



DETERMINANTS OF ACCESS TO FORMAL CREDIT BY THE POOR HOUSEHOLDS

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Abstract. This paper investigates the determinants of access to formal credit by poor households in South Africa. Despite some progress in poverty reduction in the recent years, it remains astonishingly high by historical and international standards. Access to credit is believed by some scholars to be a primary means to address poverty and improve the standards of living of poor households. Thus, it is necessary to identify the determinants of the propensity to borrow and of the amount that is borrowed. Using 2008-2012 data from the National Income Dynamics Study (NIDS), a Heckman Selection model was estimated. The results from this study suggest that age of the household head, race, educational level, gender, employment, geographic location of households affect the propensity to borrow by poor households in South Africa.

JEL classification: D12, O12

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1. Introduction

Despite the well-established and effectively regulated South African banking system, many low-income or poor households do not have access to credit services. There are several reasons for this: (i) poor households are regarded as risky and unprofitable (ii) the low levels of saving and asset accumulation in the low-income population render them to have a high risk profile, thus making them unattractive to commercial banks (iii) commercial banks are likely to incur high information costs to assess the creditworthiness poor households (Dallimore and Mgimeti, 2003; Mashigo 2007 and Okurut 2006).

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Access to credit can play an important role in the lives of the low-income or poor households as it allows them to cope better with various types of shocks (such as illness, malnutrition, famine, crime, unemployment, financial crisis and natural disasters), thus ameliorating socio-economic problems (Mashigo 2007; Zeller 1994; Islam and Maitra 2012; Vicarelli 2010; Morduch 1995; Gertler, Levine and Moretti 2009). A forceful proponent of this view is Seefeldt (2015:263) who found evidence to suggest that access to credit can “increase consumption beyond what one’s income can support, it can smooth consumption during periods when income falls, and it can represent an investment in the future”.

Much work has been done on the determinants of credit market access in developed and developing countries (see for example Anang, Sipiläinen; Bäckman and Kola (2015); Quoc (2012); Kedir (2003); Zeller, Schrieder, von Braun and Heidhues (1997); Zeller (1994); Omonona, Lawal, and Oyinlana (2010), Hussein and Ohlmer (2008); Oyedele, Akintola, Raji and Omonona (2009). However, few studies have been conducted in the South African context (Baiyegunhi, Fraser and Darroch 2008; Mashigo 2007 and Okurut 2006). Moreover, studies employing suitable techniques of assessing the determinants of access to formal credit by poor households are limited. Thus the contribution of this paper is twofold: we propose and implement an econometric framework which seeks to overcome the shortcomings of the research methodology employed in previous studies. Specifically, we correct for possible selection bias and unobserved heterogeneity in the panel data setting by estimating a model (or panel Heckman selection) proposed by Wooldridge (1995). Secondly, this paper attempts to address some of the deficiencies associated with cross-sectional data by using the National Income Dynamics (NIDS) dataset, a nationally representative survey of households in South Africa.

The remainder of this paper is organized as follows. Section 2 examines existing literature applicable to this topic. Section 3 explains the data and explanatory variables used in the empirical analysis. Section 4 sets out the methodology used. Section 5 presents the results obtained using the Heckman selection model. Finally, section 6 provides a summary and conclusion.

2. Literature Review

There is extensive literature on the determinants of access to credit in many countries (see Anang, Sipiläinen; Bäckman and Kola 2015; Quoc 2012; Kedir 2003; Zeller, Schrieder, von Braun and Heidhues 1997; Zeller 1994; Omonona, Lawal, and Oyinlana 2010, Hussein and Ohlmer 2008; Oyedele, Akintola, Raji and Omonona 2009). For example, Quoc (2012) estimated a double hurdle model and the Heckman selection model using data from a survey of 325 rural households in Vietnam. The results of the double hurdle model and the Heckman analysis show that household’s capital endowments are important determinants of the demand for formal credit as well as the loan amount. The results also show that the probability to borrow is influenced by marital status and distance to the market centre.

Using both Tobit and probit, Kedir (2003) estimated the determinants of access to credit and loan amount in Ethiopia. His estimates suggest that the main

determinants are current resources, collateral, outstanding debt and marital status of the head. Baffoe and Matsuda (2015) also implemented a binary method (probit) to the determinants of access to credit. They found that the most important variables are livelihood diversification, household productivity, savings accounts and household size – factors that significantly influence the households' ability to access credit.

Education levels were consistently found to have a significant and positive effect on household's access to credit (Okurut 2006; Vaessen 2001; and Kedir 2003). Evidence from Vietnam suggests that levels of household expenditure/income and asset are important determinants of the propensity to borrow by rural households and the amount of the loan received (Ha, 1999; Ha, 2001). Evidence from South Africa show that access to semi-formal credit in South Africa is positively and significantly affected by household size, per capita expenditure, provincial location and being coloured, while the negative and significant factors include rural location, being poor and White Okurut (2006).

However, the evidence on most determinants is mixed. In particular, the influence of gender is inconclusive. Some studies find that male is more likely to be credit constrained (Okurut 2006 Barslund & Tarp, 2008; Chaudhuri & Cheral, 2011; Freeman, Ehui, and Jabbar 1998; Zeller, 1994) while Lawal and Muyiwa, 2009 Foltz et al., 2000 show the inverse result.

Some studies also provide mixed results on the influence of age. For example, Barslund and Tarp (2008) Freeman, Ehui, and Jabbar (1998) and Jia et al. (2010) find an inverse correlation between age and probability of being credit constrained, while Baiyegunhi et al. (2010) and Chaudhuri et al. (2011) find different results.

3. Data Source

Our econometric analysis is based on the National Income Dynamics Study (balanced panel data) of South African households observed over the period 2008–2012. The longitudinal survey was conducted by the Southern African Labour and Development Research Unit (SALDRU), based at the University of Cape Town's School of Economics. The NIDS commenced in 2008 with over 28 000 individuals in 7 300 households across the country. The later waves of the NIDS were implemented in 2010 and 2012, and re-surveyed original NIDS wave1 households. NIDS data comprise comprehensive set of variables (e.g. credit, employment, income, wealth, race dummies, and province dummies) which are important for our study.

In addition to the dependent variables (access to formal credit and the amount of credit), we use several control variables in our econometric analysis. Table 1 provides a list of all the variables used. Our choice of control variables (see Table 1) is informed by the ones used in the existing empirical literature. Specifically, we control for socioeconomic and demographic characteristics (age, gender, household income, asset ownership and levels of education), household composition characteristics (household size) and geographical variables (province dummies and indicator variables for location of the household—rural or urban).

Table 1: Explanatory variables used in the empirical analysis

Variables	Type	Description
Dependent variable		
Access to formal credit	Dummy	1= Access to formal credit, 0 = Otherwise
Loan (log)	Continuous	Amount of formal credit (log)
Explanatory variables		
Age of HH head	Continuous	Age of HH head (in years)
Age SQ	Continuous	Age squared
Asset ownership	dummy	own assets (1/0)
Income	Continuous	Amount of income earned(in rand)
Size of HH	Continuous	Total number of members in HH
Coloured	Dummy	1=Coloured HH ead,0=Otherwise
Indian	Dummy	1 = Indian HH head, 0 = Otherwise
White	Dummy	1 = White HH head, 0 = Otherwise
Primary education	Dummy	1 = HHH with primary education, 0 = Otherwise
Secondary education	Dummy	1 = HHH with secondary education, 0 = Otherwise
Tertiary education	Dummy	1 = HHH with tertiary education, 0=Otherwise
Matric	Dummy	1= HHH with matric, 0= Otherwise
Gender of HH head	Dummy	1 = Female, 0 = Otherwise
Employment status of HHH	Dummy	1= Employed 0= Otherwise
Urban	Dummy	HH in urban areas
Farm	Dummy	HH in farm areas
Eastern Cape	Dummy	HH in Eastern Cape
Northern Cape	Dummy	HH in Northern Cape
Free State	Dummy	HH in Free State
KwaZulu-Natal	Dummy	HH in KwaZulu-Natal
North West	Dummy	HH in North West
Gauteng	Dummy	HH in Gauteng
Mpumalanga	Dummy	HH in Mpumalanga
Limpopo	Dummy	HH in Limpopo

Income was deflated using the national Consumer Price Index of South Africa at constant 2008

Table 2 presents the descriptive statistics of the dependent and independent variables (sample of poor households). The data shows that over the three waves, the mean loan amount accessed by households increased from 0.7% in 2008 to 1%

in 2012. The mean monthly income received by households rose considerably from R278 in 2008 to R365 in 2012. Household size was stable across the three periods with an average of 7 members, whereas, the average number of household heads that obtained a primary education fell from 45.2% in 2008 to 37.8% in 2012. On average, the number of household heads that were employed fell from 11.8% in 2008 to 10.1% in 2012. The proportion of households headed by females increased from 57% in 2008 to 71.5% in 2012.

Table 2: Summary statistics of variables used in the regressions, 2008-2012

Variable	2008		2010		2012	
	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.
Access to a loan	0.007	0.082	0.012	0.108	0.010	0.100
HHH_age	46	15	46	15	44	15
HH_income	278	127	333	151	365.015	142.
HH_size	7	3.639	7	3.677	7	3.479
HHH_empl	0.118	0.323	0.093	0.290	0.101	0.301
HHH_gender	0.570	0.495	0.658	0.475	0.715	0.452
Coloured	0.053	0.224	0.051	0.220	0.049	0.216
Indian	0.004	0.062	0.004	0.066	0.002	0.039
White	0.003	0.054	0.004	0.067	0.003	0.053
Primary education	0.452	0.498	0.380	0.485	0.378	0.485
Secondary education	0.272	0.445	0.293	0.455	0.306	0.461
Matric education	0.080	0.272	0.087	0.281	0.085	0.279
Tertiary education	0.014	0.116	0.021	0.144	0.013	0.113
Rural/traditional areas	0.535	0.499	0.523	0.499	0.536	0.499
Urban	0.394	0.488	0.407	0.491	0.401	0.490

Source: author's calculations using NIDS data

4. Methodology

Our empirical investigation is based on the estimation of the well-known Heckman selection model, which takes into consideration sample selection bias (due to non-random decision of household to participate in credit market and other related issues). In the presence of sample selection bias, OLS is likely to yield spurious results (i.e. biased and inconsistent). While the Heckman sample selection model is more frequently used in studies based on cross-section data, it is not appropriate in panel data settings. Thus to correct for the potential sample selection bias we employ the Wooldridge (1995) selection method that extends traditional Heckman selection model to a panel data. The Wooldridge (1995) selection method is similar to the

traditional Heckman selection model in that it is estimated in two stages. First it estimate a probit equation (the probability of receiving a loan in our case) and a Pooled OLS (for the amount of the loan in our case), including the Mills ratio.

Thus, the Wooldridge (1995) selection model can be expressed as follows:

Participation equation:

$$C_{it}^* = x_{1it}\beta_1 + \forall_i + \varepsilon_{1it} \quad (1)$$

Participation equation describes the probability of a household receiving a loan (C_{it}^*) as influenced by a set of independent variables X_{it} (such as age, gender, household income, asset ownership, levels of education, household size, province dummies and indicator variables for location of the household—rural or urban). While \forall_i denotes individual-specific time-invariant unobservables. The participation equation is estimated by a probit model. C_{it}^* is a dichotomous variable that takes a value of 1 if the household receives a loan, and 0 otherwise.

More formally, we have

$$\begin{aligned} C_i &= 1 \text{ if } C_i^* > 0 \\ &0 \text{ if } C_i^* \leq 0 \end{aligned} \quad (2)$$

Outcome equation:

$$Y_{it}^* = x_{2it}\beta_2 + \forall_i + \varphi_{it} + \varepsilon_{2it} \quad (3)$$

The outcome equation describes the determinants of the amount of household's loans. Y_{it}^* shows the amount of household loans, x_{2it} indicate the factors affecting the amount of household loans, and φ_{it} are the inverse Mills ratios estimated in the first selection stage using the probit model for each year. ε_{1it} and ε_{2it} follow a normal distribution – $N(0,1)$ and $N(0,\sigma\varepsilon)$, respectively.

5. Empirical Results

Table 3 reports the estimation results from the Heckman selection model. The coefficient of the Mills ratio is found to be statistically significant, implying the presence of the selection bias and, thus justifying the application of Heckman selection model. What stands out from the table is that a number of explanatory variables in the participation equation are statistically significant at 10 percent or lower level, with their expected signs. In accordance with a priori expectations the participation equation results suggest that education of the household head is an important determinant of the probability of receiving a loan (three of the four possible education levels are statistically significant in the participation equation) consistent with the findings of Okurut (2006), Vaessen (2001) and Kedir (2003).

Regarding employment status, the households where the head of the household is employed is more likely to be approved for loans than their counterpart, in line with previous findings in the literature (Fidrmuc et al. 2013). Likewise, the probability of receiving a loan is positively correlated with household income and assets, although the coefficients are statistically insignificant, a similar result was found by Sorokina (2013). Gender (female) of the household head enters with its predicted negative sign at the highly statistically significant level – female are less likely to be approved for loans than man. This result is in line with other existing studies such as Oyedele, Akintola, Raji and Omonona (2009). There are exceptions in the literature, however, as shown by D'Espallier, Guérin and Mersland (2009).

With regards to geographic variables, it was found that both household geo-type and provincial location influence the probability of obtaining access to formal credit in South Africa. Specifically, households living in the poorest provinces (Eastern Cape, Kwazulu Natal, Limpopo etc.) are less likely to be approved for the loan than those residing in the Western Cape. Surprisingly, the Northern Cape was the only province that was found to improve the propensity to borrow, however it was not found to be significant. Along the same lines, households living in traditional rural areas and farm areas are less likely to be approved for the loan than households in urban neighbourhoods. This result is anticipated because urban households are predicted to have higher levels of income and wealth and are therefore viewed as more creditworthy

Column three of Table 3 shows the determinants of the amount of the loan received. It can be seen that there are remarkable differences in the parameter estimates of the variables in participation equation and outcome equation. For example, some of the variables appearing in these equations have conflicting effects in terms of both signs and level of significance. Most of the parameters (such as household income and wealth, whether the head of the household is employed, whether the head of the household is male or female, household size and race dummies) that were statistically significant in the participation equation are no longer significant in the outcome equation of the Heckman selection model. The sign for certain variables such as education levels, and Northern Cape Province changed in the outcome equation. The differences in parameter estimates of the variables in participation equation and outcome equation confirm the fact that the decision to borrow and the decision on the amount are not made simultaneously – they are not explained by the same factors.

Table 3: Panel Heckman selection model estimates of the determinants of access to formal credit by poor households in South Africa

Variables	Participation equation		Outcome equation	
	Coef.	Rob. Std. Err.	Coef.	Rob. Std. Err.
Age of HHH	0.1265826***	0.0393013		
Age SQ	-0.0012274***	0.0004204		
Asset ownership	0.0666691	0.0576382	0,0035572	0,8143747

Variables	Participation equation		Outcome equation	
	Coef.	Rob. Std. Err.	Coef.	Rob. Std. Err.
Income	0.1467037	0.1004438	0,2099511	0,2343073
Size of HH	0.0142573	0.0260586	0,0698138	0,0531952
Coloured	-0.6647291***	0.2475982	-0,8782707	0,6264319
Primary	0.4901221**	0.2308865	-0,3169149	0,4641351
Secondary	0.6604904***	0.2505928	-0,1899239	0,4510873
Tertiary	0.9692691***	0.286741	-0,1501453	0,5796951
Matric	0.2774267	0.4515922	-0,2765149	0,8618749
Gender	-0.4159641***	0.1249802	-0,0081419	0,3204073
Employment	0.187946*	0.1037089	0,0411134	0,3159033
Urban	0.5257752***	0.1573747	0,2227421	0,4038616
Farm	-0.0078894	0.2543639	1,334874***	0,3754075
Eastern Cape	-0.9341571***	0.2827325	-0,4362408	0,8030133
Northern Cape	0.0036328	0.2415262	-2,916314***	0,7424952
Free State	-0.7073709***	0.2634206	-0,8035216	0,8765267
KwaZulu-Natal	-0.4834772**	0.2430332	-0,7080882	0,7352048
North West	-0.3892125	0.2680546	-1,446433	0,8861254
Gauteng	-0.5239795**	0.2399221	-0,4606594	0,8924259
Mpumalanga	-0.4513028	0.2798945	-0,6745748	0,9112239
Limpopo	-0.8121656**	0.3381386	-0,2215831	0,8973172
Constant	-6.695918	1.275649	3,539753	3,17208
Wave 2	0.1740624**	0.0858532	-0,2138409	0,3085567
Wave 3	-0.0688128	0.1195086	0,974978***	0,4961136
Mills ratio			0,3862088**	0,1522697
Adjusted R-squared	0.6373			
Heteroscedasticity Test [†]	(0.0000)		(0.0000)	

Note: * Significant at 10%, ** Significant at 5%, *** Significant at 1%

Source: author's calculations using NIDS data

4. Conclusions

In this paper, we investigated the determinants of access to formal credit by poor households in South Africa. We corrected for possible selection bias and unobserved heterogeneity in the panel data by estimating a model proposed by Wooldridge (1995). Our results provide valuable insights into the determinants of access to formal credit. We found a number of variables, namely, age of the household head, race dummies,

[†] Further specification tests such as autocorrelation and heteroscedasticity tests were undertaken and their existence is confirmed, the model has been adjusted using cluster the standard errors. The coefficients and the adjusted standard errors for all the models are reported in Table 3.

educational levels, gender, employment, geographic location of households, to have a significant impact on propensity to borrow. Interestingly, households living in the poorest provinces (Eastern Cape, Kwazulu Natal, Limpopo etc.) were less likely to be approved for the loan than those residing in the Western Cape. Along the same lines, households living in traditional rural areas and farm areas were less likely to be approved for the loan than households in urban neighbourhoods. Our results confirm that the fact that credit market in South Africa have been less successful in providing credit to the poor households. What can be done to promote adequate access to financial services by the poor households? A number of interesting policy options have been proposed in the literature (see Mashigo 2007, Mujeri (2015) and Ksoll et al 2013). The one that stands out is by Mujeri (2015) who takes the view that government should entice financial institutions to enter the rural finance market by providing banks with monetary incentives which help cover the initial costs of entering this risky market. Moreover, given the astonishingly higher levels of poverty and unemployment in South Africa, it goes without saying that improved access to organized credit markets (i.e formal and semi-formal credit markets) by the poor rural dwellers (traditional rural areas) should be considered as an important policy instrument. Our study has shed some light on access to formal credit by rural households, with much less focus on semi-formal credit and informal credit (specifically referred to debts from relatives and friends). Further studies to analyse this aspect would be important.

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