MASTER'S THESIS IN CORPORATE FINANCE

Does the quality of debt enforcement affect collateral requirements?

Evidence from sub-Saharan Africa

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ABSTRACT

Using a dataset of 1,210 loans across 35 sub-Saharan African countries, we study the effect of the quality of bankruptcy codes on collateral requirements. In contrast to earlier studies, we find no significant relationship between the level of creditor protection and the use of collateral. However, the efficiency of bankruptcy procedures is negatively related to both the incidence and degree of collateral. Our results indicate that creditors not necessarily consider the design of a bankruptcy code, but rather appreciate the efficiency of its implementation. Further analysis confirms that these two concepts, design and implementation, are not significantly related to one another. The main takeaway is that when trying to improve the bankruptcy process, governments should mainly focus at improving public institutions' capability to implement regulations and simplifying existing procedures.

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1 INTRODUCTION

High collateral requirements are one of the most important obstacles for firms when obtaining external financing (Beck et al., 2006). This is especially the case in emerging economies, where collateral is a highly used tool. However, the legal environment in these countries makes enforcement of collateralized debt contracts often problematic (Hainz, 2003). In this study we hypothesize that inefficient bankruptcy procedures[1] lead lenders to impose stringent collateral requirements on their borrowers.

Numerous studies have focused on the determinants of the use of collateral, finding matters such as borrower quality, economic growth, and the borrower-lender relationship to be significant indicators of collateral (see for instance Jiménez et al., 2006 and Hanedar et al., 2014). However, empirical research on the influence of the legal environment is rather limited. The evidence we know of, finds that the creditor-friendliness is negatively related to the use of secured debt (Qian and Strahan, 2007; Davydenki and Franks, 2008), implying that lenders try to compensate for limited protection in case of default by increasing collateral requirements.

In contrast to earlier studies, we estimate the quality or efficiency of bankruptcy procedures in two ways. First, we use the creditors' rights score[2] of La Porta et al. (1998). This measures whether four characteristics (the absence of an automatic stay, seniority of secured creditors' claims, the ability to replace management during reorganization, and the need of creditor consent for debtors to file for reorganization) are present in a country's bankruptcy code. A minimum score of 0 implies a creditor-unfriendly insolvency procedure, whereas a maximum score of 4 implies a creditor-friendly procedure.

Second, we apply a measure of the actual efficiency of the implementation of bankruptcy codes. This measure is based on the methodology of Djankov et al. (2008) and is implemented by the World Bank and the International Finance Corporation

[1] Although exact definitions vary, we will use the terms *bankruptcy procedures*, *insolvency procedures*, and *debt enforcement* interchangeably in this paper. We refer to the process after the debtor has defaulted during which the creditors aim to recover their claims. When we talk about the quality or efficiency of this process, we are taking the creditor's point of view.

[2] We will interchangeably use the terms *creditors' rights score* and *level of creditor protection* when referring to this measure.

(IFC). Insolvency practitioners around the world are presented with a hypothetical insolvency case and asked what the most likely outcome of this case would be in their respective countries. Based on their answers, the expected recovery rate of the (hypothetical) secured creditor is calculated. It should not be interpreted as the actual recovery rate creditors should expect to achieve in reality since this will differ from case to case. Instead, we use this measure as an 'efficiency score' of insolvency procedures, which takes into account both the design and implementation of bankruptcy codes.

We thus consider two aspects of the quality of bankruptcy codes: design, measured by the creditors' rights score, and implementation, measured by the efficiency score. These two measures allow us to investigate whether creditors only consider the design of bankruptcy codes, or also take into account the efficiency of its implementation. We can also determine whether these two concepts deviate from one another. In other words: does a well-designed code also result in efficient implementation? This question is of particular interest to sub-Saharan Africa, since enforcement of laws and regulations often lacks efficiency in the developing world (Djankov et al., 2003).

Besides using an additional measure of bankruptcy code quality, we add to existing literature by focusing on sub-Saharan Africa. This region tends to be underrepresented in research in general, but also in earlier studies focusing on collateral requirements. Other studies tend to focus on developed economies, but even when developing countries are included in a sample, such as in Qian and Strahan (2007), sub-Saharan Africa is highly underrepresented. This can largely be explained by the lack of readily available data.

We solve this issue by relying on survey data collected by the World Bank. Firms of all sizes, mainly in developing countries, are asked about a wide range of topics during face-to-face interviews, amongst others providing us with information on the collateral requirements of their most recently obtained loan or line of credit.

Our dataset covers 1,210 loans across 35 sub-Saharan African countries, approved between 2005 and 2011. Some large countries are overrepresented in our sample, but the spread of observations across countries is still sufficient. Firms of all sizes are included, although the median number of employees is only 25. The sample is limited to loans taken out by borrowers for which we have firm-level characteristics corresponding to the

same year as when the loan was approved, since these characteristics are used as control variables.

Both the level of creditor protection and the efficiency of debt enforcement vary widely across the countries in our sample. The average level of protection, on a scale of 0 to 4, is only 1.4. Over a third of the countries receive a minimum score of 0, whereas only 3 countries (Kenya, Nigeria, and Zimbabwe) receive a maximum score of 4. Moreover, 6 countries are considered to have very inefficient bankruptcy procedures and get an efficiency score of 0%.[3] Botswana, on the other hand, is the most efficient country in the region and receives a score of 58%. The average score is 20%, indicating that procedures are generally implemented quite poorly.

We find that the design of a country's bankruptcy code, measured by its level of creditor protection, does neither explain the incidence of collateral (whether or not a loan is secured) nor the degree of collateral (the value of the pledged assets relative to the loan size). This is in contrast to the findings of earlier studies. However, we do find a significant negative relationship between the efficiency of debt enforcement and the use of collateral (both its incidence and degree), implying that a well-designed code does not necessarily result in an efficient outcome of insolvency procedures. This is confirmed by additional analysis showing that the level of creditor protection is not significantly related to the efficiency score.

These results imply that the practical implementation of bankruptcy codes are of more importance to creditors than the written regulations. It might very well be that public institutions lack the capacity and/or capability to properly enforce the country's bankruptcy laws and regulations. In such case it does not matter much whether the design of an insolvency procedure is of the highest quality, since low-quality implementation will still result in an inefficient process. Angola, for example, receives a relatively high creditor protection score of 3 out of 4, whilst its efficiency score is 0%. When aiming to improve creditor protection and lower collateral requirements for firms, government should therefore largely focus on improving the efficiency of their regulations and institutions, instead of only rewriting the bankruptcy code on paper.

[3] The scores we refer to in the text concern the average over our sample period (2005 – 2011). As the *Doing Business* reports measure efficiency annually, we use efficiency scores relating to the year of loan approval in our models.

It is yet unclear what causes this deviation between the design and implementation of bankruptcy codes; it could either be due to lacking capacity and capability of public institutions, or due to unwillingness. The latter might be the case when inefficiencies are the result of rent-seeking behavior, i.e. corruption. It is important for future research to clarify this, as appropriate solutions can then be suggested.

The rest of this paper is organized as follows. Chapter 2 reviews existing literature on the quality of debt enforcement around the world and its relation with collateral requirements. Chapter 3 describes our data and how it was collected. Chapter 4 introduces our hypotheses and explain how they are tested. In Chapter 5 we present our results and discuss whether our hypotheses are confirmed. Chapter 6 closes off with the main findings, limitations of our study, and suggestions for future research.

2 LITERATURE REVIEW

This chapter covers earlier work on the topics of bankruptcy codes, debt enforcement, collateral requirements, and the relationship between these concepts. First, we discuss the different bankruptcy procedures that are used around the world. Second, we define what the goals of an insolvency procedure should be and what the main characteristics of a creditor-friendly bankruptcy code are. Third, we investigate how the quality and efficiency of the bankruptcy process differs across countries and regions. Finally, the main purposes of collateral are outlined and we investigate how its use might be impacted by the quality and efficiency of bankruptcy codes.

2.1 Insolvency procedures around the world

Although in detail bankruptcy codes vary widely from one another, insolvency procedures following default generally take one of three basic forms: foreclosure, liquidation, or reorganization. We briefly elaborate on each of these procedures and discuss their main advantages and drawbacks for (secured) creditors. This section is largely based on descriptions of Hart et al. (1997), Hart (2000), and Djankov et al. (2008).

2.1.1 Foreclosure

Officially, under foreclosure the debtor is not in bankruptcy. However, the firm is insolvent as it failed to meet its payment obligations to its creditors. Foreclosure is a procedure initiated by secured creditors and only aims at recovering this group of claimants' money, by selling (part of) the debtor's assets. The firm might be sold as a going concern; foreclosure does thus not necessarily mean the end of the business. Unsecured creditors and other claimants cannot rely on this method. Foreclosure can either be out-of-court or supervised by a court, although the court tends to be less involved than in liquidation and reorganization procedures.

Foreclosure can be a very efficient procedure for secured creditors, as there is less court involvement, implying less fees and other administrative costs. Not all countries, however, allow out-of-court debt enforcement. Moreover, the debt contract should

specifically state under which conditions the lender is allowed to seize the collateralized assets.

2.1.2 Liquidation

Liquidation is a very common bankruptcy procedure, which happens under court supervision. The firm is sold as going concern or piecemeal, depending on what creates the most value. From the receipts of the sale, creditors and other claimants are paid, normally according to absolute priority. This implies secured creditors are first in line, followed by priority claims, unsecured debt, subordinated debt, and equity. In some countries, however, absolute priority is not strictly followed and secured creditors might thus not always have the most senior claim. For instance, employees' or the government's claims might be recovered first.

For a liquidation process to work properly and to achieve the most efficient outcome, financial markets should work well. This should steer the procedure to the most beneficial outcome and result in the highest possible value. In practice, however, markets are often imperfect. Assets might be sold at fire-sale prices, leaving creditors with less than what they should have received. In fact, bankruptcy reforms have largely been in the direction of a reorganization procedure instead of a liquidation procedure, as none of the parties involved (management, shareholders, and creditors) tends to benefit from liquidation (Hart, 2000).

2.1.3 Reorganization

As the name indicates, a reorganization aims at rehabilitating the defaulted firm and preserving it as a going concern. The most well-known example is Chapter 11 in the United States. This process is court-supervised. Depending on the country, debtors might be protected from creditors through a so-called automatic stay; creditors are not allowed to seize or sell any of the firm's assets. Also, whilst in some countries management is retained during the process, in other countries regulations state that management is replaced by a party appointed by creditors or the court. The different claimants are grouped into classes depending on the type of their claim. Representatives of each class

have to come up with a plan of action, which has to be approved by a majority of each claimant class.

Reorganization tends to be a costly and time-consuming process, which, moreover, does not always respect absolute priority of claims and is often seen as too debtor-friendly. Additionally, the outcome of reorganization might not always be efficient. When absolute priority is respected and secured creditors are thus first in line, this group might push for a quick sale of assets, ensuring that their claims are recovered. In practice, preserving the firm might be the most efficient outcome.

2.2 Goals of an insolvency procedure

When defining the quality of a bankruptcy code or procedure, it is important which perspective one takes. Whereas shareholders and management might aim to preserve the firm as a going concern, secured creditors might simply try to recover their claim as quickly as possible, regardless of the future of the firm. Aghion et al. (1994) and Hart (2000) formulate the most important goals of an efficient bankruptcy procedure, taking into account all parties involved. Their definition is largely in line with our view of an efficient, creditor oriented bankruptcy code.

First, the value that will be divided between the different parties should be maximized. This implies that the appropriate course of action might be reorganization, sale as a going concern, piecemeal sale of assets, or closing down, depending on which of these realizes the greatest value. All parties involved will be better off when there is more value created. In addition, as Djankov et al. (2008) mention, the duration and costs of the insolvency process should be kept to a minimum in order to maximize value. Examples of such costs are court fees and lawyers' fees. The longer a process takes, the higher these costs will be.

A second goal is that managers and shareholders should be penalized in case of default. Managers could for instance lose their job when the firm ends up in bankruptcy. This should act as an incentive to meet payment obligations and thus prevent default. In some countries, creditors indeed have the power to replace incumbent management during reorganization.

Third, the priority of the different types of claims should be well-defined. Payments should be made according to seniority, meaning secured debtors are paid before unsecured debtors, and unsecured debtors are paid before shareholders and other claimants.

Fourth, Aghion et al. (1994) state that decision-making should ultimately be in the hands of the creditors and other claimants rather than in the hands of the court, since they are the ones that will ultimately benefit from an efficient outcome.

In brief, an efficient and high-quality procedure in the context of this paper is one that maximizes value, incentivizes management and shareholders to avoid bankruptcy, and respects the seniority of the different claims. Next, we investigate how procedures differ across countries and what explains these differences.

2.3 Characteristics of a creditor-friendly bankruptcy code

Bankruptcy codes are a collection of numerous specific laws and regulations. Djankov et al. (2008) list no less than 24 characteristics they regard of importance to the debt enforcement process. La Porta et al. (1998) have selected four characteristics of bankruptcy laws that indicate whether or not it is creditor-friendly: the seniority of secured creditors' claims, the absence of an automatic stay, the ability to replace incumbent management, and the need for creditor consent for debtors to file for reorganization. This measure makes it easy to compare the quality, from the creditors' perspective, of countries' bankruptcy codes. We briefly elaborate on each of these characteristics.

2.3.1 Absolute priority

The absolute priority rule states that senior creditors should be paid before junior creditors, and that junior creditors should be paid before the debtor (Longhofer, 1997). As Hart (2000) mentions, adherence to this rule is a characteristic of a high-quality procedure. However, in only a third of the countries in our sample secured creditors are paid before any other party. This means that in two-thirds of the countries, other parties (e.g. governments or employees) have the most senior claims. In this respect, bankruptcy codes in sub-Saharan Africa underperform the worldwide average, since Djankov et al.

(2007) finds that across 129 countries, in over 60 percent of them secured creditors are the most senior group of claimants.

Longhofer (1997) demonstrates that violating this rule might result in credit rationing; secured creditors are discouraged to lend when they are not guaranteed to be the first party to get paid in default, lowering the overall profitability of loans. There is, however, a risk to strictly following this order. Since shareholders are last in line, they might in some cases expect to end up empty-handed. When there is a threat of bankruptcy, the firm may decide to do everything in its power to avoid this situation, for instance by investing in highly risky projects or delaying a bankruptcy filing (Hart, 2000).

2.3.2 Absence of automatic stay

The presence of an automatic stay prohibits lenders from seizing or selling their collateral when the defaulted firm is in reorganization. This should increase the chance the business is preserved as a going concern. On the one hand, creditors might benefit from this regulation, as the value of the firm as a going concern is likely to be larger than when its assets are sold piecemeal. On the other hand, reorganization is often a lengthy and inefficient process, with no guarantee of the firm actually being preserved. Foreclosure might be a cheaper and faster option (Djankov et al., 2008). Either way, the presence of an automatic stay makes it less attractive for creditors to require collateral, since they are less likely to be allowed to seize this collateral. In two-thirds of the countries in our sample an automatic stay is in place. This is in line with the rest of world, as in 60% of countries globally an automatic stay is part of the bankruptcy code (Djankov et al., 2007).

2.3.3 Ability to replace incumbent management

When management knows it might be sent away in case the firm files for reorganization, it has greater incentive to prevent this from happening. Some bankruptcy codes enable the court and creditors to replace incumbent management with a party of their choice. This threat of being dismissed increases the bargaining power of creditors (La Porta et al., 1998). Ex ante, it will increase the bonding role of debt, preventing management from investing in highly risky projects (Hart et al., 1997). Ex post, it might make it easier for secured creditors to recover their claims through foreclosure, since management will be

less inclined to seek court protection by filing for reorganization. Both globally and in our sample, in half of the countries management can be replaced during reorganization.

2.3.4 Restrictions for debtors to file for reorganization

Whereas debtors in some countries can unilaterally file for reorganization, debtors in other countries need creditor consent in order to do this (La Porta et al., 1998). The latter situation is beneficial for secured creditors, since they will only allow reorganization to commence when they believe this will result in the most efficient outcome. In most countries, however, such consent is not needed. In less than 25% of the countries in our sample and in 30% of countries globally (Djankov et al., 2007) authorities require creditor approval before debtors can seek court protection and file for reorganization.

2.4 Explaining differences in efficiency of debt enforcement

By asking practitioners around the world what the most likely outcome of a hypothetical insolvency case would be, Djankov et al. (2008) compare the efficiency of bankruptcy procedures around the world. They find procedures to be very time-consuming and costly in general. On average only 52% of creditors' claims is recovered, with the entire procedure to resolve insolvency taking 2.5 years.

Variation between different countries, however, is large. Whilst in countries like Japan and the United Kingdom over 90% of the claim can be expected to be recovered, creditors in Angola and Turkey are likely to recover less than 10%. Zooming in on the sub-Saharan African countries included in our sample, efficiency scores vary from 0% in Chad, Mauritania and four other countries, to 58% in Botswana. Refer to Table 2 for information on all 35 countries. Djankov et al. (2008) find that the legal origin and economic development of an economy can for a great deal explain the efficiency of its insolvency procedures.

2.4.1 Legal origin

The legal systems in sub-Saharan Africa have either an English or a French origin. This is explained by the significant presence of these two nations during colonial times. English (common) law is considered more creditor-friendly than French (civil) law, which is

reflected in the recovery rates (Djankov et al., 2008; La Porta et al., 2008). There is a clear distinction in our data between countries with English and French legal origin. Recovery rates are significantly higher under common law systems (31% on average), than under French civil law systems (16% on average). The same can be found for the creditors' rights score (0.8 and 3.1 for systems from French and English legal origin, respectively).

The best way to illustrate the contrast between these two origins is to look into the bankruptcy codes in the countries where they originate from: the United Kingdom and France. Creditors in France have much less control over insolvency proceedings than in the U.K. (Davydenki and Franks, 2008). Procedures are generally court-supervised and the main aim is to preserve the defaulted firm as a going concern, amongst others to preserve employment. Creditors only have an advisory role and do not have any veto rights concerning reorganization plans. Also, in case of a sale of assets or of the firm as a whole, the court does not necessarily have to choose the highest bidder. Legal systems from French origin tend to be characterized by a high degree of formalism (Djankov et al., 2003). Formalism, i.e. the extent to which proceedings are regulated, results in costly and time-consuming bankruptcy resolutions.

The situation in the U.K. is rather different. Court-administered procedures do occur, but much less frequently than in France. Secured creditor can enforce the sale of collateralized assets without any court interference. Strikingly, insolvency proceedings in the U.K. succeed more often to preserve the defaulted business than in France. Davydenki and Franks (2008) explain this by pointing out that banks in the U.K. are often residual claimants and thus have greater incentive to maximize the total value of the recovered amount. Also, the fact that procedures in France are state-run provides less incentives to reorganize the firm efficiently.

Although the codes in sub-Saharan Africa have their origin in either one of these two countries, they are of course not one-on-one comparable with the codes in the U.K. and France. Codes have developed independently and might have incorporated parts of other legal origins. Just looking at the legal origin will therefore not tell the whole story, but one should instead consider the specific regulations that are in place.

2.4.2 Economic development

Djankov et al. (2008) find that efficiency is lower in developing countries compared to developed countries. Insolvency resolutions take longer time, are more costly, and more often result in the firm being sold piecemeal. This is (partly) explained by the underdevelopment of public institutions in these countries (Djankov et al., 2003). Throughout sub-Saharan Africa, colonial powers imposed regulations with a high degree of formalism. Although this might work very well in the developed world, developing countries often lack the public-sector capacity to enforce these regulations.

Less complex bankruptcy codes with less public-sector involvement could thus benefit developing countries (Djankov et al, 2008). Our data seems to confirm this. A country like Zimbabwe receives the maximum score of credit protection. On paper, the Zimbabwean bankruptcy code is thus very creditor-friendly. The efficiency score of this country is, however, only 1.5%. This implies there is a significant gap between the design and implementation of the bankruptcy law.

This issue is not strictly limited to the developing world. Ravid and Sundgren (1998) find that the efficiency of the debtor-friendly bankruptcy code in the U.S. is higher than that of the creditor oriented code in Finland. Insolvency procedures in Finland are more likely to end in a piecemeal sale of the debtor's assets, are costlier, and result in lower recovery rates for creditors.

2.5 Relating the use of collateral and bankruptcy codes

Now that has been discussed what a high-quality bankruptcy procedure should look like and how efficiency differs across countries, we investigate the relationship between the quality of bankruptcy codes and the use of collateral. To start with, we discuss the purposes collateral can serve from the creditor's perspective.

2.5.1 The purpose of collateral

Three main purposes of collateral can be identified. The most obvious one, and the one most relevant to this study, is to reduce the lender's loss in case of default. By having a claim on (part of) the debtor's assets, the likelihood that (part of) the creditor's claim will be recovered increases. Not having title to secured assets can also lead to a costly

negotiation process about how (unsecured) assets are divided amongst the different claimants (Leeth and Scott, 1989). Looking at empirical evidence, both the incidence of collateral (whether a loan is secured) and the degree of collateral (the amount of collateral relative to the loan size) are found to be positively related with recovery rates (Blazy and Weill, 2005; Davydenki and Franks, 2008).

A possible second purpose is resolving the issue of adverse selection. This issue arises when the borrower has more and better information than the lender. Consequently, it is hard for the bank to make a judgment about borrower quality and decide on the appropriate loan terms. A number of theoretical papers argue that in these cases, collateral serves as a signaling mechanism (Bester, 1985; Besanko and Thakor, 1987). High-quality borrowers can afford to pledge more collateral, since they are less likely to default on their loan and lose the secured assets. This implies a positive association between borrower quality and collateral. The opposing view is that lenders can observe borrower quality and will thus impose stricter collateral requirements on low-quality borrowers (Morsman, 1986).

Empirical evidence is largely in favor of the latter view and find a positive relationship between credit risk and collateral (Leeth and Scott, 1989; Berger and Udell, 1990; Weill and Godlewski, 2009; Hanedar et al., 2014). However, one can also find support for collateral serving as a signal of quality. Jiménez et al. (2006) use an ex-post measure of borrower quality to demonstrate that firms whose quality is unobservable to the lender at time of loan origination but default in the next period, are less likely to pledge collateral than those firms that do not default.

Finally, collateral may also mitigate the problem of moral hazard (Stulz and Johnson, 1985; Boot et al., 1991). This problem occurs when the firm underinvests in its project or uses its loan proceeds for riskier projects. As the potential loss for the borrower is greater when he has pledged collateral, he is discouraged to engage in such behavior, bringing his interests more in line with those of the creditor. The research on this relationship is mainly theoretical, as the incidence of moral hazard is hard to identify in practice. Being the only empirical study to our knowledge on this topic, Blazy and Weill (2005) observe no significant relationship between the use of collateral and the presence of moral hazard.

2.5.2 Quality of debt enforcement and collateral requirements

In general, it can be expected that the more bargaining power creditors have over debtors, meaning the power to enforce payment or seize assets, the more favorable loan terms will be (Aghion and Bolton, 1992). Empirical research on the relation between debt enforcement and collateral requirements, however, is rather limited. The little evidence on this topic points to the same conclusion: the higher the quality of bankruptcy codes, the lower collateral requirements.

Using a sample of defaulted bank loans across France, Germany, and the United Kingdom, Davydenki and Franks (2008) show that in the creditor-unfriendly France collateral requirements are significantly higher than in the more credit-friendly United Kingdom and Germany. Lower credit protection is associated with both a higher incidence and degree of collateral. Moreover, the type of collateral is affected by the bankruptcy code. In France, for example, when real estate assets of the debtor are sold, the secured creditors' claim is junior to that of employees. This is, however, not the case for proceeds from accounts receivable and personal guarantees. The study finds that this type of collateral is thus more used in France compared to the two other nations.

Qian and Strahan (2007) find a similar association between creditor rights and collateral requirements, but now for a sample of loans across 43 countries. They demonstrate that this relationship is stronger for firms with a higher degree of tangible assets. This implies that the higher a firm's capacity is to pledge collateral, the more collateral will be demanded by the lender.

The two papers we discussed only considered regulations as they appear on paper, but did not look into the efficiency of the actual implementation of bankruptcy codes. By including a measure of efficiency in our models, we aim to close this gap in literature.

3 DATA AND DESCRIPTIVE STATISTICS

Our data has been collected from secondary sources. As there are a number assumptions underlying the various variables and measures we use, it is important to describe these. This chapter explains where we collected our data from and how our secondary sources obtained this data. Subsequently we describe the dataset we use for our analysis.

3.1 Data collection

This section outlines where we obtained our data from. This concerns the level of creditor protection, the efficiency score, and the data on collateral requirements and other firm-level characteristics. A short description of our variables is provided in Appendix 1.

3.1.1 Creditor protection

The level of creditor protection is based on the measure of La Porta et al. (1998) and simply determines whether four characteristics, elaborated upon in Chapter 2, are present in countries' bankruptcy codes. This concerns adherence to the absolute priority rule, the absence of an automatic stay, the ability to replace incumbent management, and the need of creditor consent for debtors to file for reorganization. Several papers have adopted this approach and provide updated datasets. We use the most recent data to our knowledge, used in the study of Djankov et al. (2007). Although bankruptcy codes do not tend to change much over time, the timing of this dataset is rather convenient, as it is dated approximately in the middle of the period our dataset covers (2005-2011).

Data on the level of creditor protection is missing for five countries in our sample. This reduces our number of observations from 1,210 to 1,097. As there are still 30 countries left, this reduction does not harm the quality of our models and results.

3.1.2 Efficiency score

The Doing Business reports are a joint effort of the World Bank and the IFC, measuring, amongst others, the efficiency of insolvency proceedings around the world. Annually, local insolvency practitioners are presented with a hypothetical insolvency case and are

asked what the most likely outcome is in their country. Answers are verified through a study of local laws and regulations.

The methodology is based on Djankov et al. (2008). The case concerns the insolvency of a hotel with a ten-year bank loan. The bank, a secured creditor, is assumed to strive for the highest possible recovery rate, whilst the unsecured creditors try to avoid a piecemeal sale of the assets. The equity holders and the management are assumed to aim for preserving the company as a going concern. A full list of the assumptions is available in Appendix 3a.

Based on the answers of the practitioners, four measures of procedure efficiency are calculated: time, cost, outcome, and recovery rate. Time is defined as the number of years from the start of the insolvency proceedings until the resolution of the case. Cost encompasses all of the fees and levies related to the proceedings, for instance lawyer and court fees. The outcome indicates whether the firm continues to operate as a going concern or that its assets are sold piecemeal. Based on these three variables, the recovery rate represents the percentage of the bank's claim that is recovered after the proceedings. Please refer to Appendix 3b for a more detailed description.

3.1.3 Collateral requirements and firm-level characteristics

The World Bank's Enterprise Surveys collect data from a representative sample of companies in numerous countries around the world. The sampling methodology is based on a stratified random sampling. For each country there are three strata: firm size, business sector and geographic region. After the strata are created random samples are selected from each stratum. Only formally registered companies with more than 5 employees are allowed to participate in the survey. Firms with 100% government ownership and those active in agriculture are not included in the sample. In order to collect the data, private contractors address the respondents with questionnaires. Questions cover topics such as financing, taxation, crime, competition, etc. The main objective of the survey is to describe a country's business environment from the individual firm's perspective.

Firms are asked to provide details about their most recently obtained loan or line of credit. Besides information about matters such as interest rate, maturity, loan size, and

type of institution that issued the loan, firms are asked about collateral requirements. First it is determined whether the loan is secured or not (*"Did your financial institution require collateral?"*). If this question is answered positively, the firm is asked about the degree of collateral (*"If yes, what was the approximate value of the collateral required as a percentage of the amount of the loan or line of credit?"*). On these two questions we base our two dependent variables: incidence of collateral and degree of collateral.

We also obtain the majority of our control variables from the Enterprise Surveys. These include the size of the firm (in terms of full-time employees), firm age (the number of years it has been operating), manager's experience (the number of years the top manager has been working in the firm's sector), percentage of purchases made on credit, annual sales (used to calculate the loan-to-sales ratio), industry (firms are classified either as manufacturing or as services firms), and percentage of land ownership (percentage of the land occupied by the firm that is owned as opposed to rented).

3.2 Descriptive statistics

After compiling our dataset based on the selected variables, we are left with 1,210 loans from a total of 35 sub-Saharan African countries. Table 1 provides information about the number of observations per country, firm size, and the incidence and degree of collateral. Table 2 summarizes important information about specific bankruptcy law characteristics and the efficiency scores of each economy.

The median firm in our sample has only 25 full-time employees, although firms from all sizes are present. The use of collateral is very apparent throughout all countries. Overall 83% of all loans is collateralized, with the value of the pledged assets worth 1.2 times the loan size. In none of the countries the collateralization rate falls below 60%[4], and in a majority of countries the value of collateral is higher than the borrowed amount. The most extreme case is a loan secured by assets worth nine times its own size.

It also becomes clear that systems of English legal origin outperform those of French legal origin. Both the incidence and degree of collateral is lower in legal systems based on common law (82% and 118% respectively, versus 85% and 130% in French law-based countries).

[4] We ignore Eritrea, as only two loans from this country are included in our sample.

Table 1 Descriptive statistics

		Employees		Incidence of collateral		Degree of collateral (%)			
Country	**#**	**Mean**	**Median**	**Mean**	**Std. dev.**	**Mean**	**Std. dev.**	**Min.**	**Max.**
Angola	11	70.3	21.0	0.91	0.30	106.9	172.6	0.0	600.0
Benin	12	37.8	7.5	0.75	0.45	117.5	115.9	0.0	360.0
Botswana	72	72.9	29.5	0.76	0.43	101.1	111.0	0.0	520.0
Burkina Faso	23	50.2	19.0	1.00	0.00	173.0	73.0	55.0	333.3
Burundi	12	20.7	14.5	1.00	0.00	222.9	103.0	100.0	400.0
Cameroon	32	145.7	28.0	0.88	0.34	151.6	110.5	0.0	400.0
Cape Verde	14	93.1	31.5	0.93	0.27	133.4	65.7	0.0	260.0
Central African Republic	14	14.6	14.5	0.79	0.43	142.3	184.3	0.0	666.7
Chad	6	50.5	40.0	0.83	0.41	175.2	116.5	0.0	333.3
Congo, Dem. Rep.	18	125.1	35.0	0.89	0.32	102.2	91.7	0.0	300.0
Côte d'Ivoire	11	195.3	110.0	0.82	0.40	44.8	42.6	0.0	130.0
Eritrea	2	65.0	65.0	0.50	0.71	181.3	256.5	0.0	362.7
Ethiopia	19	635.1	70.0	0.84	0.37	174.1	151.0	0.0	500.0
Gambia	10	74.9	28.5	0.90	0.32	216.6	264.9	0.0	833.0
Ghana	52	92.3	15.5	0.65	0.48	82.4	82.9	0.0	300.0
Guinea	5	150.2	12.0	0.60	0.55	46.0	50.8	0.0	100.0
Kenya	125	123.0	31.0	0.93	0.26	107.1	53.2	0.0	300.0
Madagascar	21	147.6	70.0	0.90	0.30	110.0	73.0	0.0	300.0
Malawi	5	1738.8	16.0	0.60	0.55	3.0	2.8	0.0	6.0
Mali	30	54.8	17.5	0.83	0.38	126.2	95.5	0.0	303.0
Mauritania	18	22.8	12.0	0.94	0.24	179.4	187.2	0.0	800.0
Mauritius	60	81.5	25.0	0.77	0.43	44.5	47.7	0.0	200.0
Mozambique	22	44.1	8.5	0.91	0.29	90.7	58.7	0.0	200.0
Namibia	36	117.5	22.5	0.61	0.49	77.7	102.6	0.0	500.0
Niger	11	51.1	29.0	0.82	0.40	266.9	216.0	0.0	670.0
Nigeria	174	42.2	19.0	0.84	0.37	140.8	113.7	0.0	600.0
Rwanda	43	99.2	34.0	0.93	0.26	210.0	180.4	0.0	800.0
Senegal	37	108.1	20.0	0.78	0.42	102.4	73.4	0.0	300.0
South Africa	117	108.3	41.0	0.73	0.45	72.1	66.8	0.0	400.0
Swaziland	27	33.3	16.0	0.85	0.36	120.7	202.2	0.0	900.0
Tanzania	38	128.0	65.0	0.95	0.23	159.6	87.2	0.0	375.0
Togo	8	106.5	24.0	0.63	0.52	119.8	194.0	0.0	555.6
Uganda	38	68.6	17.5	0.92	0.27	128.8	107.6	0.0	600.0
Zambia	40	98.0	48.0	0.95	0.22	153.2	114.3	0.0	600.0
Zimbabwe	47	311.4	120.0	0.83	0.38	183.5	188.4	0.0	750.0
Total	**1,210**	**110.0**	**25.0**	**0.83**	**0.37**	**122.1**	**120.0**	**0.0**	**900.0**
French legal origin	*429*	*109.9*	*24.0*	*0.85*	*0.35*	*130.4*	*129.0*	*0.0*	*800.0*
English legal origin	*781*	*110.1*	*27.0*	*0.82*	*0.38*	*117.6*	*114.5*	*0.0*	*900.0*

Table 2 Bankruptcy code characteristics

Country	Legal origin	Efficiency score (%)	Creditor protection	Absolute priority	No automatic Stay	Ability to replace management	Need for creditor consent
Angola	French	0.0	3	1	1	0	1
Benin	French	17.9	0	0	0	0	0
Botswana	English	57.7	3	1	1	1	0
Burkina Faso	French	22.3	0	0	0	0	0
Burundi	French	7.2	1	0	0	1	0
Cameroon	French	13.1	0	0	0	0	0
Cape Verde	French	0.0	n.a.	n.a.	n.a.	n.a.	n.a.
Central African Republic	French	0.0	0	0	0	0	0
Chad	French	0.0	0	0	0	0	0
Congo, Dem. Rep.	French	3.0	1	0	0	1	0
Côte d'Ivoire	French	31.4	0	0	0	0	0
Eritrea	French	0.0	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	English	41.0	3	1	0	1	1
Gambia	English	27.5	n.a.	n.a.	n.a.	n.a.	n.a.
Ghana	English	24.3	1	0	0	1	0
Guinea	French	20.6	0	0	0	0	0
Kenya	English	31.3	4	1	1	1	1
Madagascar	French	16.0	2	1	0	1	0
Malawi	English	15.4	2	0	1	1	0
Mali	French	20.4	0	0	0	0	0
Mauritania	French	0.0	1	0	1	0	0
Mauritius	English	34.3	n.a.	n.a.	n.a.	n.a.	n.a.
Mozambique	French	15.1	2	1	1	0	0
Namibia	English	32.9	2	1	0	1	0
Niger	French	13.8	0	0	0	0	0
Nigeria	English	27.6	4	1	1	1	1
Rwanda	French	3.2	1	0	0	0	1
Senegal	French	21.1	0	0	0	0	0
South Africa	English	33.6	3	1	0	1	1
Swaziland	French	36.6	n.a.	n.a.	n.a.	n.a.	n.a.
Tanzania	English	21.6	2	0	1	1	0
Togo	French	26.2	0	0	0	0	0
Uganda	English	40.5	2	0	1	1	0
Zambia	English	27.6	1	0	0	1	0
Zimbabwe	English	1.5	4	1	1	1	1
Total		**19.6**	**1.40**	**0.33**	**0.33**	**0.50**	**0.23**

It should be noted from Table 1 that there is an unequal distribution of observations of loans throughout the region. From Nigeria, Kenya and South Africa we have more than 100 observations, whilst from Eritrea, Guinea, Malawi and Togo we do not have more than ten. This can partially be explained by the size of these economies. It can be expected that a higher number of firms for which information is available is observed in bigger economies. However, one should keep in mind that such a sample can represent a biased view towards the countries with more observations. In this respect, results represent a weighted average depending on the number of observations in each country.

We make the assumption that inefficient bankruptcy laws affect the incidence and degree of collateral in all countries in the same way. This largely mitigates the issue of unequal distribution. This assumption is rather plausible since we are focusing on one particular region, sub-Saharan Africa, and there is no apparent reason why creditors in one country should suffer more from inefficiency than others.

4 HYPOTHESES AND METHODOLOGY

Focusing on sub-Saharan Africa, our study tests whether the quality of a country's debt enforcement has an impact on its banks' collateral requirements. We test the impact on both the incidence of collateral (whether a loan is secured or not) and the degree of collateral (the value of the pledged collateral as percentage of the loan amount). In the following we present our hypotheses. We also explain how these hypotheses are tested and which variables we control for in our models.

4.1 Hypotheses

First, we expect to observe a negative relationship between the level of creditor protection, estimated by the four-scale measure of La Porta et al. (1998), and both the incidence and degree of collateral. This prediction is in line with earlier findings of Qian and Strahan (2007) and Davydenki and Franks (2008). A high level of creditor protection implies that lenders have more control over the outcome of insolvency procedures and that these procedures will happen in a more efficient way. We expect them to take this into account when deciding on collateral requirements.

H1: The level of creditor protection is negatively related with both the incidence and degree of collateral.

Second, we expect that the efficiency of debt enforcement, measured by the recovery rate of Djankov et al. (1998), is negatively related with both the incidence and degree of collateral. This hypothesis has not been tested before, at least to our knowledge. The reasoning is identical to the one for the first hypothesis, only now we also consider the efficiency of the implementation of the bankruptcy code, and not just its design.

H2: The efficiency of debt enforcement is negatively related with both the incidence and degree of collateral.

In both our hypotheses we use both the incidence and degree of collateral as dependent variables. In the context of our paper, we do not expect to observe any significant difference between the two. Other studies, however, focusing on other determinants of collateral requirements, do find that some variables impact the incidence of collateral different than the degree of collateral (see, for instance, Menkhoff et al., 2006). In order to make sure this is not the case in our analysis, we include both measures. Please note that that the degree of collateral also includes unsecured loans, for which the value is simply put to zero.

4.2 Model specification

When considering the determinants of the incidence and degree of collateral, a number of papers argue that an OLS regression is not suitable due to the nature of these variables. The degree of collateral is a strictly positive variable, partly clustered around the value of 0, since it takes this value when a loan is unsecured. The incidence of collateral is a dummy variable and thus only takes the value of 0 or 1. Menkhoff et al. (2006) and Hanedar et al. (2014) both apply the Probit model for the incidence of collateral and the Tobit model for the degree of collateral.

However, in our study we use an OLS regression to test the relationship between debt enforcement and collateral requirements. In line with Angrist (2001) and Angrist and Pischke (2008) we argue that in determining causal relationships, OLS is an appropriate tool. For a detailed description logic, please refer to the two mentioned articles. However, we also applied the Probit and Tobit models for the incidence and degree of collateral respectively. The direction and significance of our coefficients did not change, thereby further proving the robustness of our results.

In order to further improve our results, standard errors are based on the block-bootstrapping method. This ensures that our estimates are more precise and less prone to underlying assumptions about the data, such as homoskedasticity of the error term.[5]

[5] For a detailed explanation of the underlying logic of block bootstrapping, please refer to Künsch (1989).

4.3 Control variables

In order to test the robustness of our results, we include three sets of control variables in our models. These variables potentially affect the relationship between bankruptcy codes and collateral requirements. As literature is limited, some of these variables are derived from our own intuition and are not necessarily backed up by earlier research.

4.3.1 Borrower quality

The first set of control variable intends to capture the borrower's quality, i.e. its credit risk. We argue that low-quality borrowers, those that are more likely to default on their loan, will suffer more from an inefficient bankruptcy procedure than high-quality borrowers. As the likelihood that a creditor will have to initiate such a procedure is much higher for high-risk debtors, we expect it to be more likely that requirements will be increased for these debtors than it is for low-risk debtors.

The variables firm age, manager's experience, and number of employees account for the experience and size of the borrower. As we expect more experienced and larger firms to be more stable, their likelihood of default should be lower than younger and smaller firms (Fariñas and Moreno, 2000; Shumway, 2001). The percentage of purchases bought on credit is also expected to be an indicator of borrower quality, as, in theory, suppliers will only let their creditworthy customers pay for their goods on credit (Voordeckers and Steijvers, 2004). Our final measure of borrower quality is the loan-to-sales ratio. We expect the chance of default to increase as the loan size increases relative to the firm's annual sales.

4.3.2 Tangibility of assets

Our next set concerns the tangibility of the borrower's assets. Qian and Strahan (2007) demonstrated that firms with a high degree of tangible assets suffer more from inefficient procedures, simply because they have a higher capacity to pledge collateral. When a firm has pledged all its assets, there is no point for the lender to increase requirements, as the borrower will not be able to meet those requirements.

The variable manufacturing sector takes the value of 1 if the firm is in the manufacturing sector and the value of 0 when it is a services firm. We expect

manufacturing firms to possess more tangible assets, because they are more likely to use machinery, will use larger buildings (factories), and have more physical inventory. The second variable is land ownership, which measures the percentage of the land occupied by the firm that is owned. As firms own a higher share of their land, they will have a higher capacity to pledge collateral.

4.3.3 Macro-economic trend

The final set consists of only one variable capturing the country's economic trend. It is equal to the difference between the GDP/capita growth in the year of approval and the five-year average GDP/capita growth. A positive value indicates that the economy is growing at an above-average level. As we expect default risk to decrease for firms in general when the economy is in an upturn, we expect all firms to suffer less from inefficient debt enforcement.

5 RESULTS

This chapter will outline our results. First, the OLS regressions testing our hypotheses will be presented and interpreted. Second, we look into the relation between our two measures of the quality of bankruptcy processes: the level of creditor protection and the efficiency score. Finally, we shed some light on the robustness of our results.

5.1 Creditor protection and collateral requirements

The results related to Hypothesis 1 are presented in Table 3 and Table 4. In contrast to our expectations, we find no significant relationship between the level of creditor protection and the incidence or degree of collateral, thereby rejecting our first hypothesis. This also contradicts findings from earlier studies. Adding the control variables, designed to capture possible mitigating factors, does not result in any significance.

These findings indicate that the characteristics of a country's bankruptcy code do not impact creditors' decision on collateral requirements. This can imply two things: first, lenders do not take into account the quality of the bankruptcy procedures at all, or, second, they do take into account the quality of procedures, but do not believe the characteristics of the bankruptcy code on paper are a good indicator of quality.

If the first line of reasoning is correct, we should expect to find no significant relationship between the efficiency score and collateral requirements. If the second logic is true, however, we should expect to find a significant relationship confirming Hypothesis 2.

5.2 Efficiency of debt enforcement and collateral requirements

As can be seen in Table 5 and Table 6, our second hypothesis is confirmed. A significant negative relationship is found between countries' efficiency score and both the incidence and degree of collateral. The coefficients are significant at the 5% level and are robust to the various control variables we include in our model. The coefficient of the efficiency score in the regression on the degree of collateral starts off with a significance level of 1%, but loses some of its significance when adding control variables.

Table 3 Relation between creditor protection and the incidence of collateral

Independent variables	OLS				
	(1)	(2)	(3)	(4)	(5)
Creditor protection	0.0029	0.0005	0.0079	0.0049	0.0065
	(0.0136)	(0.0148)	(0.0183)	(0.0159)	(0.0220)
Borrower quality					
Firm age		–0.0000			0.0004
		(0.0009)			(0.0010)
Manager's experience		–0.0014			–0.0018
		(0.0018)			(0.0019)
No. of employees		–0.0001			–0.0000
		(0.0000)			(0.0001)
Purchases on credit		–0.0008*			–0.0008*
		(0.0004)			(0.0004)
Loan-to-sales ratio		0.0005			0.0005
		(0.0045)			(0.0055)
Tangibility of assets					
Manufacturing sector			0.0036		0.0143
			(0.0352)		(0.0299)
Land ownership			–0.0001		0.0000
			(0.0002)		(0.0003)
Macro-economic characteristics					
Economic trend				–0.0050	–0.0027
				(0.0085)	(0.0118)
Constant	0.8273***	0.8916***	0.8142***	0.8278***	0.8655***
	(0.0355)	(0.0444)	(0.0576)	(0.0344)	(0.0713)
No. of observations	1097	1077	931	1097	921
No. of countries	30	30	22	30	22
Adjusted R^2	–0.0008	0.0110	–0.0024	–0.0002	0.0048

Block bootstrapped standard errors are reported in parentheses.
*) 10% significance
**) 5% significance
***) 1% significance

Table 4 Relation between creditor protection and the degree of collateral

Independent variables	OLS				
	(1)	(2)	(3)	(4)	(5)
Creditor protection	–3.6025	–3.5588	4.113	–3.0046	3.1349
	(6.2585)	(5.6576)	(6.5818)	(6.3406)	(7.0552)
Borrower quality					
Firm age		0.6473**			0.5655**
		(0.2758)			(0.2340)
Manager's experience		–0.5079			–0.7228
		(0.4554)			(0.5576)
No. of employees		–0.0196***			–0.0305***
		(0.0069)			(0.0078)
Purchases on credit		–0.2813**			–0.2434
		(0.1374)			(0.1484)
Loan-to-sales ratio		0.1573			0.1829
		(1.4900)			(1.5239)
Tangibility of assets					
Manufacturing sector			7.1983		9.6498
			(9.7836)		(8.3976)
Land ownership			0.2140***		0.2215**
			(0.0788)		(0.0866)
Macro-economic characteristics					
Economic trend				–1.4609	0.8799
				(5.0661)	(5.1197)
Constant	133.6531***	142.0495***	93.2044***	133.7904***	105.8203***
	(14.2231)	(15.2992)	(16.1750)	(14.0457)	(18.7842)
No. of observations	1097	1077	931	1097	921
No. of countries	30	30	22	30	22
Adjusted R^2	0.0012	0.0134	0.0112	0.0015	0.0270

Block bootstrapped standard errors are reported in parentheses.
*) 10% significance
**) 5% significance
***) 1% significance

Table 5 Relation between the efficiency score and the incidence of collateral

Independent variables	OLS				
	(1)	(2)	(3)	(4)	(5)
Efficiency score	–0.0022**	–0.0021**	–0.0028**	–0.0025**	–0.0034**
	(0.0010)	(0.0009)	(0.0014)	(0.0011)	(0.0017)
Borrower quality					
Firm age		0.0001			0.0007
		(0.0009)			(0.0008)
Manager's experience		–0.0017			–0.0026*
		(0.0015)			(0.0016)
No. of employees		–0.0001*			–0.0000
		(0.0000)			(0.0001)
Purchases on credit		–0.0005			–0.0004
		(0.0004)			(0.0004)
Loan-to-sales ratio		0.0006			0.0004
		(0.0052)			(0.0063)
Tangibility of assets					
Manufacturing sector			0.0107		0.0237
			(0.0317)		(0.0290)
Land ownership			–0.0001		–0.0000
			(0.0002)		(0.0002)
Macro-economic characteristics					
Economic trend				–0.0068	–0.0116
				(0.0075)	(0.0122)
Constant	0.8890***	0.9374***	0.9127***	0.9047***	0.9757***
	(0.0236)	(0.0309)	(0.0457)	(0.0268)	(0.0625)
No. of observations	1210	1187	1027	1210	1014
No. of countries	35	35	25	35	25
Adjusted R^2	0.0054	0.0139	0.0063	0.0071	0.0145

Block bootstrapped standard errors are reported in parentheses.
*) 10% significance
**) 5% significance
***) 1% significance

Table 6 Relation between the efficiency score and the degree of collateral

Independent variables	OLS				
	(1)	(2)	(3)	(4)	(5)
Efficiency score	–1.7080***	–1.5758***	–1.3956**	–1.8771***	–1.5525**
	(0.5376)	(0.5408)	(0.5816)	(0.5583)	(0.7148)
Borrower quality					
Firm age		0.3837*			0.4877**
		(0.2068)			(0.2094)
Manager's experience		–0.3699			–0.7793
		(0.4505)			(0.5170)
No. of employees		– 0.0189**			–0.0273***
		(0.0081)			(0.0080)
Purchases on credit		–0.1255			–0.0610
		(0.1112)			(0.1238)
Loan-to-sales ratio		0.1641			0.1694
		(1.5144)			(1.5546)
Tangibility of assets					
Manufacturing sector			13.2346		17.0467*
			(8.7431)		(8.7640)
Land ownership			0.1608*		0.1861**
			(0.0913)		(0.0782)
Macro-economic characteristics					
Economic trend				–3.5475	–2.4864
				(3.4350)	(4.5954)
Constant	166.3579***	168.2436***	139.9596***	174.4941***	152.7583***
	(13.8232)	(17.01194)	(18.3128)	(15.0624)	(25.7826)
No. of observations	1210	1187	1027	1210	1014
No. of countries	35	35	25	35	25
Adjusted R^2	0.0362	0.0379	0.0356	0.0418	0.0456

Block bootstrapped standard errors are reported in parentheses.
*) 10% significance
**) 5% significance
***) 1% significance

The decision whether to use collateral and the amount of collateral are clearly impacted by the efficiency of a country's insolvency procedures. Relating this to the rejection of Hypothesis 1, we can conclude that creditors definitely consider the quality of bankruptcy procedures, but rather how it works out in practice than how it looks on paper.

5.3 Robustness of results to choice of methodology

Besides including three sets of control variables in our regression models and block-bootstrapping our standard errors, we also test the robustness of our results to the type of regression model.

To determine whether the choice of methodology does not significantly influence our results, we have run Probit and Tobit regressions, on the incidence and degree of collateral respectively, in addition to the standard OLS method. This method is, as discussed in Chapter 4, regularly applied in other studies. However, this did not change anything in the significance or direction of the estimated coefficients, proving our results were not influenced by our choice of methodology.

5.4 Relating creditor protection and efficiency of debt enforcement

Implicit to our results for Hypotheses 1 and 2 is that our two measures of the quality of bankruptcy procedures are unrelated. If they would be related to one another, we would expect both to have a significant impact on collateral requirements. In order to test if there is indeed no relationship, we run an additional OLS regression of which the results are presented in Table 7. No significant relationship is found between the two measures, thereby confirming our logic.

Our findings have some interesting implications. Although our study is the first to our knowledge that finds it is not the characteristics of a bankruptcy code, but the efficiency of its implementation that matters to creditors, a number of preliminary conclusions can be drawn.

Table 7 Relating creditor protection and efficiency score

Independent variables	OLS
Creditor protection	3.0068
	(2.1550)
Constant	15.3337***
	(3.0248)
No. of observations	30
No. of countries	30
Adjusted R^2	0.0520

Block bootstrapped standard errors are reported in parentheses.
*) 10% significance
**) 5% significance
***) 1% significance

First, the insignificant relationship between creditor protection and collateral requirements might imply that the enforcement of bankruptcy codes in emerging economies differs significantly compared to the developed world. This is supporting Djankov et al.'s (2003) argument that the institutions in developing countries often do not have the capacity to efficiently enforce the bankruptcy code. This is a serious issue, as lenders can apparently not rely on public institutions to protect their rights.

Second, combining the results for Hypotheses 1 and 2, it is shown that the design and implementation of a bankruptcy code are two different concepts and might widely deviate from one another. It is useful to look at a few separate countries to demonstrate that a creditor-friendly bankruptcy code does not necessarily imply the bankruptcy procedure is efficient. Angola and Zimbabwe have creditor protection scores of 3 and 4 respectively, but their efficiency scores are only 0% and 1.5% respectively. Clearly the design and the implementation of these codes deviate significantly. The opposite scenario can also be found. Togo and Ivory Coast have a minimum creditor rights' score of 0, whilst their efficiency scores are above the regional average at 26.2% and 31.4% respectively. Here an efficient procedure makes up for the fact that creditors are not that well-protected on paper.

It is hard to pinpoint where exactly this difference between design and implementation comes from. Intuitively, it can be because of two issues: the ability and/or the willingness to properly enforce creditors' rights. In the first case there is a mismatch between the content and complexity of laws and regulations on the one side,

and the capacity and capability of public institutions on the other side. This implies that, in order to improve creditor protection in practice and ultimately improve the credit environment for both debtors and creditors, either the bankruptcy code should be simplified or the capacity of institutions should be improved.

In the second case, institutions might be very capable of efficiently implementing bankruptcy laws and respect creditor rights, but are not willing to do so. In this case inefficiencies are the result of rent-seeking behavior, i.e. corruption. Government officials might want to have 'a piece of the pie', which they could achieve through increasing fees (either legally or illegally) and/or slowing down processes. Although it is not easy to simplify regulations or increase institutions' capability, getting rid of corruptive behavior might be even harder to achieve.

In fact, many economies have in recent years made efforts to increase the efficiency of their insolvency procedures, partly prompted by the financial crisis. Over the last eight years, bankruptcy laws were reformed were in 27 economies around the world.[6] These efforts included simplifying and accelerating procedures and allowing out-of-court workouts. The key to improving efficiency seems to be lowering the administrative burden and decreasing court involvement. These are very practical solutions and are not necessarily reflected in a country's bankruptcy code on paper, possibly explaining why no relation was found between creditors' rights and collateral requirements.

[6] *Doing Business 2013*, World Bank.

6 CONCLUSION

This study investigated the relationship between the efficiency of a country's bankruptcy procedures and collateral requirements in sub-Saharan Africa. In contrast to earlier research, we not only considered specific characteristics of bankruptcy codes capturing the level of creditor protection, but we also applied a measure of the efficiency of implementation. Another way in which we distinguish from earlier research is by the focus on the developing instead of the developed world.

6.1 Main findings

Whereas evidence from developed countries shows a significant negative relationship between creditor protection and collateral, we find no such relationship in sub-Saharan Africa. However, a clear relationship is found between collateral and the efficiency of bankruptcy procedures, estimated by the expected recovery rate in a typical bankruptcy case.

These seemingly contradicting results are interpreted as evidence that the written laws and their actual implementation are not related to one another, which was confirmed by regressing the characteristics on the recovery rate. A country might have a high-quality bankruptcy code on paper, but this is useless without efficient implementation of the code. In Angola, for example, 4 out of 4 characteristics indicating a creditor-friendly bankruptcy code are in place, but its efficiency score is only 1.5%. Creditors are aware of this; when deciding on collateral requirements, they do not look at their level of protection by law, but rather consider how efficient insolvency procedures are in practice and how much of their claim they can thus expect to recover.

The main issue in sub-Saharan Africa is not necessarily the content of bankruptcy codes, but more how capable institutions are to enforce them efficiently. In order to improve the credit environment for both lenders and borrowers, this is what governments' focus should be on. Laws and regulations in this region are often inherited from former colonial powers, who implemented complex procedures requiring a high degree of public sector involvement. The public sector, however, is often lacking capacity and capability to enforce these procedures, leading to inefficiencies. Procedures can thus

be made more efficient in two ways: by improving the capability of public institutions and/or by simplifying insolvency procedures. A number of economies around the world have in recent years reformed their insolvency procedures, mainly focusing on lowering the administrative burden and decreasing court involvement. It might, however, not just be a lack of capacity or capability that prevents laws from being implemented properly. Inefficient procedures could also be the result of corruptive behavior.

6.2 Limitations

The results of our study are subject to a number of assumptions. First of all, we assume the recovery rate as reported by the World Bank to be a proper indicator of the efficiency of debt enforcement. As there is no data available on the actual recovery rates of creditors in the different countries, this is, to our knowledge, the best available estimate. We stress that the recovery rate should not necessarily be interpreted as the actual recovery rate creditors should expect to achieve, but rather as an 'efficiency score' of countries' insolvency procedures.

An additional point of attention should be the spread of our observations across the different countries. A number of countries (e.g. Kenya, Nigeria and South Africa) have a high number of observations compared to other countries. However, we believe the spread is still sufficient to draw conclusions based on this dataset. Moreover, we make the assumption that an (in)efficient bankruptcy procedure affects every country in the same manner, which reduces the importance of a well-spread sample.

The available financial data on the firms in the sample is limited. For instance, it was not possible to include a profit measure in the regression to capture borrower quality, or to use balance sheet information to estimate the tangibility of a firm's assets. If such data was available, we could have based our control variables more on previous research and used more proven measures.

Finally, as our data is largely collected through surveys, there is the risk that the respondents' answers are not fully in line with reality. This would results in biased data. Small firms in developing countries will not always keep records of their accounts and contracts. The value of collateral, for instance, might just be an estimate, instead of a figure taken straight from audited accounts or debt contract. Although the survey is

anonymous, firms who are not performing well might still lie in order to hide their underperformance. The World Bank tries to mitigate this risk by properly training their interviewers, keeping questions as simple as possible, and by performing interviews face-to-face.

6.3 Suggestions for future research

Our findings have raised some other questions, that could be worthwhile to research. For instance, our study was limited to sub-Saharan Africa only. It would be very valuable to study other regions, both in the developing and the developed world. Although the relationship between debt enforcement and collateral has been investigated in developed countries, this evidence relies on written laws and regulations. Including a measure of the efficiency of implementation could give more insight. It could very well be that the inefficiency of procedures is an issue is both developing and developed countries.

Second, it is not clear what causes the inefficiency of implementation. Further research is necessary to pinpoint this. As we mentioned earlier, it could be due to inability, unwillingness, or both. Either way, in order to come up with a solution for this problem, one first needs to properly define what exactly the problem is.

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APPENDICES

Appendix 1 Description of variables

Variable	Description	Source
Key variables		
Incidence of collateral	1 if a loan is secured, 0 otherwise	Enterprise Surveys (World Bank)
Degree of collateral	Value of collateral as % of loan size	Enterprise Surveys (World Bank)
Efficiency score	Efficiency of bankruptcy procedures, estimated by the recovery rate in a hypothetical insolvency case. See Appendix 3 for more details.	Doing Business (World Bank, IFC)
Creditor protection	Level of creditor protection based on the methodology of La Porta et al. (1998). See Appendix 2 and Chapter 2 for more details.	Djankov et al. (2007)
Borrower quality		
Firm age	Number of years the firm has been operating	Enterprise Surveys (World Bank)
Manager's experience	Number of years of sector experience of the firm's top manager	Enterprise Surveys (World Bank)
Number of employees	Number of full-time employees, both permanent and temporary	Enterprise Surveys (World Bank)
Purchases on credit	Percentage of purchases paid for after delivery	Enterprise Surveys (World Bank)
Loan-to-sales ratio	Ratio of the loan size to annual sales	Enterprise Surveys (World Bank)
Tangibility of assets		
Manufacturing sector	1 if the firm is in the manufacturing sector, 0 if in the services sector	Enterprise Surveys (World Bank)
Land ownership	Percentage of the land occupied that is owned by the firm	Enterprise Surveys (World Bank)
Macro-economic characteristics		
Macro-economic trend	Difference between GDP/capita growth in year loan was approved and the average of growth in the previous five years.	World Bank, own calculations

Appendix 2 Level of creditor protection

Variable	Description
Absolute priority	1 if secured creditors are paid before any other claimant, 0 otherwise
No automatic stay	1 if there is no automatic stay in place, 0 otherwise
Ability to replace management	1 if creditors can replace incumbent management during reorganization, 0 otherwise
Need for creditor consent	1 if debtors require creditors when filing for reorganization, 0 otherwise
Creditor protection	Sum of the four variables, with 0 implying a creditor-unfriendly code and 4 implying a creditor-friendly code.

Source: La Porta et al. (1998)

Appendix 3a Assumptions about the hypothetical bankruptcy case used in the World Bank's Doing Business reports.

The hypothetical business:

(1) Is a limited liability company.
(2) Operates in the economy's largest business city.
(3) Is 100% domestically owned, with the founder, who is also the chairman of the supervisory board, owning 51% (no other shareholder holds more than 5% of the shares).
(4) Has downtown real estate, where it runs a hotel, as its major asset. The hotel is valued at 100 times the income per capita or $200,000, whichever is larger.
(5) Has a professional general manager.
(6) Has 201 employees and 50 suppliers, each of which is owed money for the last delivery.
(7) Has a 10-year loan agreement with a domestic bank secured by a universal business charge (for example, a floating charge) in economies where such collateral is recognized or by the hotel property. If the laws of the economy do not specifically provide for a universal business charge but contracts commonly use some other provisions to that effect, this provision is specified in the loan agreement.
(8) Has observed the payment schedule and all other conditions of the loan up to now.
(9) Has a mortgage, with the value of the mortgage principal being exactly equal to the market value of the hotel.

Source: www.doingbusiness.org

Appendix 3b Description of indicators used in the World Bank's Doing Business reports.

Variable	Measurement	Description
Time	Calendar years	Appeals and requests for extensions are included.
Cost	Percentage of estate value	Includes court fees, fees of insolvency administrators, lawyers' fees, assessors' fees and other related fees.
Recovery rate	Cents on the dollar recovered by creditors	Includes PV of debt recovered, official costs of insolvency proceedings are deducted, depreciation of furniture is accounted, outcome for the business influences the maximum value that can be recovered.
Outcome	Two options: (1) firm is preserved as a going concern, or (2) firm's assets are sold piecemeal.	This variable concludes whether the business was preserved as a going concern or assets were sold piecemeal.

Source: www.doingbusiness.org