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Access to versus Use of Loans: What are the True Determinants of Access?^{*}

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Abstract: Access to finance is a prerequisite for economic development. Existing studies measure access by the use of finance. We develop a direct measurement for access to finance from the Business Environment and Enterprise Performance Survey 2005 data. We determine whether a firm without a loan does not need one or is indeed credit-constrained. The determinants of access estimated in a Heckman selection model are compared with those of use. Our results show that firm age and sector effects do not influence access although they are significant in the use regression. The reasons are differences in demand.

Keywords: Access to Finance, Use of Finance

JEL classification: G21, O16

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1. Introduction

It is a well-established fact that access to finance is a major determinant of economic growth (Rajan and Zingales, 1998; Beck, Levine, and Loayza, 2000).¹ In the current financial crisis, financially constrained firms do not invest (Campello, Graham, Harvey, 2009). Therefore, access to finance, which has been one of the core topics in development for quite some time (see, for instance, Claessens, 2006; World Bank, 2008), came on the agenda of basically all governments. The important policy question is: which measures must be taken to foster access to finance?

A prerequisite to answer this question is to know which factors determine access to finance. In reality, it is however difficult to measure access to finance. In many studies, the use of finance is taken as a proxy for access to finance. This approach, however, neglects that those firms that do not use loans can be firms that either do not have access (and were denied loans) or that they do not need loans. For analyzing access only the first group is relevant, i.e. those that do not get a loan despite they have demand. This implies that studying the factors affecting access to loans by studying the use of loans may be misleading.

We derive a direct measure of access to loans. Our analysis uses the BEEPS (Business Environment and Enterprise Performance Survey) data, which are based on a survey conducted in 2005 among 9655 firms in 27 countries in Europe and Central Asia. This data set provides a unique source of information because firms are not only asked whether they have a bank loan or not, but if a firm does not have a bank loan, it gives reasons for it. The reasons are either that it does not get access or that it does not need a loan (which is the case for about one third of the total population of firms in our sample). For the first time, we can directly measure access to loans. This new measures allow us to study the true determinants of access.

To highlight the differences between access and use we analyze the determinants of both (measures?). We perform different probit regressions with the aim to identify whether the determinants of use and access are different. We start with estimating the

¹ For developing countries, there are several studies that use either policy changes or controlled experiments to estimate the effect of credit constraints on firm performance (for a survey, see Beck and Demirgüç-Kunt, 2008).

determinants of use. Then, we do the same for access to loans. For access we take two different approaches. First, we restrict our sample to those firms that need loans and study which explanatory variables determine access. Second, we perform two-stage regressions in which, on the first stage, we model demand for loans and, on the second stage, we model access. Finally, we compare the significance of determinants in the different specifications.

Our empirical analysis shows that there exist three major differences in the determinants for use and access both on the firm and on the country level. First, the most substantial differences appear for the firm's sector. Despite controlling for a wide range of determinants, firms from many sectors have a smaller probability of using a loan. The access analysis shows, however, that assuming restriction in access to loans is mostly misleading as the reduced probability is often due to differences in demand. Second, we find that firm age matters for the use of finance but not for access to finance. The reason is that firms in a particular age group have less demand for loans and therefore appear more likely to be credit-constrained in a model in which use of loans is the dependent variable. The regressions for access show, that this is mainly caused by demand and not by a higher probability for being credit-constrained. Third, we show that among the country-specific factors, the protection of creditor rights is only significant for explaining access and not use. And that foreign bank presence does not improve access although it increases use.

Our results show that taking use of loans as a proxy for access to loans can be misleading in many respects. This finding has important policy implications. In particular, with respect to sectors we see that some sectors have a much lower use of loans simply because they do not need loans. When studying access to loans they do not face more constraints than other sectors. Given the distortions in financial intermediation caused by the current crisis many firms/ sectors demand financial support from the government. If this support was provided in form of easier access to loans, sector-specific programs will be very inefficient, unless they are based on data that adequately measure access to finance. Therefore, we want to emphasize how important it is to possess data about access to finance before policy measures are taken.

In contrast to the existing literature we directly measure access and do not proxy for it. Previous approximated measures for access are loans or debt relative to total assets or loans to total debt. Our measure of access takes into account whether a firm that needs a loan gets a loan. Thus, firms that do not need a loan and therefore do not have a loan are not lumped together with firms that are denied access. Thereby, we use more information than all other measures do, which allows us comparing whether the determinants of use of finance indeed influence access to finance.

In the existing literature, the firms' financial situation is evaluated by using balance-sheet data and by surveying the firms. Investigating the balance-sheet provides information which sources of finance are actually used and the extent of use. Balance-sheet data can be used to measure whether a firm is financially constrained, for instance, by studying the sensitivity of investment to cash flows (Fazzari, Hubbard, Petersen, 1988). However, there is a big debate about this approach (Kaplan and Zingales, 1997, 2000) just as it is for other approaches, such as Tobin's q . Sometimes information from the annual report indicates that financial constraints exist because firms cannot fulfill covenants. Since reliable balance-sheets are needed, this approach is most appropriate when studying big corporations. For small- and medium enterprises (SMEs) data availability is often an issue. Alternatively, data from surveys can be used. For instance, the World Business Environment Survey (WBES) conducted by the World Bank in many emerging and developing economies asks how problematic access to financing and cost of financing are for the operation and the growth of a firm.²

Our paper is related to the literature on access to finance and how it is determined by firm- and country-specific characteristics. In this literature a variety of data sources are used. On the firm level, most studies include ownership and size as explanatory variables. Interestingly, the results on these determinants are ambiguous. Some studies find that small firms use loans more intensively (Giannetti and Ongena, 2008 using loans/ total assets from balance sheets data as dependent variable) while other obtain the opposite result (Beck, Demirgüç-Kunt, and Maksimovic, 2008 using bank loan/ total finance from survey data and Brown, Jappelli, and Pagano, 2008 using total debt/ assets from survey

² Campello, Graham, Harvey (2009) ask firms whether they perceived themselves financially constrained. However, they focus on the effect of financial constraints on firm behavior.

data). The same is true for ownership where only Brown, Jappelli, and Pagano (2008) find that state-owned firms use loans more intensively. Beck, Demirgüç-Kunt, and Maksimovic (2005) use survey data where firms assess how much access to finance is an obstacle for their growth. Interestingly, access to finance is perceived as more difficult by small and state-owned firms (Beck, Demirgüç-Kunt, and Maksimovic., 2005).

On the country level, the results are less ambiguous. It is generally agreed that better protection of creditor rights increases the use of finance (Giannetti and Ongena, 2008, Beck, Demirgüç-Kunt, and Maksimovic, 2008, Brown, Jappelli, and Pagano, 2008). When investigating the legal provisions made to protect creditor rights and the quality of the legal system that can be used to enforce these rights, they are complements (Safavian and Sharma, 2007). The results on the impact of information show that the results may depend on the type of measure for access to finance. When access is measured by perceived access, the existence of information sharing arrangements increases access to finance for all firms. However, if the dependent variable is total debt/ assets information sharing affects only small firms and those firms in countries with weak creditor rights (Brown, Jappelli, and Pagano, 2008).

We contribute to the literature on access to loans by deriving for the first time a direct measure of access. Since we can contrast the factors determining access with those determining use, we can see can evaluate whether the policy measured discussed so far, which are based on measuring the use of loans, are appropriate to foster access to loans.

The paper is organized as follows. In section 2, we describe our data set and the methodology. The results from the empirical analysis are presented in section 3. In the empirical analysis we discriminate between firm and country-specific determinants of access to finance. We conclude in section 4.

2. Data and Methodology

We use the Business Environment and Enterprise Performance Survey (BEEPS) collected by the European Bank for Reconstruction and Development (EBRD). The BEEPS intends to assess the environment for private enterprise and business development. We use the survey that was conducted in March and April 2005. The

survey covers 27 countries in Europe and Central Asia. Per country between 200 and about 500 firms were interviewed, depending on the size of the country. We leave out data from Uzbekistan and Tajikistan as information about institutional characteristics of these countries are missing and answers might be distorted for political reasons. We also leave out Turkey because it is not a transition country. So finally we analyze 6659 firms in 24 transition countries.

[Table I]

The questionnaire has information about the general characteristics of the firm and a whole section about its financing. In this section firms are asked about the most recent loan. Table I shows how the answers are distributed. In our sample 56% of all firms have a loan, 44% do not have one. If the firm does not currently have a loan, it can provide different reasons for it. About 4 % of the firms were rejected, 94% even have not applied for a loan and for 2% the application are still pending. In addition, firms which did not apply for a loan were asked for the reasons. The answers could be summarized in two different categories. First, the firm did not apply for the following reasons: collateral requirements are too strict, interest rates are too high or informal payments need to be made to obtain a loan. We call them discouraged firms. Second, a firm actually did not need a loan. This differentiation is essential for the following analysis.

2.1. Dependent Variables

We have two different dependent binary variables, *use* and *access*. The difference between these two dependent variables is depicted in Figure 1.

[Figure I]

Use is equal to 1 if a firm has a loan and 0 otherwise. This measure is equivalent to former studies analyzing the use of finance. This method does not differentiate between firms that are financially constrained and firms that actually have no demand for a loan.

To study access to finance, only firms with demand for a loan should be examined. Therefore we need to identify those firms. Accordingly the binary variable *demand* equals 1 for the following three cases:³

- the firm has a loan [1]
- the firm does not have a loan because its application was turned down[2]
- the firm does not have a loan because it was discouraged [3]

The last group of firms did not apply for a loan, but since these firms need a loan they are integrated here.

Finally, demand is 0 if the firm does not have a loan because it has no need for a loan and therefore has not applied [4]. The number of firms whose application is still pending is very small and as it is unclear whether they will get access or not, we do not use this data.

To analyze *access* to finance we account only for those firms which have demand for loans (*demand*=1). Therefore the variable *access* is 1 if the firm has a loan (and by definition has demand). *Access* is 0 if it does not have a loan although it has demand for it; this means that the group consists of firms that applied for a loan but have been rejected and of discouraged firms.

Summarizing, we can say that the measure *use* of finance does not discriminate within the “*use*=0” group between firms that applied for a loan and have been rejected, firms that did not apply for a loan, because they were discouraged, and firms that do not have demand at all. Table II summarizes the descriptive statistics.

[Table II]

2.2. Methodology

We study whether the determinants of access and use are the same, i.e. whether the determinants of use are good proxies for access to loans. Therefore, we perform probit estimations for use and access separately and then compare the statistical and economic significance of the coefficients.

³ Ideally, we would like to discriminate firms with demand further into those that are creditworthy and those that are not creditworthy. However, such a differentiation is very difficult to be done in practice. There is one study in which a bank newly entering the market evaluated the creditworthiness of households (Johnson and Murdoch, 2008)

$$\Pr(\text{access}_i=1|x_i)= \Phi(x_i'\alpha+v_i) \quad (1)$$

$$\Pr(\text{use}_i=1|x_i)= \Phi(x_i'\beta+w_i) \quad (2)$$

with x_i – vector of covariates for firm i , α and β – vectors of coefficients and v_i , w_i – random disturbance for firm i .

In the estimation of access we restrict our sample to those firms with demand for loans ($\text{demand}=1$). Through such a restriction valuable information gets lost. Moreover, selection into the sample group “demand for credit” might not be random and unmeasured variables could influence the decision of a firm to demand a loan. This selectivity would bias the coefficients in the *access* estimation. Therefore, we make use of all the available information and control for possible selection bias by performing a Heckman selection model. On the first stage, we estimate the demand for loans. On the second stage, we estimate access to loans given that the firm has demand. The results complement what we find for the comparison for the specifications of use and access.

The determinants of access to finance can be classified into two broad groups: firm-specific and country-specific factors. We describe the variables used in our model in the following two subsections.

2.3 Firm level explanatory variables

From the policy debate and the existing evidence there are several important firm-specific characteristics that may influence access to finance. These include size, age and ownership of the firm. With respect to *size* different effects interact. On the one hand, the banks' costs for conducting a credit evaluation do not vary a lot with the amount of the loan. Thus, smaller loans are less profitable for banks and therefore banks might be reluctant to lend to small firms. On the other hand, there is a diversification effect by granting many small loans. The dummy variable *small-firm* controls for the size of a firm, it equals to 1 if the number of employees is less than 50.

Firm *age* should influence the demand for loans because, depending on the stage of development of the firm, financial needs differ and so do the alternative sources of finance available. For newly founded firms the information asymmetries a creditor faces are most severe. Older firms already have a track record and can (ideally) show that they

always repaid on time. To measure the effect of age, we use the dummy variables for the following *age* categories: 0 – 5 years, 6 – 15 years, 16 – 30 years, 31 years or more.

Firms can try to reduce the information asymmetries the investors face by becoming more *transparent*, for instance, through reporting their balance-sheets according to international accounting standards and having them audited by a renowned auditing company. The variable *transparency* takes the value 0 if a firm does neither use international accounting standards nor external auditors, it takes the value 1 if at least one of them is used and the value 2 if both are used.⁴

In transition countries the *ownership* structure has some special features. After the demise of the socialist system basically all firms were state-owned. Since then many of the firms were privatized with the aim to render them more efficient. From this point of view, they should be better debtors. However, if state-owned firms have a soft budget constraint, they will not fail and therefore the bank does not face a risk financing them. The effect of ownership structure is captured with the two dummy variable *privatized-firm* and *state-owned-firm*. *Privatized-firm* equals 1 if the firm was established by privatization of a state-owned firm and 0 for an originally private firm.⁵

Moreover, the chance to get a loan depends on the firm's default risk. We capture it by two more explanatory variables: a dummy whether a firm is profitable or not and a dummy whether it made an investment during the last 36 months. So the dummy variable *profit* is 1 if the firm realized profits in 2003 and 0 otherwise. The dummy variable *investment* equals to 1 if new production technologies were acquired in the last 36 months and 0 otherwise.

Also the *sector* which a firm operates in plays an important role because, depending on the nature of the firm's business, the need for financing might change substantially. For instance, the size of investments is much higher in manufacturing than in retail. Thus, the *demand* for loans might strongly depend on the firm's sector. However, we expect that *access* to loans depends on firm-specific rather than sector-specific factors. We

⁴ The degree of transparency is determined by firms' choices within regulatory limits. However in the following analysis it is treated as an exogenous variable, referring to robustness checks by Brown, Jappelli and Pagano (2008) They control for potential endogeneity using instrumental variables estimations and show that analysis of Cost and Use of Finance using BEEPS data do not change.

⁵ Thus, we our basic covariates are similar to those Brown, Jappelli and Pagano (2008) who use data from an earlier wave (2002) of the BEEPS survey. In this round, however, firms were not asked why they do not have a loan.

control for different sector characteristics, using dummy variables which equals to 1 if more than 95 percent of the sales of a company comes from this sector. The sectors are mining and quarrying (sector 1), construction (sector 2), manufacturing (sector 3), transportation, storage and communication (sector 4), wholesale, retail and repairs (sector 5), real estate, renting and business services (sector 6), hotels and restaurants (sector 7). Table III summarizes the firm-level explanatory variables.

[Table III]

2.4. Country level explanatory variables

The second group of determinants are country-specific factors. In this respect particularly important is the *legal framework*. It shapes the credit contracts that potentially can be designed through two channels. The first channel is the protection of creditor rights as codified in the law. The better creditor rights are protected, the more likely banks are willing to provide loans (see La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998). The second channel is how well the protection of creditor rights is indeed enforced (Pistor, Raiser and Gelfer, 2000). We capture the first channel by the creditor rights index constructed by Doing Business. It measures the degree to which collateral and bankruptcy laws protect the right of borrowers and lenders and ranges between 1 and 10. A higher score facilitates lending and therefore leads to better access to finance. For the second channel we use the effectiveness of legal institutions as measured by the days it takes to enforce a contract.

Credit markets are subject to substantial problems of asymmetric information which are most severe in emerging markets. *Information sharing* devices such as credit registries are an important mechanism to reduce information asymmetries by providing information on, for instance, whether a firm has defaulted on a loan previously. Thus, their existence should make access easier, in particular, for more opaque firms.⁶ Here we use an index developed by Brown, Jappelli and Pagano (2008). This index measures the presence and structure of public credit registries and private credit bureaus. The value

⁶ There is a rich theoretical literature on the effects of information sharing on the behavior of borrowers and ultimately on the credit market (for a survey see Brown, Jappelli and Pagano, 2008). Not in all models information sharing has positive effects on access to credit. The effects depend crucially on the incentive problem studied in the model.

ranges from 1 to 5, the more detailed the information provided are and the longer the registry has existed the higher is the scale.

The effect of *foreign bank presence* on access to finance is controversial. On the one hand, foreign banks bring expertise and capital into the host market which might improve access to finance. On the other hand, it is argued that foreign banks might focus on particularly lucrative projects, that are easily identifiable because they are transparent. As foreign bank entry affects the behavior of domestic banks, they could start lending to more opaque firms (Dell’Ariccia and Marquez, 2004).⁷ We capture the presence of foreign banks by the market share of foreign-owned banks (among all bank assets).

Moreover, we use as explanatory variable the income level measured by the log of the gross national income (*logGNI*), *inflation* measured by the GDP deflator. Table IV summarizes the country level explanatory variables and states the data sources.

[Table IV]

3. Empirical Results: Access versus Use

We first report the results for use because this is what is measured in other papers and thus is our point of reference. Next, we report the results for access. By comparing the results, we can highlight the differences. We show coefficient estimates because we are interested in the implied direction of the effects. Throughout the paper we use robust standard errors.

3.1. Firm-specific factors

We first investigate the firm-specific factors influencing the **use** of loans (Table V). This is done in a probit regression where we next to firm-specific factors and sectors dummies use country dummies to control for differences between the 24 countries in our dataset. The results show that small and state-owned firms are less likely to have loans. In

⁷ Empirical evidence on the effects of foreign bank entry is mixed. Giannetti and Ongena (2008) find that in Eastern Europe larger firms benefit more from foreign bank presence. Detragiache, Tressel and Gupta (2008) show in a sample with low income countries that financial intermediation decreases in foreign bank penetration. Gormley (2009)’s results on India indicate that, on average, firms are less likely to receive a loan after foreign bank entry.

contrast, more transparent firms are more likely to use loans and so are firms that were profitable in 2003. Age effects are not significant. Moreover, all the sector dummies are negative and significant. Thus, they all use loans less often than those in the basic category, which is mining and quarrying.

Next, we run the same regression with **access** to loans as a dependent variable. With respect to the firm-specific variable we find that small firms and state-owned firms less often have access and that transparent and (in 2003) profitable firms more often have access. With respect to the sector-specific effects, only firms in real estate, renting and business services (sector 6) have less access to loans than in the base sector.

These results already highlight the substantial **differences** in the determinants of use and access. With respect to the firm-specific variable we find almost the same variables to be significant as in both regressions. However, the results for the sector-specific determinants change fundamentally. Comparing the results for use of loans and access to loans implies that the demand for loans must differ significantly between sectors. However, given that there is demand banks do not base their decision to grant a loan on the firm's sector – with the exception of real estate, renting and business services (sector 6). For them, it is more difficult to get access.

[Table V]

3.2. Country-specific factors

For the analysis of firm-specific factors we captured differences between countries by country dummies. In order to investigate which determinants on the country level matter, we replace them by country-specific factors (Table VI). The first result is that in both the use and the access regression the significant firm-specific determinants are nearly the same as above. The only exception is firm age. It remains insignificant in the access regression but in the use regression firms in the age cohorts 0 – 5 and 16 – 30 are less likely to have a loan.

For the **use** of loans the parameters for GNI and inflation are not significant. Moreover, measures of the legal environment, protection of creditor rights and the time it takes to enforce a contract are not significant. However, foreign bank presence increases the use of loans. We find that information sharing is positive and significant. We also

study whether particular groups of firms profit more strongly, by interacting information sharing with a small firm dummy, an opaque firm dummy (if transparency is smaller than 2) and a dummy for weak protection of creditor rights (if the creditor rights index is smaller than 6). The interaction effect between information sharing and the small firm dummy is insignificant, while the interaction with weak creditor rights is significant and negative. Thus, small firms do not benefit more from information sharing than others, firms from countries with a weak protection of creditor rights however benefit less from better information sharing. In contrast, the interaction with a dummy for opaque firms is positive and significant. This positive interaction effect implies that in countries that have information sharing arrangements in place access is easier for opaque firms.

For **access** to loans GNI is insignificant and inflation has a negative impact. Foreign bank presence does not matter. For the legal system, we find a positive coefficient of creditor rights, but the time it takes to enforce contracts is insignificant. Information sharing is positive and significant in all regressions (except when interacted with an opaque firm dummy). Only the interaction effect between information sharing and the opaque dummy is significant and positive.

Thus, also on the country level there are some **differences** in the determinants of use and access. Inflation negatively influences access but does not matter for use. In contrast to the results for use, foreign bank presence does not affect access. A better protection of creditor rights improves access but does not matter for use. Information sharing is significant in the use and the access regression. However, the interaction effect with weak creditor rights protection is significant and negative only in the use regression. This result would imply that firm in countries with weak protection of creditor rights and adequate information sharing use loans less often than in countries with better creditor rights. However, since the interaction effect is insignificant in the access regression the lower probability of having a loan (due to weak creditor rights) can not be explained by constraints of access to finance.

[Table VI]

3.3. Heckman Selection Model

The comparison of results for use and access already shows that there are significant differences in their respective determinants. We want to explain these differences more rigorously. Therefore, we use a maximum-likelihood probit model with sample selection. We estimate the demand for a loan in a first selection equation and access to loans in a second outcome equation performing a Heckman selection model. The selection equation is:

$$\text{demand}_i = 1(z_i' \gamma + u_i > 0) \quad (3)$$

with z_i – vector of covariates for firm i , γ – vector of coefficients and u_i – random disturbance for firm i in the selection equation.

And the outcome equation:

$$\text{Pr}(\text{access}_i = 1 | x_i) = \Phi(x_i' \delta + e_i) \quad (4)$$

with x_i – vector of covariates for firm i , δ – vector of coefficients and e_i – random disturbance for firm i in the outcome equation.

To specify the demand equation we use the firm-specific determinants age, ownership structure, size and profitability equivalent to the use and access regression and additionally include the variable competition as an exclusion restriction. Competition should influence the demand for loans because with more competition firms may have lower retained earnings and therefore need more loans. Moreover, they may invest more often. However, banks should base their decision to grant a loan on harder information, in particular, on figures that are observable in the firm's balance sheet.

To measure the competitive environment firms were asked what would happen if they raised the prices of their main product line or main line of services by 10 percent in the domestic market. The variable *competition* takes the value 1 if customers would continue to buy the same quantities, 2 if they would buy a slightly reduced quantity, 3 if they would buy a much lower quantity and lastly 4 if many buyers would switch and buy from the competitor instead.

When the correlation between the error terms e_i of the outcome equation and the error terms u_i of the selection equation is zero, probit regression provides unbiased estimates. Otherwise the estimators are biased.

Table VII shows the results of the Heckman selection model that controls for selectivity bias. The Wald test of independent equation rejects the H_0 hypothesis that the

correlation between the error terms is zero at a 1 percent significance level. This means that it is necessary to use a sample selection model.

In the **demand** regression, we find that firms in the age group 16-30 years have a lower probability of demand than firms in the base group (31+). Small firms in terms of employment are less likely to demand a loan. Firms that face more competition and those that invested in a new production technology are also more likely to demand a loan. The firm's profitability is negative and significant in this regression implying that firms that were profitable in 2003 have less likely demand for a loan. The sector dummies are particularly interesting. We see that all sectors except sector 2 (construction) less often have demand for loans than the base sector, mining and quarrying.

On the second stage, for **access** to finance the results for the firm-specific results are similar to what we obtained before. Here, small and state-owned firms are less likely to have access but transparent firms are more likely. Past profitability significantly alleviates access. However, neither age groups nor sector dummies are significant.

On the country level, our results show that better protection of creditor rights increases access to loans while better enforcement is insignificant. Moreover, foreign bank presence is not significant. The measure for information sharing is significant in the base regression and when interacted with a small firm dummy or a dummy for weak creditor rights, but there the interactions effects are insignificant. The interaction effect of information sharing with opaque firms is positive and significant at the 11.7 percent level, but information sharing itself becomes insignificant implying that only opaque firms benefit from information sharing.

[Insert Table VII]

When comparing the access in the one-stage and the two-stage model we do not find difference between the country-specific results. The biggest differences arise between these two approaches with regards to sector-specific results. While in the one-stage model for access we find significant differences between sectors they disappear in a two-stage model. The results of the first stage of the Heckman selection model suggest that firms in all other six sectors demand loans less often than in the base sector. Thus, the

difference between the one-stage and the two-stage model are due to differences in demand.

3.4. Access Versus Use

When comparing access and use we find several important differences. First, with respect to the firm-specific effects there are differences for the age effects. We show that firms in the age categories 0 - 10 and 16 - 30 years use loans less often. But for access they do not differ from other firms. At least for firms in the cohort 16 - 30 years we find that this is due to less frequent demand. We run regression with different definitions of age groups and find that the coefficients of the individual age groups depend on their definition. But what we can see in general is that age groups less often are significant in the regression for access (in particular in the Heckman selection model) than for use.

Second, the biggest difference exists for the sector dummies. Here again the use of loans in a sector is driven by demand and sector-specific effects do not matter for access. Thus, our results also show that using sector dummy in the use regression does not provide consistent estimates for analysis of access.

Third, with respect to country-specific variables, we show that better creditor rights improve access. But they do not make the use of loans more likely. For foreign bank presence, the results are reversed. Firms are more likely to have a loan in countries with higher foreign bank presence but it does not improve access. Information sharing is significant in both regressions.

4. Conclusions

We started this paper with the question whether the use of finance is a good approximation for access to finance and, in particular, whether the factors determining use and access, respectively, are the same. We show that the results with access as the dependent variable in a one-stage regression and the results of a two-step Heckman selection model are similar. However, our results indicate that there are major differences between the determinants of use and access, respectively. The differences are most

pronounced with respect to effects of firm age, sector-specific effects and the role of foreign banks and creditor rights protection (on the country level).

The age effects are insignificant in the access regression of the Heckman selection model. For firms between 16 – 30 years the negative coefficient in the use regression is due to the fact that they significantly less often demand a loan. Our analysis thus suggests that age does not influence access, at least for our sample which, of course, has some particularities because many firms were founded after transition started in 1989.

What does our analysis suggest for governments? With respect to reforms on the country level improving the protection of creditor rights and implementation of information sharing devices are appropriate measures. These measures are particularly important for developing countries where these institutions are still deficient.

What can be done by targeting firm-specific aspects of access? Our most important policy conclusion is probably that information about the use of loans is not enough to identify either the type of firms that should be supported or the reforms that should be undertaken on the country level. Our results also show that sector-specific programs to improve access do not make sense, at least in “normal” times.

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APPENDIX

Table I: Descriptive Statics - Sample

Firms, that	Freq.	Percent
do not have a loan	4.794	56,29
have a loan	3.722	43,71
Total	8.516	100

If the the firm does not have a loan, what was the reason?	Freq.	Percent
Firm did not apply for a loan	4.487	93,6
Application was turned down	220	4,59
Application for the loan is still pending	87	1,81
Total	4.794	100

If firm did not apply, what were the main reasons?	Freq.	Percent
Does not need a loan	2936	48,11
Application preecedures for bank loans are too burdensome	798	13,08
Collateral requirements for bank loans are too strict	842	13,80
Interest rates are too high	1183	19,38
It is necessary to make informal payments to get bank loans	98	1,61
Did not think it would be approved	141	2,31
Others	105	1,72
Total	6103	100

If firm did not apply, what were the main reasons?	Freq.	Percent
At least one answer is "does not need a loan"	2936	65,43
None of the answers is "does not need a loan"	1551	34,57
Total	4487	100

Table II: Descriptive Statistics

Different groups of firms	use	demand	access	Freq.	Percent
firm has a loan	1	1	1	3722	44.16
firm does not have a loan, because application turned down	0	1	0	220	2.61
firm does not have a loan, because discouraged from applying	0	1	0	1551	18.40
firm does not have a loan, because no need	0	0	-	2936	34.83
Total				8429	100.00

Demand	Freq.	Percent
no	2,936	34.83
yes	5,493	65.17
Total	8,429	100

Access	Freq.	Percent
no	1,771	32.24
yes	3,722	67.76
Total	5,493	100

Table III: Descriptive Statistics: Firm Characteristics

country	transition firm	post-transition firm	small firm	privatized firm	state-owned firm	transparency	profit	competition	investment
Albania	0,22	0,72	0,74	0,08	0,09	0,99	0,92	2,50	0,40
Armenia	0,11	0,63	0,78	0,31	0,06	0,71	0,97	2,46	0,53
Azerbaijan	0,08	0,78	0,68	0,07	0,11	0,68	0,99	2,64	0,50
Belarus	0,21	0,62	0,71	0,05	0,12	0,48	0,85	2,45	0,28
Bosnia	0,08	0,62	0,61	0,18	0,10	0,76	0,79	2,55	0,45
Bulgaria	0,30	0,51	0,74	0,14	0,10	0,66	0,78	2,54	0,28
Croatia	0,35	0,38	0,65	0,21	0,11	1,08	0,96	2,57	0,43
Czech Rep.	0,38	0,55	0,76	0,07	0,09	0,41	0,91	2,45	0,23
Estonia	0,37	0,54	0,74	0,12	0,09	1,68	0,89	2,52	0,19
Georgia	0,08	0,64	0,74	0,26	0,12	1,15	0,74	2,61	0,28
Hungary	0,39	0,46	0,72	0,10	0,04	0,88	0,85	2,91	0,15
Kazakhstan	0,14	0,76	0,73	0,19	0,07	0,43	0,87	2,38	0,31
Kyrgyz Rep.	0,14	0,57	0,63	0,36	0,11	0,83	0,78	2,65	0,43
Latvia	0,22	0,65	0,74	0,10	0,11	0,86	0,69	2,31	0,25
Lithuania	0,29	0,53	0,68	0,17	0,13	0,65	0,75	2,79	0,29
Macedonia	0,22	0,53	0,73	0,16	0,09	0,49	0,80	2,66	0,31
Moldova	0,17	0,71	0,65	0,22	0,06	0,23	0,62	2,50	0,38
Poland	0,31	0,42	0,75	0,07	0,06	0,45	0,88	2,83	0,34
Romania	0,36	0,53	0,65	0,11	0,06	0,59	0,83	2,40	0,41
Russia	0,16	0,70	0,67	0,12	0,10	0,48	0,88	2,30	0,31
Serbia	0,25	0,45	0,65	0,13	0,14	0,92	0,79	2,06	0,36
Slovak Rep.	0,36	0,51	0,68	0,06	0,11	0,65	0,87	2,66	0,23
Slovenia	0,39	0,29	0,71	0,19	0,11	0,58	0,74	2,47	0,29
Ukraine	0,18	0,64	0,71	0,15	0,10	0,49	0,83	2,31	0,31

Table IV: Descriptive Statistics - Country Characteristics

country	information sharing	GNI	inflation	foreignbank	creditrighs	enforcement days
Albania	0	2580	3,49	92,3	9	390
Armenia	0	1470	3,17	48,7	4	285
Azerbaijan	0	1270	16,14	6,6	7	267
Belarus	0	2760	16,6	16,2	4	225
Bosnia	0	2680	1,4	90,9	4	595
Bulgaria	0,8	3510	3,76	74,5	6	564
Croatia	0	8350	3,19	91,2	5	561
Czech Rep.	0	11150	0,68	84,4	6	820
Estonia	4	9530	6,79	99,4	4	425
Georgia	0	1300	8,27	75,9	5	375
Hungary	3,8	10210	2,01	82,6	6	335
Kazakhstan	3,6	2940	17,87	7,3	5	230
Kyrgyz Rep.	0	450	7,13	73,6	4	177
Latvia	0	6760	10,18	57,9	8	279
Lithuania	4,6	6910	5,77	91,7	4	210
Macedonia	2	2830	3,27	51,3	6	509
Moldova	0	960	9,35	19,6	6	365
Poland	0	7150	2,58	74,3	4	980
Romania	0,6	3830	12,29	59,2	5	537
Russia	0	4470	19,19	8,3	3	281
Serbia	0	2190	15,12	66	3	1028
Slovak Rep.	1,2	8100	2,37	97,3	9	565
Slovenia	2,8	17430	1,47	22,6	6	1350
Ukraine	0	1540	24,66	21,3	8	354
Total	0,95	5042	9,28	53,84	5,29	503

Source of *logGNI* and *inflation* : World Bank, DDP quick query; *foreignbank* : EBRD, Structural and institutional change indicators; *creditrighs* and *log_enfdays*: Doing Business; Information sharing: Brown et al. (2008)

Table V: Firm-specific Results

	use			access			
	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	z	P>z
age 0-5	-0,104	0,075	0,162	-0,044	0,100	-0,440	0,660
age 5-15	-0,004	0,063	0,945	0,088	0,086	1,010	0,311
age 15-30	-0,127	0,078	0,106	-0,055	0,106	-0,520	0,601
small firm	-0,495 ***	0,041	0,000	-0,719 ***	0,058	-12,370	0,000
privatized firm	0,011	0,055	0,848	0,042	0,077	0,540	0,587
state-owned firm	-0,556 ***	0,071	0,000	-0,490 ***	0,100	-4,910	0,000
transparency	0,185 ***	0,027	0,000	0,301 ***	0,038	7,940	0,000
profit	0,221 ***	0,046	0,000	0,412 ***	0,058	7,160	0,000
sec2	-0,140 **	0,067	0,037	-0,135	0,088	-1,530	0,126
sec3	-0,092 **	0,044	0,035	-0,061	0,056	-1,090	0,277
sec4	-0,179 **	0,079	0,023	-0,079	0,105	-0,760	0,449
sec5	-0,191 ***	0,048	0,000	-0,017	0,064	-0,270	0,784
sec6	-0,551 ***	0,071	0,000	-0,304 ***	0,097	-3,140	0,002
sec7	-0,489 ***	0,086	0,000	-0,123	0,127	-0,970	0,330
_cons	0,164	0,156	0,291	0,6088621 ***	0,2048415	2,970	0,003
countrydummies	yes			yes			
Observation	6629			4412			
Pseudo R-squared	0,09			0,13			

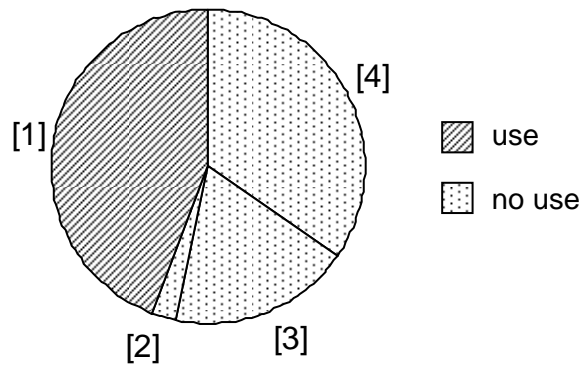
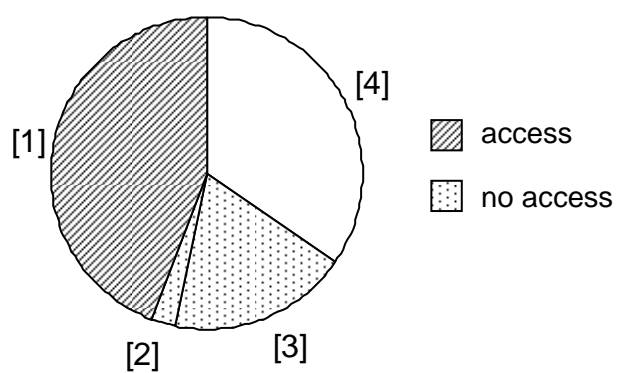
Table VI: Country-specific Results

use	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z
age 0-5	-0,124 *	0,073	0,089	-0,117	0,073	0,110	-0,125 *	0,073	0,089	-0,118	0,073	0,109
age 5-15	-0,020	0,062	0,748	-0,013	0,062	0,831	-0,020	0,062	0,746	-0,013	0,062	0,835
age 15-30	-0,154 **	0,077	0,045	-0,149 *	0,077	0,053	-0,153 **	0,077	0,047	-0,153 **	0,077	0,046
small firm	-0,481 ***	0,040	0,000	-0,482 ***	0,040	0,000	-0,453 ***	0,046	0,000	-0,481 ***	0,040	0,000
privatized firm	0,073	0,054	0,180	0,071	0,054	0,189	0,071	0,054	0,190	0,078	0,054	0,149
state-owned firm	-0,554 ***	0,070	0,000	-0,556 ***	0,070	0,000	-0,550 ***	0,070	0,000	-0,549 ***	0,070	0,000
transparency	0,170 ***	0,025	0,000	0,196 ***	0,027	0,000	0,171 ***	0,025	0,000	0,168 ***	0,025	0,000
profit	0,161 ***	0,045	0,000	0,162 ***	0,045	0,000	0,160 ***	0,045	0,000	0,163 ***	0,045	0,000
sec2	-0,151 **	0,067	0,023	-0,152 **	0,067	0,023	-0,149 **	0,067	0,025	-0,151 **	0,067	0,023
sec3	-0,146 ***	0,042	0,001	-0,147 ***	0,042	0,000	-0,145 ***	0,042	0,001	-0,143 ***	0,042	0,001
sec4	-0,210 ***	0,077	0,007	-0,210 ***	0,078	0,007	-0,211 ***	0,077	0,006	-0,206 ***	0,077	0,008
sec5	-0,194 ***	0,048	0,000	-0,192 ***	0,048	0,000	-0,194 ***	0,048	0,000	-0,193 ***	0,048	0,000
sec6	-0,527 ***	0,070	0,000	-0,526 ***	0,070	0,000	-0,526 ***	0,070	0,000	-0,524 ***	0,070	0,000
sec7	-0,494 ***	0,086	0,000	-0,496 ***	0,086	0,000	-0,490 ***	0,086	0,000	-0,490 ***	0,086	0,000
logGNI	-0,007	0,029	0,801	-0,007	0,029	0,816	-0,008	0,029	0,789	-0,016	0,029	0,594
inflation	-0,002	0,004	0,529	-0,001	0,004	0,709	-0,002	0,004	0,531	0,000	0,004	0,900
foreignbank	0,002 *	0,001	0,069	0,002 **	0,001	0,037	0,002 *	0,001	0,072	0,002 **	0,001	0,027
creditrighs	0,012	0,010	0,228	0,010	0,010	0,334	0,012	0,010	0,233	0,005	0,010	0,655
log_enfdays	0,032	0,043	0,459	0,036	0,043	0,407	0,032	0,043	0,458	0,030	0,043	0,485
information sharing	0,055 ***	0,014	0,000	-0,001	0,026	0,960	0,077 ***	0,022	0,000	0,082 ***	0,020	0,000
info_opaque				0,067 **	0,027	0,012						
info_small							-0,031	0,023	0,188			
info_weakcr										-0,042 **	0,021	0,049
_cons	-0,078	0,289	0,787	-0,136	0,291	0,639	-0,093	0,289	0,747	-0,020	0,291	0,945
Observation	6629			6629			6629			6629		
Pseudo R-squared	0,06			0,06			0,06			0,06		

access	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z
age 0-5	-0,055	0,098	0,571	-0,047	0,098	0,628	-0,055	0,098	0,573	-0,053	0,098	0,590
age 5-15	0,086	0,084	0,308	0,093	0,084	0,271	0,086	0,084	0,306	0,088	0,084	0,295
age 15-30	-0,101	0,102	0,324	-0,092	0,102	0,369	-0,100	0,102	0,329	-0,100	0,102	0,329
small firm	-0,716 ***	0,056	0,000	-0,718 ***	0,056	0,000	-0,701 ***	0,063	0,000	-0,716 ***	0,056	0,000
privatized firm	0,121	0,075	0,109	0,119	0,075	0,114	0,120	0,075	0,110	0,122	0,075	0,104
state-owned firm	-0,474 ***	0,096	0,000	-0,476 ***	0,096	0,000	-0,472 ***	0,096	0,000	-0,472 ***	0,096	0,000
transparency	0,274 ***	0,035	0,000	0,299 ***	0,037	0,000	0,274 ***	0,035	0,000	0,273 ***	0,035	0,000
profit	0,351 ***	0,056	0,000	0,350 ***	0,056	0,000	0,350 ***	0,056	0,000	0,351 ***	0,056	0,000
sec2	-0,165 *	0,087	0,057	-0,166 *	0,087	0,057	-0,164 *	0,087	0,059	-0,166 *	0,087	0,056
sec3	-0,122 **	0,054	0,024	-0,125 **	0,054	0,022	-0,122 **	0,054	0,025	-0,121 **	0,054	0,025
sec4	-0,129	0,104	0,213	-0,130	0,104	0,209	-0,130	0,104	0,209	-0,128	0,103	0,217
sec5	-0,015	0,063	0,813	-0,013	0,063	0,835	-0,015	0,063	0,812	-0,015	0,063	0,813
sec6	-0,259 ***	0,095	0,006	-0,253 ***	0,094	0,007	-0,259 ***	0,095	0,006	-0,258 ***	0,094	0,006
sec7	-0,096	0,126	0,446	-0,098	0,126	0,437	-0,094	0,126	0,453	-0,095	0,126	0,451
logGNI	0,052	0,036	0,152	0,053	0,037	0,147	0,052	0,036	0,155	0,049	0,037	0,181
inflation	-0,009 **	0,004	0,047	-0,008 *	0,004	0,071	-0,009 **	0,004	0,047	-0,008 *	0,005	0,091
foreignbank	0,001	0,001	0,437	0,001	0,001	0,332	0,001	0,001	0,451	0,001	0,001	0,394
creditrighs	0,035 ***	0,013	0,008	0,032 **	0,013	0,013	0,034 ***	0,013	0,008	0,032 **	0,014	0,020
log_enfdays	0,059	0,054	0,275	0,062	0,054	0,250	0,059	0,054	0,269	0,058	0,054	0,281
information sharing	0,047 ***	0,018	0,008	-0,020	0,037	0,587	0,060 *	0,032	0,058	0,056 **	0,026	0,034
info_opaque				0,077 **	0,038	0,045						
info_small							-0,017	0,034	0,611			
info_weakcr										-0,014	0,029	0,637
_cons	-0,333	0,362	0,359	-0,386	0,364	0,289	-0,345	0,364	0,343	-0,311	0,367	0,396
Observation	4412			4412			4412			4412		
Pseudo R-squared	0,1			0,1			0,1			0,1		

Table VII: Results of Heckman Selection Model

	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z	Coef.	Robust Std. Err.	P>z
access												
age 0-5	-0,020	0,091	0,824	-0,016	0,092	0,862	-0,018	0,091	0,842	-0,015	0,091	0,872
age 5-15	0,116	0,078	0,136	0,120	0,078	0,125	0,118	0,078	0,131	0,121	0,078	0,121
age 15-30	-0,041	0,096	0,671	-0,036	0,096	0,706	-0,037	0,096	0,700	-0,038	0,096	0,695
small firm	-0,576 ***	0,065	0,000	-0,580 ***	0,065	0,000	-0,544 ***	0,067	0,000	-0,573 ***	0,064	0,000
privatized firm	0,089	0,070	0,201	0,089	0,070	0,205	0,088	0,070	0,207	0,092	0,069	0,187
state-owned firm	-0,241 **	0,103	0,019	-0,245 **	0,104	0,018	-0,231 **	0,102	0,023	-0,234 **	0,102	0,022
transparency	0,239 ***	0,033	0,000	0,257 ***	0,035	0,000	0,239 ***	0,033	0,000	0,236 ***	0,033	0,000
profit	0,326 ***	0,052	0,000	0,328 ***	0,052	0,000	0,324 ***	0,052	0,000	0,326 ***	0,052	0,000
sec2	-0,105	0,082	0,202	-0,107	0,083	0,195	-0,101	0,082	0,217	-0,105	0,082	0,202
sec3	-0,081	0,051	0,112	-0,084	0,051	0,101	-0,080	0,051	0,116	-0,079	0,051	0,120
sec4	-0,039	0,098	0,693	-0,040	0,099	0,683	-0,039	0,098	0,687	-0,035	0,098	0,717
sec5	0,067	0,059	0,257	0,067	0,060	0,260	0,069	0,059	0,242	0,069	0,059	0,242
sec6	0,013	0,098	0,894	0,014	0,098	0,888	0,020	0,097	0,838	0,019	0,097	0,846
sec7	0,129	0,123	0,294	0,125	0,124	0,314	0,136	0,121	0,263	0,134	0,122	0,270
logGNI	0,043	0,032	0,175	0,044	0,032	0,173	0,043	0,032	0,181	0,038	0,032	0,234
inflation	-0,007 *	0,004	0,063	-0,007 *	0,004	0,087	-0,007 *	0,004	0,063	-0,006	0,004	0,156
foreignbank	0,001	0,001	0,512	0,001	0,001	0,416	0,001	0,001	0,548	0,001	0,001	0,418
creditrighs	0,032 ***	0,012	0,005	0,031 ***	0,012	0,008	0,032 ***	0,011	0,005	0,028 **	0,012	0,020
log_enfdays	0,054	0,047	0,254	0,056	0,047	0,237	0,055	0,047	0,240	0,052	0,047	0,265
information sharing	0,042 ***	0,016	0,007	-0,006	0,034	0,854	0,069 ***	0,030	0,020	0,058 **	0,023	0,013
info_opaque				0,054	0,035	0,117						
info_small							-0,034	0,031	0,276			
info_weaker										-0,023	0,026	0,360
_cons	-0,058	0,322	0,856	-0,096	0,325	0,768	-0,077	0,321	0,810	-0,016	0,325	0,960
need												
profit	-0,082 *	0,044	0,062	-0,082 *	0,044	0,062	-0,082 *	0,044	0,063	-0,082 *	0,044	0,063
privatized firm	0,051	0,054	0,345	0,051	0,054	0,346	0,051	0,054	0,346	0,051	0,054	0,346
state-owned firm	-0,413 ***	0,067	0,000	-0,413 ***	0,067	0,000	-0,413 ***	0,067	0,000	-0,413 ***	0,067	0,000
age 0-5	-0,076	0,072	0,293	-0,076	0,072	0,292	-0,075	0,072	0,298	-0,076	0,072	0,295
age 5-15	-0,090	0,062	0,149	-0,090	0,062	0,148	-0,089	0,062	0,151	-0,089	0,062	0,150
age 15-30	-0,148 *	0,076	0,052	-0,149 *	0,076	0,051	-0,148 *	0,076	0,053	-0,148 *	0,076	0,053
small firm	-0,204 ***	0,039	0,000	-0,204 ***	0,039	0,000	-0,204 ***	0,039	0,000	-0,204 ***	0,039	0,000
competition	0,066 ***	0,014	0,000	0,066 ***	0,014	0,000	0,065 ***	0,014	0,000	0,065 ***	0,014	0,000
investment	0,155 ***	0,033	0,000	0,155 ***	0,033	0,000	0,155 ***	0,033	0,000	0,156 ***	0,033	0,000
sec2	-0,104	0,066	0,115	-0,104	0,066	0,115	-0,104	0,066	0,116	-0,104	0,066	0,116
sec3	-0,076 *	0,041	0,066	-0,076 *	0,041	0,066	-0,076 *	0,041	0,066	-0,076 *	0,041	0,066
sec4	-0,185 **	0,075	0,014	-0,185 **	0,075	0,014	-0,184 **	0,075	0,014	-0,184 **	0,075	0,014
sec5	-0,242 ***	0,046	0,000	-0,242 ***	0,046	0,000	-0,242 ***	0,046	0,000	-0,242 ***	0,046	0,000
sec6	-0,507 ***	0,064	0,000	-0,507 ***	0,064	0,000	-0,507 ***	0,064	0,000	-0,507 ***	0,064	0,000
sec7	-0,550 ***	0,081	0,000	-0,550 ***	0,081	0,000	-0,550 ***	0,081	0,000	-0,550 ***	0,081	0,000
_cons	0,626 ***	0,087	0,000	0,626 ***	0,087	0,000	0,626 ***	0,087	0,000	0,627 ***	0,087	0,000
/athrho	-0,891 ***	0,272	0,001	-0,872 ***	0,273	0,001	-0,920 ***	0,270	0,001	-0,917 ***	0,275	0,001
Observation	6659			6659			6659			6659		
Wald chi2	221,89			221,89			225,10			224,70		
Prob > chi2	0.000			0.000			0.000			0.000		



[1] loan

[2] no loan, because rejected

[3] no loan, because discouraged

[4] no loan, because no need

Figure 1: Comparison of Access and Use