (0.0270)	-0.0156 (0.0244)
Selfempl	-0.0083 (0.0138)	-0.0074 (0.0368)	0.0434* (0.0229)	0.0291 (0.0160)
Inactive	-0.0384*** (0.0126)	0.0440 (0.0339)	0.0917*** (0.0208)	0.0393** (0.0163)
<i>Unempl</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Gauteng	0.0658*** (0.0140)	-0.1123*** (0.0231)	-0.0864*** (0.0211)	-0.0474*** (0.0163)
Urban	0.0124	0.0506**	0.0001	0.0405**

	(0.0128)	(0.0260)	(0.0220)	(0.0180)
Extremepoor	0.0216 (0.0154)	0.0104 (0.0278)	-0.0746*** (0.0260)	-0.0290 (0.0185)
Moderpoor	0.0407** (0.0193)	0.0280 (0.0259)	-0.0947*** (0.0307)	-0.0546*** (0.0228)
<i>Nonpoor</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Number of observations	1876	1467	1877	1876
Wald chi2 statistic	271.45***	280.53***	257.19***	120.42***
Pseudo R2	0.2528	0.2804	0.1771	0.1274

Notes: (1) Robust standard errors in parentheses; (2) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7. Marginal Effects for the Determinants of Housing Conditions – Access to safe water, sanitation and electricity

Variable name	Dep. Var.=Access_water	Dep. Var.=Access_sanit	Dep. Var.=Access_electr
African_fb	-0.0787*** (0.0298)	-0.0115 (0.0332)	-0.0487** (0.0249)
Hhsize	0.0030 (0.0055)	0.0144* (0.0076)	0.0105** (0.0053)
Has1_2child	0.0081 (0.0204)	0.0216 (0.0272)	0.0254 (0.0172)
Has3_8child	-0.0160 (0.0349)	-0.0572 (0.0484)	-0.0274 (0.0335)
<i>Hasnochild</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Male	0.0131 (0.0189)	0.0186 (0.0252)	-0.0113 (0.0158)
Married	0.0289 (0.0224)	0.0413 (0.0297)	0.0549*** (0.0187)
Engag_union	-0.0010 (0.0275)	-0.0078 (0.0373)	0.0128 (0.0207)
Wid_div_sep	0.0094 (0.0249)	0.0140 (0.0344)	0.0137 (0.0212)
<i>Nevmarried</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Muslim	0.1002** (0.0194)	0.0747 (0.0581)	0.0618* (0.0237)
Christian	0.0903*** (0.0297)	0.0181 (0.0345)	0.0339 (0.0234)
Traditional	0.0427 (0.0261)	-0.1290** (0.0621)	0.0058 (0.0295)
<i>Notreligious</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Oth_ethnic	-0.0492*** (0.0167)	-0.0362 (0.0227)	-0.0015 (0.0153)
<i>Age16_29</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
<i>Age30_44</i>	-0.0176	-0.0057	0.0034

	(0.0258)	(0.0331)	(0.0189)
Age45_59	0.0278 (0.0268)	0.0732** (0.0347)	0.0556*** (0.0189)
Age60_74	0.0580* (0.0267)	0.0908** (0.0375)	0.0831*** (0.0164)
Age75_98	0.0038 (0.0442)	0.1090* (0.0444)	0.0869*** (0.0132)
Noeduc	-0.0685* (0.0415)	-0.1605*** (0.0549)	-0.2523*** (0.0596)
Primary	-0.0616* (0.0385)	-0.1874*** (0.0513)	-0.1889*** (0.0508)
Middle	-0.0626* (0.0392)	-0.1776*** (0.0514)	-0.1346*** (0.0464)
Secondary	-0.0261 (0.0299)	-0.0492 (0.0381)	-0.0600** (0.0302)
<i>Higher</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Empl_full	0.0922*** (0.0192)	0.0865*** (0.0279)	0.0498*** (0.0170)
Empl_part	0.0678*** (0.0184)	0.0424 (0.0355)	0.0325 (0.0185)
Selfempl	0.0592** (0.0207)	0.0323 (0.0362)	0.0467** (0.0168)
Inactive	0.0081 (0.0243)	0.0302 (0.0326)	0.0542** (0.0184)
<i>Unempl</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Gauteng	-0.0050 (0.0188)	-0.0231 (0.0265)	-0.0775*** (0.0165)
Urban	0.2465*** (0.0251)	0.3317*** (0.0293)	0.0784*** (0.0202)
Extremepoor	-0.0652*** (0.0249)	-0.1478*** (0.0327)	-0.0401* (0.0217)
Moderpoor	-0.0645** (0.0290)	-0.1390*** (0.0367)	-0.0342 (0.0238)
<i>Nonpoor</i>	<i>Base category</i>	<i>Base category</i>	<i>Base category</i>
Number of observations	1877	1877	1877
Wald chi2 statistic	360.40***	460.57***	207.44***
Pseudo R2	0.2309	0.2333	0.1565

Notes: (1) Robust standard errors in parentheses; (2) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The results above indicate that immigrant households are significantly less likely to own their primary residence than comparable native households.

Independent of the model specification, there is evidence for a positive relationship between the age of the household head and the home-ownership probability. The probability to own a house increases if the household head is married. Surprisingly, the employment status of the household head does not affect the home-ownership probability, indicating that home-ownership might not be affected by changes in the employment status in the short run. Education level of household head turns out to have a positive effect in home ownership.

Although the above results show that migration status has an independent effect on housing conditions net of other observable characteristics, in the previous section we also saw that migrants are selected on these same characteristics that are affecting housing conditions. Thus, the estimated effects of migration status on housing conditions obtained from the probit analysis are likely to be biased. To address the possibility of selection bias we thus adopt propensity score matching (PSM) methods (see, e.g., Heckman, Ichimura and Todd 1997)² and estimate the Average Treatment on the Treated (ATT) effect using three different types of propensity matching estimators: the Nearest Neighbour (NN) matching, the 5-Nearest Neighbour matching, and the Kernel matching.

In the case of the NN and the 5-NN matching we impose the 0.01 within calliper condition: in the case of the 1-to-1 (or nearest neighbor) matching, for example, this imposes that one individual from the non-treated group is only matched to the closest neighbor from the treated group if the difference between their propensity scores is lower than 0.01. Similarly, in the case of the kernel matching we impose a bandwidth of 0.01. Furthermore, in the case of the NN and the 5-NN matching we report both the standard T-statistics for the ATT, as well as the Abadie and Imbens (AI) T-statistics for the ATT, which provides a more conservative estimate of the level of significance of the treatment effect (Abadie and Imbens

² Heckman, J.J., Ichimura, H. and Todd, P.E. (1997), "Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme", *Review of Economic Studies*, 64 (4): 605-654.

2006).³ In the case of the kernel matching instead we adopt the classic bootstrap procedure, in addition to the computation of the standard T-statistics, since when using kernel matching bootstrap provides valid inference (Abadie and Imbens 2008).⁴

Tables 8 and table 9 show the results that we obtained from the different methods, including the estimated ATT effect on the matched sample with the corresponding T-statistic for each of the outcome variables, as well as the Pseudo R2 balance statistics before and after the matching. With reference to the latter statistics, a low value of the pseudo R2 and a high p-value in correspondence of the matched sample indicate that after matching the distribution of covariates between the treated (African immigrants) and the non treated (natives) is well balanced, that is, the two groups are very similar after the matching.

The propensity score was estimated on approximately the same list of covariates that were considered in the previous probit regressions, with only a few differences in the specification of marital status, education and poverty. In fact, some of the categories that we had previously included in the regressions were aggregated with the base category when we computed the propensity scores, and this was because the inclusion of these categories was leading to a lower quality of covariate balancing between the treated and the non-treated. The results of the propensity score estimation (available from the authors upon request) are very similar to the results of the probit regression of immigration status that we reported in Table 3 above.

The ATT in Table 8 shows that the effect of being an immigrant on housing conditions is only significant when the outcome variable is 'shack', 'stones' or 'access_water', and this is true independent of the matching method used (1-to-1, 5-nearest, and kernel matching).

However, the magnitude of the effect and sometimes their level of significance varies

³ Abadie, A. and Imbens, G.W. (2006), "Large Sample Properties of Matching Estimators for Average Treatment Effects", *Econometrica*, 74(1): 235-267.

⁴ Abadie, A. and Imbens, G.W. (2008), "On the Failure of Bootstrap for Matching Estimators", *Econometrica*, 76(6): 1537-1557.

depending on the method used for matching and that used for the estimation of the standard errors. For example, when we adopt the 5-NN estimator we can see that the significance of the effect of being an African immigrant on the three variables of housing conditions under concern becomes relatively weaker, especially according to the AI-based T-statistics.

Nevertheless, overall the estimated ATT in these three cases are not negligible and they are overall consistent with the estimated marginal effects that we reported in Tables 6 and 7. On the other hand, with regard to the variable of home ownership the estimated ATT effects are very stable independent on the matching method used and the magnitude of the effect is also very close to the estimated marginal effect reported in the third column of Table 6.

Table 8. Average Treatment on the Treated (ATT) Effects from PSM for all Housing Conditions apart from Ownership of House (n=1,875)

Outcome variable	NN within calliper of 0.01			5-NN within calliper of 0.01			Kernel with bandwidth of 0.01		
	ATT	T-stat	T-stat based on AI criterion	ATT	T-stat	T-stat based on AI criterion	ATT	T-stat	Bootstrapping: 95% confidence interval for ATT, bias-corrected
Shack	0.1231	2.78	2.49	0.0769	1.92	1.55	0.0857	2.43	[0.0270, 0.1528]
Stones	-0.1308	-2.64	-2.32	-0.0990	-2.25	-1.66	-0.0950	-2.37	[-0.2132, -0.0347]
Has_seproom	-0.0154	-0.36	-0.37	-0.0308	-0.89	-0.83	-0.0265	-0.85	[-0.0655, 0.0687]
Access_water	-0.1038	-2.14	-2.04	-0.0881	-2.12	-1.73	-0.0847	-2.14	[-0.1787, -0.0139]
Access_sanit	-0.0308	-0.57	-0.61	0.0112	0.24	0.25	0.0107	0.24	[-0.0775, 0.0949]
Access_electr	-0.0231	-0.47	-0.50	-0.0162	-0.40	-0.36	-0.0220	-0.61	[-0.0988, 0.0989]
	UM	M		UM	M		UM	M	
Pseudo R2	0.396	0.015		0.396	0.013		0.396	0.009	
LR chi2	636.81	11.15		636.81	9.61		636.81	6.80	
p>chi2	0.000	0.992		0.000	0.998		0.000	1.000	
#obs. Off common support	28			28			28		

UN=Unmatched; M=matched

Table 9. Average Treatment on the Treated (ATT) Effects from Propensity Score Matching for Ownership of House (n=1,467)

Outcome variable	NN within calliper of 0.01			5-NN within calliper of 0.01			Kernel with bandwidth of 0.01		
	ATT	T-stat	T-stat based on AI(1) criterion	ATT	T-stat	T-stat based on AI(5) criterion	ATT	T-stat	Bootstrapping: 95% confidence interval for ATT, bias-corrected
Ownshouse	-0.3529	-5.44	-6.10	-0.3641	-6.61	-6.11	-0.3689	-7.18	[-0.4921, -0.2446]
	UM	M		UM	M		UM	M	
Pseudo R2	0.375	0.033		0.375	0.017		0.375	0.016	
LR chi2	361.06	12.36		361.06	6.35		361.06	5.96	
p>chi2	0.000	0.965		0.000	1.000		0.000	1.000	
#obs. Off common support	13			13			13		

UN=Unmatched; M=matched

5. Conclusions

This paper has presented an analysis of how immigrant-headed households in South Africa differ from native-headed households in terms of home-ownership and a number of indicators of housing conditions, including access to basic services. The homeownership-related findings provide strong evidence that immigrant households are less likely to own their primary residence than comparable native households. The estimates on housing conditions show that differences in access to safe water between native and immigrant households are also considerably significant. Further research will be needed to explore if Africans immigrants in South Africa support the predictions of ethnic enclaves or the assimilation process. This is a topic for future research with data that are better suited to control for wealth differences and ethnic networks for all African immigrant groups.

References to be completed