

IMF Working Paper

The Impact of Legislation on Credit Risk—Comparative Evidence From the United States, the United Kingdom and Germany

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Monetary and Capital Markets Department

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March 2011

Abstract

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This study investigates the link between bankruptcy and security legislation and potential credit losses faced by banks based on a cross-country study for the United States (US), the United Kingdom (UK) and Germany. Focusing on corporate credit, we find that legislation produces the highest credit risk in the US, followed by Germany, while UK law is found to be most favorable for banks. US banks gains from the higher number of informal restructurings (without losses) but lose from the low level of recovery in formal proceedings. German banks demand more credit risk mitigants than UK and US banks do, but still recover less than do UK banks. To be at par with UK banks, US banks would have to recover more than twice as much in formal proceedings, while German proceedings would have to be shortened by about one half.

JEL Classification Numbers: K22, G11, G18, G33

Keywords: Legislation, Corporate Credit Risk, Recovery Rates

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¹ This paper benefited from comments by Daniel Hardy, Helmut Kraemer-Eis, Nadezhda Rendak, Andrea Rieck, H el ene Poirson Ward, Marta Ruiz-Arranz, Kevin Fletcher, Andrea Maechler, Charlie Kramer, Wolfgang Bergthaler, and Sean Kerr. All errors are of the authors.

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I. INTRODUCTION

Previous studies have shown that differences in corporate bankruptcy codes matter—(a) for banks which may suffer higher losses as well as for financial stability if losses accumulate; and (b) for economic growth, as some codes can help keep businesses alive while others would not. With the globalization of economic activity³, differences in codes, which are often deeply rooted in cultures and traditions, were subject to enforced scrutiny.

In a study comparing Sweden and the US, for example, Thorburn (2000) found that the Swedish system is faster and cheaper than the US Chapter 11 process, which result triggered lively discussions in the US; in 2005 legislation was changed in favor of creditors. In Europe, it was discussed whether the stigma of bankruptcy, which is particularly strong in continental Europe, would have negative effects on growth as it restrains the second chance for entrepreneurs. As part of the Lisbon Growth and Jobs Strategy, the European Commission (EC) sought to reduce the stigmatization of business failures to promote entrepreneurship.⁴ Ultimately, the policy decision is not only to investigate whether the proceedings can be more efficient (while maintaining a system that remains fair in terms of the interests of all stakeholders involved in the proceedings), but to decide how creditor- or debtor-friendly legislations should be.

This study focuses on the financial stability dimension. To this end, it deals with the implications on the credit riskiness of corporate loans evolving from differences in national legislations for corporate bankruptcy and secured transactions. The focus is on potential credit losses faced by banks (usually senior creditors), seeking to minimize credit losses. As such, we leave other important complementary aspects aside, particularly whether and how

³ During recent years, market participants spent higher and higher portions of their investments outside their home countries. In the US, for example, three top tier investment banks generated almost 50 percent of their 2007 revenues abroad and almost two thirds of American investors were invested in non-US companies (Volcker et al., 2008, p.21). A central aspect of concern for investors to engage in foreign markets, particularly if it comes to credit risk, is to have a meaningful understanding of differences in legislations across countries—in order not to face “unexpected” losses.

⁴ In 2007, the EC made the following statement: “Good national framework conditions for entrepreneurship are crucial to the full exploitation of the European Union’s (EU) entrepreneurial potential and to the creation of dynamic companies. The societal appreciation of successful entrepreneurship, vital to this end, should go hand in hand with a policy of promoting a second chance for entrepreneurs who are at risk or have failed. Consequently, the EC invites EU countries to engage more vigorously in reducing the stigma of business failure as part of their commitment to promote entrepreneurship under the Growth and Jobs Strategy and within the context of a comprehensive entrepreneurship policy. The EC will continue to support the Member States’ efforts by raising the visibility of national good practices. To speed up the pace of reforms, the EC will also provide communication material to be used for campaigns in order to promote a better image of business failure.” (European Commission 2007). To address the issue, the EC considers the aspect of the “second chance” as well in its Small Business Act for Europe (the second out of ten principles); see European Commission (2008).

legislation affects credit supply and demand, economic growth and innovation.⁵ Likewise, we do neither discuss the role of other creditors nor bank bankruptcy legislation.⁶

Despite the relevance of the issue, the literature has, so far, mostly focused on a discussion whether legislation matters for the level of credit risk rather than aiming at quantifying its actual impact. As jurisdictions provide market participants with flexibility in terms of business behavior, the analysis of the impact of legislation on credit risk ultimately becomes an empirical matter.

Theory suggests that market participants (i.e., banks as creditors) adjust their lending behavior (namely in terms of credit prices and demand for collateral) to the applicable legislation to maximize efficiency and minimize costs (Coase Theorem). Likewise, according to theories of debt based on the control rights upon default, creditors in creditor-friendly legal environments are assumed to grant credit based on more advantageous terms, evident in lower interest rates and longer maturities (Agion and Bolton 1992, Hart and Moore 1994, 1998). Presumably, borrowers and other creditors adjust their behavior as well, which adjustment would affect demand for bank loans and manager decisions once a loan is received.

Empirical studies have shown that there are in fact (behavioral) adjustments by market participants, for example in the assessment of creditworthiness (Djankov et al. 2007), the consideration of control rights in bankruptcy, such as collateral and the duration of work-out processes (Acharya et al. 2006, Qian and Strahan 2007) and by an adjustment of credit prices (Bae and Goyal 2004, Qian and Strahan 2007).⁷

Davydenko and Franks (2008), who compare recovery rates of bank credit in the UK, France and Germany, found that banks tend to adjust their lending practices to differences in bankruptcy codes, for example, by asking for more or different types of collateral. However, they found—unlike what is suggested by theory and despite a certain degree of behavioral adjustment—non-negligible differences in credit risk between countries persist, which are not offset by differences in credit prices.

⁵ Such broader aspects are, for example, topics of the current VIVRE2 research project, that aims—with a focus on small- and medium-sized enterprises (SMEs)—at providing a detailed comparison of the European bankruptcy codes (a related study compares the bankruptcy proceedings of France, Germany, and the UK (OSEO, 2008).

⁶ Bankruptcy codes for banks have recently been subject to public attention (such as US FDICIA bankruptcy laws and the novel German restructuring law).

⁷ Other studies find that creditors' rights, notably collateral rules, highly influence the terms of loans, e.g., Bae and Goyal (2004), Claessens and Klapper (2005), and Qian and Strahan (2007).

We contribute to the literature by systematically investigating differences in the credit riskiness of loans resulting from legislation.⁸ We study three countries, namely Germany, as well as the UK and the US, representing two key law families, namely civil law and common law. The study draws on various pieces of the limited empirical literature. To this end, we use a concept that attempts disentangling legal effects from other potential effects such as market participants' behavior and the credit environment (e.g., credit prices and credit supply) impacting credit risk. We investigate how formal bankruptcy procedures (i.e., “in-court” procedures ending either in liquidation or going-concern) and informal default/bankruptcy measures (such as out-of-court restructuring) affect credit risk parameters depending on the country. Taking into account that the US financial system is least bank-based, the study uses data from legal proceedings, whereby firms financed through capital markets are also included in the study.

For the default rates, we find that the comparably debtor-friendly US law allows firms to go through preemptive restructuring to pro-actively avoid formal bankruptcy, which would leave US banks with a comparably high recovery. By controlling for cyclical effects, our framework reveals that approximately 20 percent of the informal restructurings or 10 percent of the overall default events in the US are preemptive measures not observable in the other two countries. Hence, US legislation aiming at early restructuring reduces the number of formal defaults compared to the UK and even more so for Germany.

Likewise, German banks adjust their behavior by demanding more credit risk mitigants than UK and US banks do—in line with economic theory. Compared to UK banks, German banks recover approximately 10 percent more collateral (as a percentage of the Exposure at Default) in formal bankruptcy proceedings, in cases of both liquidation and going-concern proceedings. Banks in the US recover about 45 percent less than UK banks do in case of liquidation (Chapter 7), and 4 percent less in case of a going-concern (Chapter 11).

In sum, banks in the US face the highest credit risk, followed by Germany and the UK. The reason for that is that the advantage of US banks in terms of the higher number of informal restructurings (yielding low or zero loss levels) is dominated by the low level of recovery in formal US procedures. In the case of Germany, the long duration of the proceedings reduces recovery substantially.

⁸ The surveys carried out by the World Bank as part of their Doing Business initiative (<http://www.doingbusiness.org/>) touch upon a similar question, and are available for 183 economies. However, the actual information provided by the surveys remains more limited. Specifically, the surveys focus on a specific type of firm (a hotel) and makes the respondents choose the most likely bankruptcy procedure and the estimated recovery rate, thereby neglecting at least part of the full picture.

Other things being equal, US banks would have to recover more than twice as much in Chapter 7 proceedings, and liquidation proceedings in Germany would have to be shortened by more than half to be at par with banks in the UK.⁹

The rest of this study is organized as follows: Sections II and III identifies relevant dimensions, which can account for differences in credit risk from a legal perspective and an economic perspective, respectively. Section IV looks at the previous findings and analyzes and interprets the legal differences between Germany, the UK, and the US. Section V, compares the model-based result with empirical evidence. Section VI concludes.

II. LEGAL PERSPECTIVE TO CREDIT RISK AND HYPOTHESES

A. General Aspects and Notions

The foremost obstacle in the comparison of legal systems is language—not only due to translation, but also because one and the same notion can have different meanings in different legal systems. This holds true, for example, for two key notions “bankruptcy” and “insolvency”. In the UK “bankruptcy” traditionally refers to individuals and “insolvency” to firms (cf. Fletcher 1990: 4, 9), whereas it is vice versa in the US. Under the German Bankruptcy Code (“Insolvenzordnung”, 1999), the notion of “Insolvenz”, i.e., bankruptcy, covers both cases.¹⁰ “Bankruptcy” (“Bankrott”) is no legal term in Germany, but commonly used in everyday language. In a legal context, we will stick to *bankruptcy*, thereby applying the US sense of the notion.

Likewise, the same notion can have different meanings in a legal and in an economic context. This holds true for “default”, which is often referred to as financial breakdown (or bankruptcy) in economic terms. Legally, “default” means non-performance of an obligation in due time, regardless of the reason for the non-performance and the nature and content of the obligation. The contents and function of the economic definition of default—namely to mark the threshold of bankruptcy—is corresponded by the legal prerequisites for the initiation of bankruptcy proceedings, albeit this does not necessarily require economic bankruptcy (see Hypothesis 3).

Bankruptcy and secured transactions are core issues of jurisdictions. Consequently, legal science and practice in each country have developed detailed schemes. An in-depth comparative legal study would exceed the limits of a basically economic treatise. We will therefore focus on the effects and functioning of the respective legislation as far as relevant

⁹ As a caveat, we highlight that the data used for this study cover periods before the reform of UK law in 2002 and the data captures the reform of US law in 2005 only to a limited degree.

¹⁰ It replaces the term “*Konkurs*” of the old code (“*Konkursordnung*”) prior to 1999.

for our subject-matter, leaving aside issues which are essential from a legal, but not from an economic point of view.

B. Credit Risk and Bankruptcy Legislation

The basic progress of a bankruptcy proceeding is well-known, and its influence on credit risk has been assessed by recent studies. Smith and Strömberg (2005), for example, distinguish 24 different characteristics split into six categories as shown in Appendix 1.¹¹ Osterkamp (2006) proposes to add two elements to that list, namely the costs of a bankruptcy procedure and the question whether a court has to open a procedure or can decide not to do so. We will concentrate on the most relevant dimensions for credit risk.

In broad terms, bankruptcy codes are aimed at an equitable distribution of the debtor's remaining assets among the creditors after a financial breakdown. While the motto for creditors normally is first come, first serve, bankruptcy codes regularly suspend the creditors' rights to enforce their claim outside the bankruptcy proceedings. A bankruptcy proceeding can result in liquidation or allow the debtor to stay in business and use the revenue generated to resolve the debts (going-concern or reorganization). It depends on national legislation whether the creditors have broad powers to supervise and organize the recovery independently or whether the oversight over, and distribution of the debtor's assets is managed mainly by a public administrator and monitored by a court. The procedural costs, which are induced by court fees, the reward of the administrator, sale costs etc., are usually drawn off before distribution, diminishing the recovery of the creditors. The recovery rate depends on the procedural costs (PC) according to the formula $[(\text{value of the assets} - \text{PC}) / \text{total outstanding debt}]$. Details will be outlined in Appendix 3 based on a stylized example.

The previous considerations highlight the essential role of the costs of the bankruptcy proceedings. *It is generally assumed that the duration and formality are crucial factors for the costs of bankruptcy proceedings (Hypothesis 1).*

The balancing of creditors' control rights and public supervision of bankruptcy proceedings is a question of national policies and traditions. The key questions are whether a country or state gives preference to certain creditors (like employees, whereby legislation is seen as a means to safeguard the workplaces) and, more generally, whether the legal system is more protective of either the creditor's or the debtor's interests.¹²

¹¹ Wood (2005) distinguishes between 11 characteristics.

¹² Systems differ also in their efficiency: more or less resources may be absorbed by the process itself, as further discussed below.

The number of formal bankruptcies in particular to be expected under the two regimes depends on the power of the two parties involved, namely creditors (our focus is on banks) on the one hand, and debtors (we concentrate on corporates) on the other. *It is assumed that banks are ultimately in a stronger position than borrowers, and therefore that in debtor-friendly systems banks urge firms to restructure outside in-court (hereinafter: formal) bankruptcy procedures (i.e., through out-of-court settlements, hereinafter: informal proceedings), while in creditor-friendly systems formal bankruptcies are more common (Hypothesis 2).*

The frequency of bankruptcies is also assumed to be influenced by the public perception of default. In some countries (notably the US), bankruptcy is perceived as a result of misfortune rather than wrongdoing whereas in other countries business failure is regarded a disgrace, leading in extreme cases even to criminal or at least personal financial liability of shareholders and management.¹³ In countries where default is stigmatized, firms might be more open towards informal default (in order to prevent formal proceedings), but the opposite could also hold true (if reorganization is also linked to the stigma).

Regularly, studies concentrate on the factors reducing the debtor's assets in pending bankruptcy proceedings. However, the value of the debtor's assets at the beginning of a bankruptcy proceeding is also highly relevant, particularly from a legal perspective. Economic default definitions typically denote a relatively clear-cut definition for default, namely when a firm's assets fall below their liabilities (Merton 1974).¹⁴ By contrast, the legal preconditions for the initiation of formal bankruptcy proceedings can differ substantially from this economic default definition: In order to disembarass debtors and enable them to restructure unprofitable business, bankruptcy legislation can allow the initiation of bankruptcy proceedings before the financial situation of the debtor has reached breakdown (see Figure 1). Initiation at a very early stage typically leaves substantially more assets for distribution among creditors. *In this way, we can conclude that the preconditions for the initiation of bankruptcy proceedings in national legislation, i.e., the bankruptcy definition (in a narrower sense) and default definition (in a broader sense), affect credit risk (Hypothesis 3).*

C. Credit Risk and Security Interests

A model of bankruptcy proceedings, which disregards security interests, is incomplete. The fundamental reasoning of security interests is straightforward: Creditors grant debt because

¹³ The Economist wrote already in 1998 "If you start a company in London or Paris and go bust, you have just ruined your future; do it in Silicon Valley and you have simply completed your entrepreneurial training."

¹⁴ There has been substantial research to determine the default point, a prominent example being Moody's KMV.

they expect their debtor to be solvent and liquid when it comes to repayment. In order not to be confined to this belief, creditors demand some kind of insurance (security) which they can fall back on to recover the debt should the debtor fail to perform, i.e., to mitigate their credit risk.

Security rights can basically be subdivided into two main groups, which will herein be referred to as personal security and real security in legal terms, or guaranties and collateral in economic terms.¹⁵

The value of a personal security interest (guaranty) depends on the solvency of the guarantor. If the latter is solvent, the creditor can entirely recover the debt by claiming payment from the guarantor directly. Leaving aside the possibility that the guarantor is unattainable, the creditor only suffers loss if both principal debtor and guarantor are in default (dealt with by the so-called double default framework under Basel II).

A creditor secured by a real security interest (collateral) does not depend on the solvency of another person, but is regularly entitled to sell or make use of the collateral independently of the actual ownership. As long as the revenues cover the actual debt, the creditor suffers no loss. If the revenues are lower than the total sum of security interests, though, the beneficiaries in the last rank positions remain (at least partly) unsatisfied. Hence, the key criteria for the value of a real security interest are its rank and its market value.

These basic rules for security interests (namely market risk and priority) are relatively clear-cut and do not vary substantially across jurisdictions.¹⁶ It is therefore assumed that market participants adjust to specific conditions of national legislation only to a minor degree and limited to arrangements like the avoidance of some collateral or guaranty types where the country-specific rules are unfavorable. *Hence, in respect of standard security types, the country-specific differences resulting from differences in credit risk mitigation instruments are assumed to be relatively limited (Hypothesis 4).*

In order to prevent a perilous misunderstanding, we highlight that security interests in general do not give the creditor superior rights in respect of the principal claim. A secured creditor has the same means of enforcement against a debtor in default as an unsecured one, which in case of bankruptcy usually denotes the participation in the bankruptcy proceedings. The

¹⁵ These notions are derived from civil law, and less commonly used in common law. However, the distinction hits the point for common law systems as well. The Basel II framework (BCBS 2006), which tends to take an economic approach, distinguishes likewise. For the standardized approach, see BCBS (2006), para. 119f. For the Internal Ratings-based Approach (IRB) see BCBS (2006), para. 285f.; See also the respective national legislation underlying Basel II.

¹⁶ This statement does not include rules and procedures for creating, perfecting and enforcing security, which differ widely from jurisdiction to jurisdiction.

function of a security title is similar to re-insurance: It grants the creditor a second chance to recover the debt, besides the primary claim.

Further information on security interests is given in Appendix 2 and a numerical example is shown in Appendix 3.

III. ECONOMIC PERSPECTIVE TO CREDIT RISK

The key challenge of economic credit risk modeling is to predict future default events in quantitative terms. This is usually done by using historical data, simulation techniques, quantitative theoretical modeling or a mixture of these approaches. This study focuses on two key credit risk parameters, the probability of default (PD) as well as recovery rate and loss-given-default (LGD), respectively.

There have been numerous contributions on how to determine these credit risk parameters, a very prominent one being the seminal econometric study on counterparty creditworthiness by Altman (1968). More recently, with the advent of modern IT systems, PD modeling has seen further advancements with logistic regression analysis being among the most popular methods used by scholars and practitioners. The contributions related to the LGD were less numerous, an important reason being a lack of data. However, certain standards have emerged, such as differentiating between workout LGDs and market LGDs¹⁷ (Schuermann 2004), the former LGD referring to loans, where the (expected and actual) cash flows are discounted to the time of default. This study focuses on workout LGDs. In addition, one has to determine the debt outstanding at default, the so-called exposure-at-default (EAD), which can usually be determined easily for illiquid (standard) credit loans with predefined cash flow structures.

A. Probability of Default Modeling

For PD modeling, there are essentially two main challenges, namely the actual prediction of the likelihood of a debtor's default, and, in case of guaranteed exposures, the prediction of the joint PD of the debtor(s) and guarantor(s).¹⁸ In order to determine the PD of a counterpart, the underlying default definition plays a crucial role (Table 1). In economic terms, default is usually triggered by one of the two following conditions: past due credit and/or unlikely to

¹⁷ Market LGDs can be derived from market data, which can be directly observable (i.e. recovery rates from defaulted bonds) or model-derived from sub-investment grade traded debt.

¹⁸ For the modeling of the joint default probability of a debtor and a guarantor, the Basel II framework foresees a simple way of the latter, the so-called *PD substitution approach* (BCBS 2006, para. 141, 303) and the so-called *double-default* framework (BCBS 2006, para. 284). In the first case, it is assumed that there is a 100 percent correlation between the debtor and the guarantor, implying that the debtor will have always defaulted should the guarantor default (provided that the default probability of the guarantor is lower). In case of the more sophisticated approach an assumption for the correlation of the PDs of the debtor and the guarantor has to be made.

pay events (see BCBS 2006). After default has occurred, a creditor can be cured (i.e. business goes on) or be liquidated during the workout period (Figure 1). The two key dimensions of default risk modeling with respect to country-specific legislation as assessed herein are listed below.

Figure 1. Stylized Default Process

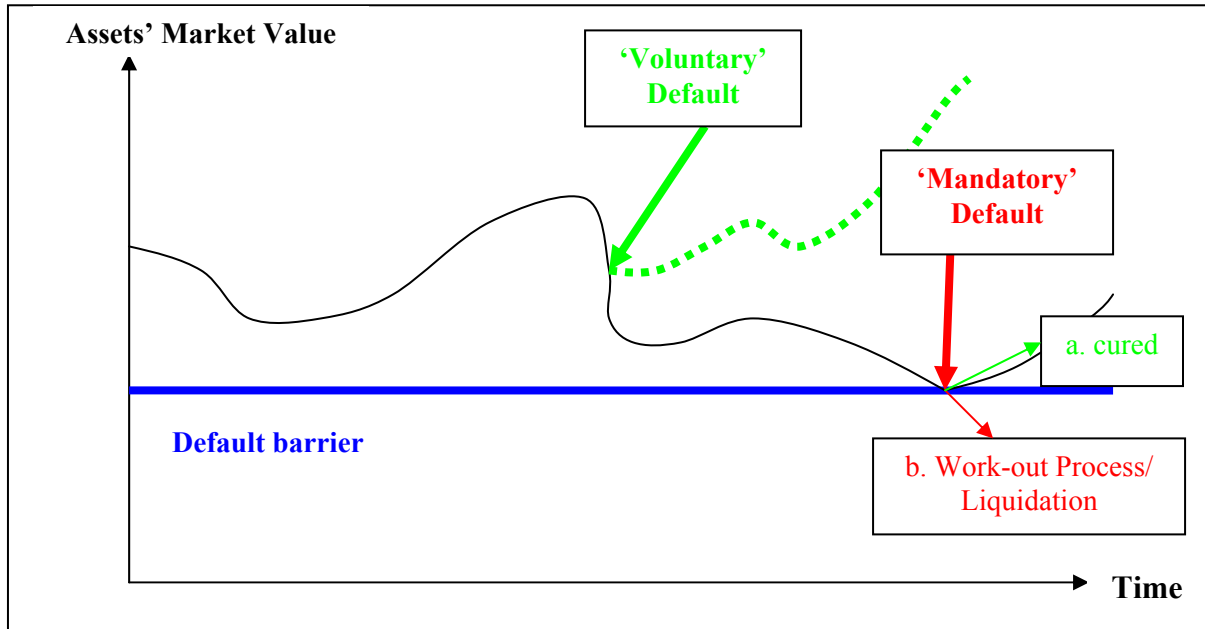


Table 1. Determinants of Probability of Default Modeling

Determinant	Country Dependent	Effect on the PD
Default definition	Yes	The more conservative the default definition, the lower the PD.
Guaranty as a security title	No ¹⁹	The higher the (likelihood of a positive) value of the guarantor's assets, the lower the PD.

B. Loss-Given Default Modeling

In terms of LGD modeling (Table 2), we focus on workout LGDs, which can—based on an appropriate definition of economic loss²⁰—be estimated as follows (Schuermann 2004):

$$LGD = 1 - EAD^{-1} \sum_{t=1}^T \frac{C_t}{(1+R)^t} \quad (1)$$

¹⁹ The general measures and frameworks for guaranties are expected to be similar.

²⁰ According to the revised Basel II Framework (BCBS, 2006, para. 460) the LGD estimation should focus on economic loss. To measure economic loss, “all relevant factors should be taken into account. This must include material discount effects and material direct and indirect costs associated with collecting on the exposure”.

where C_t denotes the cash flow at time t , R is the applied discount rate and EAD is the exposure at default, both the principal and unpaid interest. The discounted cash flows are made up by proceeds²¹ and expenses.²²

Table 2. Determinants of Loss-Given Default Modeling

Determinant	Country Dependent	Effect on Firm-Level LGDs
Duration of work-out time	Yes	The longer the duration of the work-out process, the higher the LGD.
Costs of bankruptcy procedure	Yes	The higher the costs, the higher the LGD.
Default Definition	Yes	The more conservative the default definition, the higher the LGD.
Value, quality and seniority of security titles	Rather no	The higher the value, quality and seniority of the security titles, the lower the LGD.
Discount Rate	No ²³	The higher the discount rate, the lower the LGD.

A stylized, Merton model type graph (Merton, 1974) that illustrates our considerations used to analyze the impact of legislation is shown below for clarification. Accordingly, it is assumed that the development of the asset value of a firm follows a random diffusion process reflecting the expected future development of the firm. A “mandatory” (formal) default event is assumed to occur should the market value of a firm’s assets fall below a certain barrier, the default threshold, i.e., when firms are unable to meet their debt obligations. There have been numerous studies to determine “typical” default barriers (assets over liabilities).²⁴

In legal terms, mandatory default would usually be formal bankruptcy. Firms can also default voluntarily, be it within the framework of legislation, i.e., a formal going-concern procedure such as Chapter 11 in the US (which is not allowed and/or foreseen in all jurisdictions) or outside legal bankruptcy frameworks (for strategic reasons, e.g. restructuring of business),

²¹ For example through the liquidation of collateral.

²² For example legal costs or collection costs for collateral. Instead of discounting all components individually, the sum of the recovered cash flows may be discounted for the duration of the workout. Resti and Sironi (2004, p. 65f.) suggest Macaulay’s duration, while Franks et al. (2004) apply a value-weighted average duration, for example. However, this procedure will result in comparable LGDs only for homogenous exposure classes in terms of LGD. If this is not the case, a bottom-up approach can be appropriate in which the exposure is decomposed, for example, with respect to the available collateral. Afterwards the LGD is determined from the recovery rates of different collateral categories (and workout proceeds and expenses).

²³ There could be a difference in discount rates, e.g., resulting from cyclical effects, but in the long-term the differences can be assumed to be subordinated.

²⁴ This framework, established by Merton, has been taken up by the Moody’s KMV framework, for example. In the Moody’s KMV framework, it is assumed that default occurs if the asset value falls below the sum of the long-term debt plus half of the short-term debt. In fact, at the beginning of bankruptcy procedures in the US, for example, the median level of debt is typically above the asset value. For Chapter 7 cases, for example, Bris et al. (2006) report a median of 168 percent and for Chapter 11 cases the median is 123 percent.

typically with the aim of keeping business as a going-concern by adjusting business strategies in a pre-emptive manner (see dotted line above). The question becomes, in which way this influences credit risk.

The determinants for LGD modeling on the firm-level and their expected effect on the LGD considered in this study are shown below, together with information as to whether country-specific differences can be expected.²⁵

IV. COMPARISON OF THE BANKRUPTCY AND SECURED TRANSACTIONS LEGISLATION OF GERMANY, THE UNITED KINGDOM, AND THE UNITED STATES

Next, we outline several legal key differences between Germany, the UK and the US based on the hypotheses developed in section II.

While the legal system in Germany is uniform across the country, this is neither the case for the UK nor for the US. For the UK, the concentration is on English law and the regional peculiarities are left aside. In fact, the basic and overall legal structure is the same throughout the UK, except that some regions have their own legislation, e.g., the Scottish Insolvency Code (2007). The basic structure of US law, as a common law system, is similar to English law. However, one has to be aware that the states in the US have extensive legislative powers, and that State legislation can be dissimilar. Hence, only general statements will be made herein. Potential changes in Germany anticipated in the German Draft Law on Restructuring Insolvent Companies are discussed when it comes to conclusions.

Table 3 summarizes the outcome of country-specific analyses related to the four hypotheses laid down in section II (see Appendix 4 for details). First, the comparison revealed that the duration of the workout process tends to be rather lengthy in Germany and comparably short in the UK and in the US. The differences are expected to be particularly substantial for liquidation proceedings. The same order holds true for the legal costs of bankruptcy, which increase with the formality and duration of the proceedings. For the creditors' control rights,²⁶ the order is different: there were many control rights in the UK before the vanishing of the receivership procedure, but the balance between creditors and debtors can meanwhile be characterized as relatively neutral and similar to Germany, where the procedure is handled mainly by an administrator. In the US, where even debtors have a say in the proceedings (Chapter 11), creditors have limited control rights.

²⁵ Additional factors that have been found to have a potential impact on LGDs are counterparty features (creditworthiness, legal form, size), business connections between banks and firms (number of creditors, distance between creditor and debtor) and business cycle conditions will be directly or indirectly considered in section V.

²⁶ Control rights include supervision over and influence on the proceedings.

Table 3. Summary of Differences Between Legislations²⁷

Findings related to...	DE	UK	US
1: Proceedings and Control Rights a. Duration b. Legal Costs c. Control Rights for Creditors	Long High Medium	Short Low/Medium Medium/High	Short Low/Medium Low/Medium
2: Creditor-friendliness ➤ LaPorta et al. ²⁸ (1–4) ➤ Wood (1–10) ➤ Own review (1-10) ²⁹	3 7 7: Stigmatization of debtors (8), Creditor-friendliness of law (6)	4 9 6-7: Stigmatization of debtors (7), Creditor-friendliness of law (6)	1 6 3: Stigmatization of debtors (2), Creditor-friendliness of law (4)
3: Bankruptcy code and default definition	Formal	Rather formal (with some exceptions)	Least formal
4: Security titles	Similar instruments, similar effects (Portion of security interests subject to empirical analysis)		

Source: Authors.

Note: Category 2 uses scales, where the lowest number indicates the lowest level of creditor-friendliness (La Porta, Wood) and stigmatization (own review). We refer to the same scale as Wood, namely 1 to 10, where 1 would indicate a regime strongly biased towards debtors and 10 a system biased towards creditors, while a rating of 5-6 indicates a neutral rating.

There is a negative public perception of bankruptcy in both European countries, where failing debtors are stigmatized. This observation is confirmed by research surrounding the Small Business Act (2009): Both countries are at par with the EU average to allow firms for a second chance.³⁰ In order to cope with this issue that has a negative impact on innovation, policy measures have been introduced at the EU level to diminish the stigmatization which is deeply rooted in European traditions.³¹

²⁷ In recent analyses, Moody's analyzed the impact of jurisdictions on recovery rates and ratings, taking into account the latest reforms in legislation (DePetigny et al., 2008). Overall, the findings are in line with the outcome presented herein.

²⁸ The studies by La Porta et al. (1998) and Wood (1995) do not take into account recent changes in legislation for all three countries. For the UK, La Porta et al. (1998) assesses administrative receivership, the most creditor-friendly procedure. The study by Djankov et al. (2007) relies on La Porta et al. (1998).

²⁹ Our review includes most recent developments, namely the abolishment of receivership procedures in the UK and the 2005 US reform of corporate bankruptcy legislation.

³⁰ European Commission (2009a and 2009b).

³¹ In the context of the Lisbon strategy, several EU states have recently announced that they plan to reform their bankruptcy procedure in favor of a more debtor-friendly framework as a catalyst for company foundations namely "to promote a climate where risk-taking is encouraged and a fresh start is possible". See http://ec.europa.eu/enterprise/library/ee_online/art09_en.htm for further information. In Germany, a draft Law on Restructuring Insolvent Companies has recently been presented.

However, the UK perception is more generous vis-à-vis creditors compared to Germany when it comes to informal, out-of-court restructurings (which give firms more leeway to adjust their business in order to avoid formal default), at least evidenced by the fact that they are more common than in Germany. We disagree with previous studies, which frequently found UK law to be by far the most creditor-friendly legislation among the three investigated countries, owing to the receivership procedure which before 2003 September entitled creditors to appoint a receiver who solely represents their interests. It still holds true that the creditors' control rights in the UK remain broader than in Germany, but with the cessation of the receivership procedure, UK law has become more debtor-friendly. Therefore, we see the basic difference between the two countries in the fact that formal proceedings can be initialized voluntarily by the debtors in England, an option that is not existent in Germany. In contrast to European law, US legislation tends to be more balance between debtors and creditors (with Chapter 11 being debtor-friendly), despite the 2005 reform in favor of creditors.

We also conclude that voluntary default (i.e., informal out-of-court restructurings) can be considered a real alternative choice in the US, mainly due to the debtor-friendly public attitude, but particularly also due to the fact that the control rights of banks in formal bankruptcy procedures are substantially lower than in the UK and Germany. Hence, we characterize US law as comparably informal. This is in contrast to the situation in the two European countries, particularly Germany, where bankruptcy is substantially more formal: While UK laws allow for voluntary initiation of bankruptcy proceedings under certain circumstances, this option is not foreseen by German laws; second, administrators are generally appointed by the court in Germany and in certain cases in the UK (particularly not in the abandoned receivership proceeding); third, German proceedings put equality on top of a preferably short duration—unlike in the UK and the US—which requires a time-consuming and burdensome assessment of all claims (including very small ones). Ultimately, we will test this result against empirical evidence to confirm our qualitative finding.

In addition, the bankruptcy proceedings tend to be the most formal in Germany where there is no separate formal procedure explicitly aiming at restructuring of a firm as a going-concern (but rather one common formal procedure which allows for both going-concern and liquidation), while the US and the UK laws are relatively similar in this respect, both distinguish between a formal procedure aiming at restructuring as a going-concern (Chapter 11 in the US; Administration in the UK) and one resulting in liquidation (Chapter 7 in the US; Liquidation in the UK). In addition, US law sets up the lowest threshold for the initiation of bankruptcy procedures, while European jurisdictions tend to set up an economic bankruptcy test for formal proceedings.

Also, the commonly used law security interests—personal security and real security—used in the three investigated countries are, in shape and practical effects, relatively similar (see

Appendix 4 for further details). Thus, differences are expected to be triggered by behavioral adjustment rather than the underlying legal framework.

V. NET IMPACT OF LEGISLATION ON CREDIT RISK

Subsequently, we determine quasi-theoretical (henceforth: implied) PDs and LGDs, which are used to determine the net impact of legislation on credit risk. This is done by comparison of the implied credit risk parameters with empirical evidence.

A. Method

Our conceptual reasoning is as follows: Total credit risk can be subdivided into credit risk driven by legislation and a portion that is not subject to legislation.

$$\text{Empirically observed Credit Risk} = \text{Credit Risk driven by Legislation} + \text{Credit Risk not driven by Legislation} \quad (1)$$

To arrive at a meaningful comparison between implied credit risk parameters and empirically observed indicators, one has to neutralize country-specific differences not driven by legislation. We have identified three main dimensions that have to be considered:

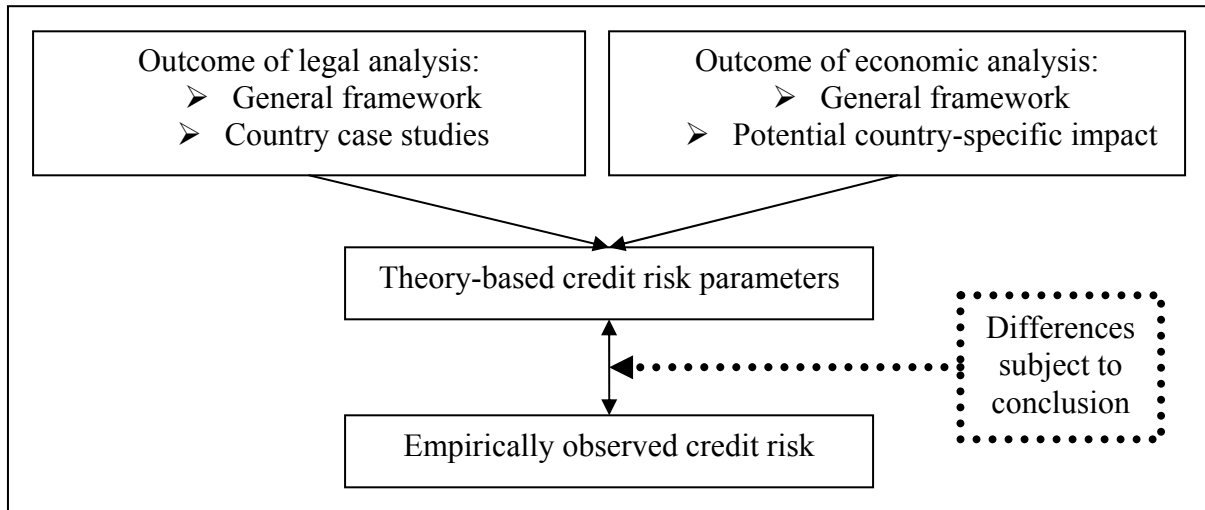
- (i) The type/nature of default events.
- (ii) The credit environment (essentially cyclical effects as well as credit conditions, such as credit prices and credit supply).
- (iii) A potential adjustment of the behavior of market participants (banks).

In terms of the first issue, we will make systematic use of our findings documented in Section IV.³² For the credit environment, we seek to investigate comparable conditions:

- (i) Credit prices are not directly relevant for our analysis in the first step, but will be considered for final conclusions.
- (ii) In terms of credit supply, we assume that there are no country-specific differences in the long run.
- (iii) We use through-the-cycle credit risk parameters to account for cyclical effects.

What remains is a potential adjustment of the lenders' behavior. By neutralizing various non-legal effects, we expect that the implied credit risk parameters match with the empirically observed parameters. We assume that the residual is behavioral adjustment. Our conceptual framework is graphically summarized in Figure 2.

³² For a comprehensive analysis, it has also to be taken into account that the registration and classification of bankruptcies is far from being basic. We assume that there are no substantial differences between the three investigated countries.

Figure 2. Conceptual Overview

B. Frequency of Different Bankruptcy Proceedings

The frequency of different default procedures has been found to be relevant both for PDs and for LGDs (we refer to firm-level LGDs) (Table 4). As shown in Figure 1, it is highly relevant whether default occurs on a voluntary basis or in a mandatory way. The reason for that is that voluntary procedures typically occur at a point in time when a default does not (yet) necessarily result in a loss, or, at least to a substantially lower one than in case of mandatory bankruptcy procedures.³³ We distinguish three default categories, namely (a) informal voluntary default; (b) formal bankruptcy of a going-concern type nature; and (c) liquidation type procedures. In order to assess country-specific differences, we seek to determine the likelihood for firms ultimately ending up in one of three categories based on historical data.

³³ This is clearly shown by the observed LGDs reported by Franks et al. (2004) for formal and informal bankruptcies in the UK and Germany, for example.

Table 4. Frequency of Different Bankruptcy Procedures Chosen by Firms

Country	Portion of...			
	... Formal Bankruptcy Procedures			... Voluntary Default 1/ (Percent)
	... Thereof Liquidation Type (Percent)	... Thereof Going-Concern Type 2/ (Percent)	Total Percentage of Formal Bankruptcies	
DE	69	31 3/	87	13
UK	62 4/	38	75	25
US	74	26	53	47 5/

Source: Authors.

1/ The table displays the actual portion of voluntary default events that were successful. Voluntary default events can also be referred to as informal renegotiations and private renegotiations.

2/ In this dimension, we report formal bankruptcies with the explicit legal option to keep the firm as a going-concern, which is not the eligible in Germany, so we use proxy figures.

3/ According to Grunert and Weber (2009), 40 percent (48 of 120 firms) of the defaulted firms investigated continued their business, while 60 percent of the firms were liquidated (72 firms). As the sample is based on a broad default definition, the figure includes also voluntary default events, whereby the likelihood for going-concern type bankruptcy procedures becomes 27 percent of all default events or 31 percent in conditional terms. A survey among more than 100 administrators carried out in 2007 (thereby accounting for the 1999 reformed German bankruptcy code) reveals that the experts expect the likelihood of German SMEs (sales between EUR 5m and EUR 50m) to end up in a "real" going-concern (i.e. not a sale of the firm) is about 10 percent, 56 percent for reorganizations via a sale of the firm and 34 percent for liquidations (Euler Hermes Kreditversicherungs-AG, 2007), which is by and large in line with the previous figures.

4/ As receiverships do not exist any longer and has been replaced by administration, we re-classify 44 percent of the receiverships (i.e. 44 percent*39 percent=17 percent) into the going-concern category and 56 percent of them to liquidation (i.e. 22 percent in overall terms), in line with empirical evidence as reported by Franks and Sussman (2003).

5/ According to a study carried out by Gilson et al. (1990), 85 percent of the investigated firms tried to restructure outside of formal bankruptcies, and 55 percent of those trying to stick to informal renegotiations (or 47 percent of all firms) were successful in doing so. In the remaining cases, the firms ultimately filed for formal (i.e. Chapter 7 or Chapter 11) bankruptcy.

According to empirical evidence, the portion of successful informal voluntary default procedures (i.e., voluntary default procedures that did not lead to formal bankruptcies afterwards) on the total number of defaults is 13 percent for Germany, 25 percent for the UK, and 47 percent for the US.³⁴ For the remainder of the defaulted firms that entered formal bankruptcy procedures, the likelihood for the formally bankrupt firms being liquidated in the UK is approximately 62 percent (liquidations and ex-receivership), and 38 percent for keeping them as a going-concern (administrations). For Germany, where no separate chapter 11 type bankruptcy procedure exists,³⁵ we use a proxy, namely the likelihood that a firm

³⁴ Data for the UK and Germany: Franks et al. (2004:54); Data for the US: White (2005) based on a study by Gilson et al. (1990).

³⁵ A survey carried out in 2006 among 125 administrators in Germany revealed that the majority did not see a need for a Chapter 11 type code (Euler Hermes Kreditversicherungs-AG, 2007).

entering formal bankruptcy will be carried on based on data from Grunert and Weber (2009).³⁶ Conditional on entering formal bankruptcy procedures 69 percent of the firms were liquidated, while 31 percent were successfully kept as a going-concern.³⁷

For the US, the corresponding likelihood for liquidation and going-concern is 74 percent and 26 percent, respectively.³⁸ It is worth mentioning that about 16 percent of the Chapter 11 filings can be assumed to mute into Chapter 7 cases at a later stage (Bris et al. 2006).

C. Theoretical Credit Risk Parameters

Theoretical Probabilities of Defaults

PDs ultimately depend on the underlying default definition. In order to allow for cross-country analysis we refer to a broad default definition, whereby the PD can be decomposed into two components, the probability that default occurs in a formal way and the probability that default occurs in a voluntary manner:

$$PD = PD(\text{Formal Bankruptcy}) + PD(\text{Voluntary Default}) \quad (2)$$

The other key dimension to be taken into account is how debtor-friendly legislations are (Hypothesis 2), as this will influence how frequently firms that are facing financial distress will opt for voluntary default.

In addition to knowing how often firms in different countries default, one ultimately has to answer two related questions:

- (i) How often firms do firms in different countries use the option to restructure outside of formal bankruptcy proceedings? and
- (ii) What portion of formal bankruptcies can be prevented by early restructuring (i.e. are voluntary defaults).

A survey among German liquidators revealed that in case of early restructurings the chance of being successful is 44 percent (Euler Hermes Kreditversicherungs-AG, 2006),³⁹ compared

³⁶ Some (more disaggregated) data subsequently referred to is taken from the 2005 version of the paper.

³⁷ Although the figures for Germany are not directly comparable (except on an aggregated level of formal bankruptcies), the portion of going-concerns revealed by this study appears to be sufficiently conservative (i.e., not overstating the number of going-concern type bankruptcies) to allow for comparisons with the frequency of going-concern type formal procedures in the UK and the US.

³⁸ This portion has been determined as the arithmetic average of the relative frequency of Chapter 7 (73.7 percent) and Chapter 11 (26.3 percent) filings reported by US Courts from 1997 to 2008. See http://www.uscourts.gov/Press_Releases/.

to 10 percent of successful internal restructuring in case of formal bankruptcy procedures (Euler Hermes Kreditversicherungs-AG, 2007). As the 1999 reformed German bankruptcy code allows for both liquidation and restructuring the answer of the experts is—in economic terms—assumed to be also relevant for the other countries investigated in this study.⁴⁰

We take a cohort of 100 firms with the same level of credit risk in all three countries. If one refers to the number of informal default events that have been successful, then one captures both dimensions: In the US, 85 percent of the defaulted firms tried to restructure in an informal way and 47 percent of them were successful, while the portion of successful informal restructurings is 25 percent for the UK and 13 percent in Germany (see above). In relative terms, the PD for formal bankruptcy events in the US is by 39 percent lower than in Germany. In the UK, the figure is by 14 percent lower than in Germany (US: UK:DE = 0.53:0.75:0.87 = 0.61:0.86:1).

Theoretical Loss-Given Defaults

LGDs conditional on the legal framework can be simulated as follows:

$$\begin{aligned} LGD &= Pr1(LGD_{Liq}) + Pr2(LGD_{GC}) + Pr3(LGD_{Informal}) \\ &= Pr1((P_{Liq} - LCost_{Liq}) * DF_{iLiq}) + Pr2((P_{GC} - LCost_{GC}) * DF_{iGC}) + Pr3(LGD_{Informal}) \end{aligned} \quad (3)$$

The overall LGD depends on the LGD pertinent to the three different default procedures, namely liquidation (“Liq”), going-concern type bankruptcy (“GC”) and informal restructuring (“Informal”), and the probability for their occurrence ($Pr1$, $Pr2$, $Pr3$). The net proceeds in case of liquidation type default and formal going-concern type bankruptcy (Proceeds P , including non-legal costs, minus the legal costs “ $LCost$ ”) are multiplied by the discount factor corresponding to the duration weighted-average length of bankruptcy (“ DF ”).

In line with Hypothesis 4, we presume that the average gross proceeds P for formal bankruptcies are the same in all three countries considered herein, reflecting our assumption that (a) security titles are similar in terms of their type (and thus quality) and value, as well as (b) for the fact that we look at the average recovery rate (for financial institutions to recover on loans) of virtually the same cohort of firms placed at the same time in the three countries. This assumption will be compared with empirical evidence below.

³⁹ The surveyed experts were asked to base their answer on their experience during the last three years before 2006, i.e., after the introduction of the 1999 reformed German bankruptcy code.

⁴⁰ This observation is supported by the outcome of an empirical study on defaulted US firms done by Gilson et al. (1990), which revealed that the portion of firms that are kept as a going-concern in case of voluntary default events is 55 percent, being only slightly higher than the portion estimated by experts for Germany.

We simulate firm-level LGDs for undiscounted proceeds of 90 percent of the EAD for going-concern bankruptcy procedures and 80 percent for liquidation type bankruptcy, which corresponds to the figures reported by Davydenko and Franks (2008) for the UK. These proceeds are assumed be net of all expenses which are not subject to legal differences, such as expenses for the collection of security titles.

Next, we subtract the country-specific direct legal costs⁴¹, and then calculate the LGD for liquidation-type bankruptcy (LGD_{Liq}) based on the cash flow weighted average duration of the work-out process⁴² and a discount rate of 12 percent.⁴³

For the UK and Germany, there is no data on the legal costs of bankruptcy for liquidation-type bankruptcies and going-concern type bankruptcies, respectively. Hence, we use the same parameters for both procedures. For Germany, there is also no data for the duration of the work-out period for going-concern procedures. We assume 1 year, closely corresponding to the length in the UK and in the US, but robustness checks reveal that the outcome (and overall conclusion) is similar for a more conservative duration of 1.5 years.⁴⁴

For voluntary default events, which are largely based on economic considerations of firms and acceptance by their creditors and are, if at all, only indirectly influenced by legislation, we assume that the LGD is the same for all three countries and substantially lower than in case of formal default events. This assumption is backed by economic evidence presented by Davydenko and Franks (2008) for informal default events: In the UK, the LGD for these types of default events is very similar to the one for Germany (22 percent vs. 24 percent), despite substantial differences for LGDs based on formal procedures. For a sample mostly comprising large US corporates, Araten and Karagozoglou (2007) estimate an LGD of 23.8 percent, which closely matches the figures for the UK and Germany. We use LGDs of 22 percent for informal default events in all three countries. The resulting procedure-specific LGDs are displayed in Table 5.

For Germany, the LGD for liquidation type bankruptcy becomes as high as 56.7 percent, while the figures for the UK and the US are relatively similar to one another at 38.3 percent and 36.8 percent, respectively. The latter figures clearly reveal that the substantially higher

⁴¹ Direct legal costs typically comprise the costs for the bankruptcy practitioner, the expenses for the selling of the assets, potential costs for running the business, and other professional fees (e.g., for external consultancy).

⁴² The duration broadly reflects the indirect costs of bankruptcy. See Bris et al. (2006), for example.

⁴³ This discount rate has been used by Franks et al. (2004) and Araten et al. (2004), for example, and can roughly be understood as a rate used for liquid sub-investment grade debt.

⁴⁴ Accordingly, the theoretical LGD for going-concern type procedures would increase from 32.9 percent to 36.5 percent and the total LGD from 45.8 percent to 46.8 percent.

LGD for Germany result from the comparably high duration of the bankruptcy process. For going-concern type bankruptcies, the LGDs are relatively similar for all countries at around 30 percent.

As a last step, we calculate the overall LGD. The LGD for Germany is again the highest one (45.8 percent, Table 6). The LGD for the UK (31.7 percent) is 3 percentage points higher than the one for the US (28.6 percent), mainly due to the higher frequency of voluntary defaults in the US. It is important to note that differences in direct legal costs (i.e., administrative costs) do not appear to play a decisive role.

Table 5. Overview on Loss-Given Defaults for Different Default Procedures 1/

Country	Undiscounted Proceeds P (1, Percent)	Direct Legal Costs 2/ (LCost) (2, Percent)	Undiscounted Net Proceeds (3)=(1)-(2)	Duration of Workout Process (Weighted Average Duration, years) 3/ (4)	LGD Based on Discounted Cash Flows at 12 Percent (5) = 100 - ((3),(4))
<i>LGD_{Liq}</i>					
DE	80	14.8	65.2	3.62	56.7
UK	80	12	68	0.86	38.3
US	80	8.1	71.9	1.14	36.8
<i>LGD_{FGC}</i>					
DE	90	14.8	75.2	1	32.9
UK	90	12	78	0.86	29.2
US	90	9.5	80.5	0.98	28.0
<i>LGD_{Informal}</i>					
DE	NA	NA	NA	NA	22
UK	NA	NA	NA	NA	22
US	NA	NA	NA	NA	22

Source: Authors.

1/ The LGDs are firm-level figures based on average security titles in place.

2/ In all cases, we referred to the direct costs of bankruptcy measured as a portion of the firms' asset value at the time of bankruptcy. Data for the UK: Franks and Sussman (2003); in that study, the direct costs are measured relative to the realizations. We refer to the sample of firms with realizations of more than GBP 1m, for which the direct costs have been found to amount to 16 percent of the realizations. Next, we assume that the total assets at default amount to the outstanding debt at default and hence multiply the 16 percent with the average undiscounted recovery relative to the outstanding debt at default found in the same study (75 percent). Data for Germany: Franks et al. (2004); the study reports that the fees for the administrator can be assumed to be 9 percent of the realized securities (the maximum allowed by law), which have been found to be 61 percent for Germany in the same study, so the direct costs are 14.8 percent of the total outstanding debt at default and the total assets, respectively. Data for the US: Bris et al. (2006); the average costs for Chapter 7 and Chapter 11 filings (as a percentage of the total assets) were 8.1 percent and 9.5 percent, respectively and the medians were 2.5 percent (Chapter 7) and 2 percent (Chapter 11).

3/ Data for the UK and Germany: Davydenko and Franks (2008), except for the duration for the going-concern type bankruptcy for Germany, which is based on expert judgment. Given the limited data for the duration of bankruptcy proceedings in Germany, we cross-checked with other sources, for example Paffenholz and Kranzusch (2007), confirming that they last at a minimum one to two years and at a maximum 6 years. Data for the US: Bris et al. (2006); the average elapsed time of bankruptcy proceedings has been found to be 2.25 years (Chapter 7) and 1.94 years (Chapter 11), respectively. This figure is closely in line with the average time to final resolution (2.4) and the time to zero book value (1.8) as reported by Araten et al. (2004). To arrive at the weighted average duration, we adjust this elapsed time of bankruptcy (2.25 years) by using evidence from the UK, where the elapsed time to final resolution was 1.7 years, yielding a duration of 1.14 years for the US ($0.86/1.7 \times 2.25$). A similar average elapsed time of bankruptcy of 2.25 years (Chapter 7) and 1.94 years (Chapter 11) has been found by Bris et al. (2006). For Germany, the elapsed time to resolution is 4.1 years.

Table 6. Total LGDs Calculated Based on Analytical Concept

(Figures in Percent) 1/

Country	Formal Default		Informal Default		Total LGD
	Mean LGD	Frequency	Mean LGD	Frequency	
DE	49.3	87	22	13	45.8
UK	34.9	75	22	25	31.7
US	34.5	53	22	47	28.6

Source: Authors.

1/ The LGD for formal procedures in Germany is 69 percent * 56.7 percent + 31 percent * 32.9 percent.

According to the Basel II Foundation IRB approach, the LGD for senior unsecured debt is set at 45 percent, which indicates that the estimated parameters appear to be realistic in general terms.

D. Empirical Evidence

Empirical Evidence for the PD

In order to identify credit risk driven by legislation in empirical figures, one first has to remove cyclical effects.

We refer to the portion of registered formal bankruptcies in order to account both for the changes in bankruptcy codes during recent years and for cyclical effects. We use the average bankruptcy rates (a so-called through-the-cycle credit risk parameter) for the period from 2000 to 2008 as reported by CreditReform⁴⁵ for Germany and the UK as well as figures published by the US Court Press⁴⁶ for the US. Accordingly, we arrive at a level of formal bankruptcies of 0.53 percent for the US, 0.88 percent for the UK and 1.2 percent for Germany, or a relative level of 0.44:0.73:1.

As these time series are relatively short, they might reveal misleading findings. In Germany, for example, the corporate default rate observed after 1995 has been relatively high compared to earlier periods as a consequence of an unfavorable economic development—and also in the context of the German re-unification⁴⁷ process—so the through-the-cycle level of bankruptcies for Germany seems to be overstated. By contrast, the economic environment in the US was very benign (at least until the onset of the financial crisis) and one might underestimate the actual through-the-cycle figures.

This assumption is confirmed if one looks at the number of formal corporate bankruptcies per 1 million inhabitants for the period 1980–2005 as reported by Osterkamp (2006). These figures not only account for cyclical effects, but also for the differences in the firm density between the US (comparably low density) on the one hand and the UK and Germany on the other (comparably high density). The respective average number of defaults is about 200 for the US, 250 for the UK and 300 for Germany (or 0.67:0.84:1 in relative terms).

⁴⁵ We used the annual reports published by CreditReform on the bankruptcies in Europe from 2000 to 2008, which have been compared and cross-checked with figures provided by the respective national statistical offices to verify the robustness of the CreditReform figures.

⁴⁶ See http://www.uscourts.gov/Press_Releases/.

⁴⁷ For long-term time series of German corporate bankruptcies see the webpage of the German Federal Statistical Office (www.destatis.de).

The figures for Germany were lower than the ones for the UK and the US until 1993–94, but have more than doubled since then, whereby the average figure for Germany becomes the highest ones among the three countries. For the US, the default rates during the 1980s have been higher than the long-term average during the savings and loan crisis, but the subsequent benign period until 2005 has brought down the default rate. For the UK, the figures include both benign periods and periods of stress during the 1990s. In sum, this data appear to be valid figures to be used as an empirical benchmark. If one adds the informal default dimension, then the relative number of total defaults becomes 1.10:0.97:1 (US:UK:DE) as shown in Table 7.

Table 7. Total Default Rate by Country

	Formal Defaults per 1 Million Inhabitants	Informal Defaults per 1 Million Inhabitants	Total Defaults per 1 Million Inhabitants (relative level)
DE	300	44.8 (=300/0.87-300)	344.8 (1)
UK	250	83.3 (=250/0.75-250)	333.3 (0.97)
US	200	177.4 (=200/0.53-200)	377.4 (1.1)

Source: Authors.

The implications of this outcome are two-fold: First, the formal PDs based on our conceptual reasoning (US:UK:DE=0.69:0.84:1) closely resembles empirical evidence (0.67:0.84:1). This outcome gives some indication that we have captured the most important dimension from a legal perspective, namely the frequency of formal and informal default events while controlling for cyclical effects.

Second, while the total default rates in the UK and Germany are similar, the total default rate for the US is about 10 percent higher. Although there is no readily available empirical evidence to do a robustness check, it appears likely that this difference is attributable to voluntary default events not directly related to solvency problems, for example to adjust business into a more favorable direction before it becomes too late. This observation reflects our finding that US law is the most debtor-friendly one and default is least stigmatized, in favor of such “arbitrary” default events. In the US, about 20 percent of the informal default events seem to be of such a nature.

Empirical evidence for the LGD

For the LGD, we refer to the study by Davydenko and Franks (2008) for the UK, Grunert and Weber (2009) for Germany and Bris et al. (2006) for the US. All studies cover very similar time periods without major cyclical stress and can be considered the most representative studies for the respective country for loan-type credit. The studies for the UK and for Germany are based on actual bank data, while the data for the US is based on all formal bankruptcies in two states, Arizona and New York. In order to provide for comparable data with the other countries, we adjust the figures calculated by Bris et al. (2006) to account for

the fact that banks recover more than other (more junior) creditors. As an additional means of robustness, the figures are compared with evidence observed by Araten et al. (2004) and Carey and Gordy (2004) for actual bank debt for the US and Davydenko and Franks (2008) for Germany.

For informal default events, we re-use LGDs of 22 percent for all three countries, in line with evidence from Davydenko and Franks (2008) and Araten and Karagozolu (2007). Again, we report average LGDs for bank debt, i.e., take into account the effect of credit risk mitigation instruments as well as potential cyclical effects⁴⁸ in order to make the results comparable with our conceptual outcome.

The undiscounted net proceeds conditional on the pertinent bankruptcy procedure (liquidation type and going-concern type) are displayed below. As shown in the table, cross-country differences in the undiscounted net proceeds for going-concern type bankruptcies are relatively limited, while this does not hold true for liquidation type bankruptcies.

For Germany, the net undiscounted proceeds for liquidation type bankruptcy on an undiscounted basis were 75.1 percent and for going-concern procedures including voluntary default type events 85.8 percent, the highest among all three countries (Table 8). For the US, the low level of proceeds for liquidation type bankruptcy reported by Bris et al. (2006) is striking, but illustratively reflects the fact that Chapter 7 bankruptcies leave little to be recovered in many cases, particularly for junior creditors. The discounted proceeds are displayed in parenthesis.

The aggregate discounted LGD for formal defaults in the UK becomes 36.7 percent⁴⁹ and the total LGD is 33 percent (Table 9). For Germany, the discounted LGD for formal procedures yields 39.5 percent, resulting in a total LGD of 37.2 percent. For the US, the formal LGD is 64.5 percent. For the informal default events in the US, we account for our previous finding that 20 percent of the events can be classified as truly voluntary action, whereby we assume that the LGD is zero. Accordingly, the total LGD for the US yields 42.5 percent.

⁴⁸ Referring to shorter time series does not appear to be problematic as LGDs based on secured exposure have been found not to be subject to significant cyclical effects (see, for example, Araten et al. 2004).

⁴⁹ As Franks et al. (2004:55) report only undiscounted LGDs, we have discounted the cash flows based on the country-specific duration.

Table 8. Cross-Country Comparison of Undiscounted Net Proceeds (and Discounted Proceeds in Parenthesis)

(Figures in percent)

Country	Net Proceeds for Liquidation-Type Procedures	Net Proceeds for Going-Concern Type Procedures	Source	Period / Number of Defaults
DE	75.1 (49.8)	85.8 (76.6)	Grunert and Weber (2009) 1/	1992-2003 120
UK	68.9 (62.5)	78.0 (70.8)	Davydenko and Franks (2008)	1994-2003 1,418
US	27.4 ⁵⁰ (24.1)	76.6 ⁵¹ (68.5)	Bris et al. (2006)	1995-2001/ 303

1/ The data is taken from the 2005 version of the paper published on the webpage of the University of Mannheim, Germany. Grunert and Weber (2005) used a default rate of 5 percent. The undiscounted proceeds have been calculated based on the duration of the workout process as displayed in

Table 9. Empirically Observed LGDs (Discount Rate: 12 Percent)
(Figures in Percent)

Country	Formal Default		Informal Default		Total LGD	LGDs Based on Conceptual Framework
	Mean LGD	Frequency	Mean LGD	Frequency	LGD Based on Discounted Cash Flows (12 Percent)	
DE	39.5	87	22	13	37.2	45.8
UK	36.7	75	22	25	33.0	31.7
US	64.5	53	22 (80) 0 (20)	47	42.5	28.6

Source: Authors.

Table 9 reveals several key findings: for the UK, the actual empirical LGD closely matches the conceptual LGD. Given that we sought to target the UK case in terms of the proceeds (Table 5) and that the empirical evidence for the UK appears to be robust, our conceptual framework seems to correctly depict the major effects.

For the US, the LGD backed by empirical data is, in relative terms, 50 percent higher than the implied theoretical one (42 percent vs. 28 percent). Given that US Chapter 7 bankruptcy events are clearly the ultimate solution if everything else has failed, higher formal LGDs than

⁵⁰ For Chapter 7 procedures, we refer to the scenario labelled as “optimistic”, whereby the total recovery becomes 27.2 percent. We thereby take into account that banks are likely to recover substantially more than other creditors. Robustness checks with other studies confirm that this assumption seems to be valid. Yet, additional analyses on the recovery of bank debt for Chapter 7 procedures are needed for additional robustness.

⁵¹ For Chapter 11 procedures, the average recovery for senior debt is 90.2 percent while the recovery for junior debt is 51.6 percent (Carapeto (2007) reports similar figures for data from 1989 to 1997). With the portion of secured debt on the total debt under Chapter 11 filings being 47.6 percent and the observation that 36.9 percent of the secured debtors include banks, while the portion among unsecured debtors is merely 18.2 percent, the recovery becomes 76.6 percent.

for the other two countries suggest that behavioral adjustment makes firms choose less formal procedures (or banks to push firms to do so), if possible, with an adverse outcome for Chapter 7 procedures.

The low recovery for Chapter 7 cases is driven by a high number of zero recovery cases, with a median senior creditor left with a zero recovery. Banks recover more than other creditors, but they also face a low recovery. This finding was actually one of the key points that led to the reform of the US regime in 2005, trying to avoid the low recovery of debt in Chapter 7 cases and thereby to increase the recovery rate through an even higher combination of informal default events and Chapter 11 cases with lower LGDs.

There is some caveat with the data used by Bris et al. (2006), as they do only cover two states and are derived from firm-level recovery for all creditors. However, the outcomes for the two states are relatively consistent and they include all bankruptcy events in the pertinent period, so the data appear to be robust for the purpose at hand.

According to the study by Araten et al., (2004), the average LGD for US bank debt is approximately 38.5 percent for the same discount rate⁵², which is about 4 percentage points lower than the LGD based on our framework. If we apply the outcome of Carey and Gordy (2004), who found that for each percent (more) of bank debt (as a portion of total debt of a firm) the recovery of a firm increases by approximately 0.35 percentage points, then the Chapter 11 recovery on an undiscounted basis would be 87 percent and the one for Chapter 7 cases 23.9 percent, yielding a formal LGD of 59.6 percent and a total LGD of 40.9 percent.⁵³ Overall, these two empirical benchmarks confirm the robustness of our results.

With the vanishing of receiverships in the UK, formal (liquidation) LGDs might have increased since 2002, but successful early restructuring could become more common, reflecting altered incentives of creditors being in a weaker position. However, the investigation of the effect of the reform requires more recent data for the UK that is not available.

For Germany, the empirical LGDs are substantially lower than the implied ones, suggesting that there is behavioral adjustment by German banks to arrive at more favorable credit terms

⁵² As the study done by Araten reports only LGDs based on a discount rate of 10 percent (LGD: 36.2 percent) and 15 percent (39.8 percent), respectively, we used linear intrapolation to arrive at the LGD corresponding to a discount rate of 12 percent. As the average LGD for the middle market exposures is about 0.5 percentage points higher (for a discount rate of 15 percent it is 40.3 percent as compared to 39.8 percent), we add this portion.

⁵³ The reason for this substantial effect is quite straightforward: Banks typically have greater control rights than other stakeholders (e.g. bondholders) as a firm approaches default, and thus banks are likely to stop financing the firm at an earlier stage than other stakeholders would do. Hence, banks are likely to force firms into informal default (and/or chapter 11 procedures) while they are not yet or still only “moderately” insolvent, in order to protect their recovery. This particularly applied to the case when banks take the role of junior creditors.

and compensating for disadvantages relative to the UK (and also the US), in line with economic theory. Yet, the final LGDs for Germany in terms of percentage points, remains higher than in the UK (37 percent vs. 34 percent), and its driven by the higher number of liquidation-type bankruptcy cases with higher LGDs than in the UK (in addition to the long work-out process). At the same time, the LGDs are about 5 percentage points lower than in the US unlike 17 percentage points higher as suggested by the implied parameters.

The figures reported by Grunert and Weber (2009) are more favorable than the data for Germany reported by Davydenko and Franks (2008). A key reason for that is that there appear to be differences between German banking pillars (private banks, savings banks, cooperative banks), reflecting aspects of competition among banks (higher in larger cities, lower in rural areas) and the intensity of creditor-debtor relationships (relationship banking being prominent in Germany). Davydenko and Franks (2008) outline that their data received from one German bank contains higher LGDs than the data from the two other ones, which points to this consideration, but makes their outcome quite opaque, particularly as it is not further discussed due to confidentiality.

The firms investigated in the study by Grunert & Weber (2009) are also larger than the ones analyzed by Davydenko and Franks (2008). While the latter study does not find a significant relationship between size and LGDs and empirical evidence is mixed, Grunert and Weber (2009) find a positive relationship between the total assets of a firm and the LGD, indicating that larger firms recover less. This finding makes the data used by Grunert and Weber (2009) more conservative. Given that the study focuses specifically on Germany, we assume that it is an adequate reference for our purposes.

As elaborated in the conceptual part (Section V.A), we sought to eliminate all relevant dimensions that have been identified in order to make a meaningful assessment of the impact of legislation on credit risk, except for one single dimension, namely behavioral adjustment by market participants, which is essentially determined by two factors:

- (i) The frequency of the “choice” of different default procedures (liquidation type formal bankruptcy, going-concern type formal bankruptcy, and informal default for example).
- (ii) The use of credit risk mitigation instruments, defined by the portion of exposure covered by security titles, the type of the security title as well as security realization.

While the first dimension has been incorporated in our analysis, we sought to investigate the use of credit mitigation instruments indirectly through the level of proceeds, as disaggregated data remain too scarce for a meaningful comparison of specific elements.

The available figures suggest that there is no clear evidence for cross-country differences regarding the type of security titles. In terms of the collateral type and its use for debt

recovery, the differences between the UK and Germany are limited, with real estate (47 percent), guarantees (22 percent), accounts receivables (16 percent) and stocks (5 percent) being the most widespread credit risk mitigants in the UK. Likewise, real estate (49 percent), guarantees (27 percent), accounts receivable (7 percent) and stocks (7 percent) are also the most important security titles used by German banks with similar portions. As to the type of credit risk mitigants for the US, Araten et al. (2004) report that real estate assets are the most frequent collateral used by US banks with a portion of 55 percent, which is highly comparable to the portion in Germany and in the UK.⁵⁴

As outlined by Davydenko and Franks (2008), the fraction of secured lending depends on two additional factors besides the actual level of exposure that is secured, namely the valuation of collateral by banks (level of conservatism) on the one hand and the timing/frequency (e.g., whether banks revalue more often and then ask for more collateral before distress) on the other. This aspect remains a caveat at this stage, as we assume that country-specific differences are limited due to a lack of data.

In terms of undiscounted proceeds, German banks recover approximately 10 percent more than UK banks, both in case of liquidation and in case of going-concern procedures. Banks in the US recover about 45 percent less than UK banks (and 55 percent less than German banks) in case of liquidation, and 4 percent less in case of a going-concern. This outcome reveals that German banks seem to demand most collateral, followed by UK banks, while US banks have less collateral to be liquidated, at least in case of Chapter 7 cases.

Other things being equal liquidation proceedings in Germany would have to be shortened by about one half and US banks would have to more than twice as much collateral in case of Chapter 7 proceedings (or one third of all Chapter 7 events would have to become Chapter 11 cases) to be at par with UK banks.

E. Implications for Portfolio Credit Risk

To determine the differences in terms of expected losses (EL) and unexpected losses (UL), we fix the PD (i.e., formal and informal defaults) for Germany to 1.37 percent, in line with empirical long-term evidence.⁵⁵ For the LGD, we use the empirically derived figures displayed in Table 9. As displayed below, portfolio credit risk originating from legislation is the highest in the US, both for the EL and for the Basel II minimum capital requirements (the UL), followed by Germany, where capital requirements are about 15 percent lower and for the UK, where capital requirements are 25 percent lower than in the US.

⁵⁴ The study by Franks et al. (2004) does not provide information on guaranties and other types of credit risk mitigants.

⁵⁵ This PD corresponds to the default rate calculated based on CreditReform bankruptcy statistics from 2000-2007, adjusted for informal default events. See CreditReform (2008). The corresponding PD for the UK is 1.32 percent and for the US 1.5 percent.

Table 10. Portfolio Credit Risk Per Country Based on Theoretical Credit Parameters

Country	Expected Loss (Percent of Exposure)	Basel II capital requirements (Percent of Exposure)
DE	0.51	6.79
UK	0.44	5.96
US	0.64	7.97

Source: Authors.

From a theoretical point of view based on arbitrage, such differences in credit risk can only be justified if they are additional factors that have not been considered yet, most importantly credit prices. If one looks at credit spreads, German banks ask lower ones than US banks do, which is consistent with theory suggesting that US banks price the additional risk resulting from the debtor-friendly legislation.⁵⁶

There appears to be an inconsistency between the UK and Germany, though, with UK banks charging similar or even slightly higher interest rates for comparable firms than German banks do (Davydenko and Franks, 2008). A potential factor for that is the lower level of competition in the UK, which is in line with the literature on the relationship between competition and interest rates carried out by Berger and Hannan (1989) and Hannan (1981) for the US, suggesting higher interest rates in less competitive markets. Overall, the outcome suggests that economic theory ultimately predicts differences in credit risk resulting from corporate legislation, but additional evidence is warranted to facilitate the robustness of this outcome.

VI. CONCLUSION

This study investigated the impact of bankruptcy and secured transactions legislation on potential credit losses encountered by banks. We reviewed the main economic drivers of credit risk (PDs and LGDs), and on this basis investigated how they can be influenced by legislation. Accordingly, we studied and compared three legislations, namely that of Germany, the UK and the US—the latter two from the English law family (common law) and Germany based on civil law.

The motivation for this study was that legal frameworks are increasingly subject to scrutiny, not only in terms of their jurisdictional efficiency, but also as to their contribution of economic growth and innovation. In addition, cross-border investments require investors to better understand the link between legislation and credit risk. Those wishing to study

⁵⁶ Credit spreads for non-financial corporate debt have been found to be higher in the US than in the Eurozone (IMF 2008) and the credit spreads for Germany are only slightly higher than for the Eurozone (ECB 2006). The low credit spreads in Germany have been explained by the specific German banking system with its three-tier-structure and due to the very high number of banks in Germany as compared to other countries. See IMF (2004), for example.

financial stability could gain by taking into account legal factors that affect PDs and LGDs. The study focused on credit risk faced by banks that is driven by legislation, i.e., was limited to a specific subset of the discussion (bank restructuring laws were not discussed, for example).

This analysis sought to make use of an increasing number of empirical sources available to determine credit risk for firms ending up in three different procedures—informal default, going-concern and liquidation. While the number of assumptions to be made was high, various cross-checks have been used to make the outcome preferably robust.

It has been found that informal out-of-court restructurings are an integral part of bankruptcy procedures in the US, used by the majority of firms to avoid formal bankruptcy. This reflects the absence of a stigma of failure on the one hand, but also the more debtor-friendly nature of bankruptcy proceedings compared to European law on the other, which makes banks push for informal procedures.

The advantage of early restructurings through informal procedures is that the number of formal procedures is lower than in Europe and helps to prevent bankruptcy in at least some cases. However, this advantage comes along with very high losses if both informal proceedings and Chapter 11 procedures are not successful. Hence, the deterrent is strong but correspondingly costly once firms (are obliged to) use formal bankruptcy proceedings. Potential reactions by US banks to increase their recovery could be (a) some kind of margin calls once firms' solvency begins to deteriorate, striking a balance between securing recovery and allowing firms to survive; or (b) demanding more collateral upfront. With less ample market funding available since the onset of the crisis, banks could currently be in a better position to be successful with such a strategy, but their potential success comes at costs for the real sector.

Overall, potential credit losses faced by banks are the highest in the US, which was tackled by a reform of legislation in 2005, making US law less debtor-friendly. At the same time, European bankruptcy systems are gradually becoming less creditor-friendly (UK law already became so and for Germany there is a draft act with this aim), whereby the legal frameworks converge—in Europe with the aim to spur innovation and growth, an aspect not covered separately by this study.

If one extends the view on credit prices and competition, then there is some indication that higher credit risk faced by US comes along with higher prices than in Germany. For the UK, lower competition in the banking sector than in Germany seems to allow banks to charge higher rates despite slightly lower credit risk. While the latter observations indicate

that the findings of this study are ultimately in line with theory additional data is required to further assess this complex issue.⁵⁷

Another key observation (also for other countries which exhibit substantially longer workout periods than in the UK and US) is that the overall recovery shrinks substantially while the duration of the work-out process goes up.⁵⁸ For German banks to recover the same as UK banks do, formal proceedings would have to be shortened by about one half, which is likely to be seen as a threat to the tradition of German law particularly keen at “equality”. While there are valid reasons to prefer “equality” against efficiency, the cake of assets to be distributed may become unnecessarily small if procedures last several years—a finding that seems to be of relevance for future legislation in Germany.⁵⁹ The alternative is that informal proceedings become more frequent, e.g., like in the US, which means that the stigma of default would have to vanish—a confirmation of recent policy measures initiated through the Small Business Act for Europe and also reflected in the German Draft Law on Restructuring Insolvent Companies. The hope is that Europe credit markets become more dynamic—with a potential of substantial added-value for the economy through innovation.

⁵⁷ For example, higher credit prices will ultimately lead to higher losses, so there are some endogeneity issues.

⁵⁸ Charles Dickens’ Bleak House could be a worthwhile read in that context (Dickens, 1853).

⁵⁹ The fact that German bankruptcy law is least favorable (both in terms of duration and most formal) in terms of formal restructurings has caused a few German firms to move their headquarters to the UK, which was a key trigger to initialize reforms (the German Draft Law on Restructuring Insolvent Companies as of 23 February 2011).

Appendix 1. Taxonomy of Corporate Bankruptcy Codes (Smith and Strömberg, 2005)

Field	<i>Characteristic</i>
Basic characteristics of the laws	<ul style="list-style-type: none"> • National denomination of “liquidation” code • National denomination of “reorganization” code • Year of last change
Verification and Coordination mechanisms	<ul style="list-style-type: none"> • Automatic stay of assets in reorganization? • Automatic stay of assets in liquidation? • Voting rules for approval of reorganization plan • Flexibility in defining voting classes in reorganization • Limits on debt write-downs in reorganization • Cram-down in reorganizations • Creditor committees
Protection of third party claimants	<ul style="list-style-type: none"> • Wage guaranty? • Procedure should aim towards preserving employment? • Priority of wages?
Maintaining asset value	<ul style="list-style-type: none"> • Possession of assets in liquidation • Possession of assets in reorganization • Seniority of new financing in reorganization? • Time limits to reorganization? • Time limits to liquidation?
Liquidity and disposal of assets	<ul style="list-style-type: none"> • Exchange of debt for other securities possible in reorganization? • Sales mechanism in liquidation? • Auctioneer/trustee incentive compatible? • Limits on whom assets can be sold/transferred to?
First-mover advantages	<ul style="list-style-type: none"> • Debtor has advantage in filing? • Who submits reorganization plan?

Appendix 2. Overview of Credit Risk Mitigants From a Legal Perspective

Personal and Real Security

The first difference between personal and real security interests is toward whom they can be enforced. Personal securities are part of contract law, which is governed by the legal rule “*pacta tertiis nec nocent nec prosunt*”, i.e., contracts do not affect anyone who has not consented. Real securities, on the other hand, are absolute, i.e., valid toward everyone. In order to understand the distinction, it is helpful to imagine a legal title to be a tie, which the creditor holds in their hand. In case of a personal security, the other end of the tie is attached to a person (“guarantor” or “surety”), in case of a real security to an object (the “collateral”⁶⁰). The distinction is expressed by different legal terms: In contract law, i.e., when the legal tie is attached to persons on both ends, the parties are referred to as “parties”, “creditor” and “debtor”, and the legal tie is called “claim”, “obligation” or “debt”. Legal relations between a person and an item, on the contrary, are called “interests”, the person entitled is called “beneficiary”. Creditors can therefore only enforce their claim towards the debtor, whereas beneficiaries can enforce their interest against anyone who affects it.

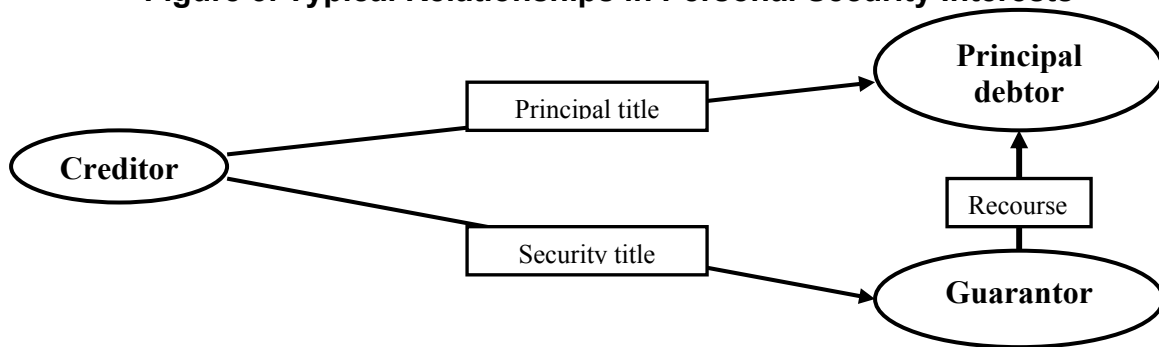
This leads to the second difference, which is the more important one in terms of credit risk management: The assets which the creditor or beneficiary can seize in order to recover the outstanding debt. A personal security (guarantor) is personally liable to the creditor who can sue the guarantor and—according to the respective legislation—seize his actual assets. The beneficiary of a real security interest (collateral), on the contrary, cannot sue a certain person and seize any part of his assets, but is limited to the specific collateral concerned. However, alienation does not disburden the collateral, since the legal tie (in the picture chosen above) attaches to the collateral, not a person.

Personal security (or guaranty)

The value of a personal security (guaranty) depends on the assets of the obliged (third) person, the guarantor. Personal security titles are created by agreement between creditor and guarantor. (Figure 3) This security agreement determines the content of the security interest, in particular the commitment of the guarantor to satisfy the creditor in case of default of the principal debtor and the preconditions for this liability. Usually, the guarantor can claim recourse from the principal debtor for the satisfaction of their obligation.

⁶⁰ This term will be used herein, although it is a specific term of the US UCC and rarely used in English law.

Figure 3. Typical Relationships in Personal Security Interests



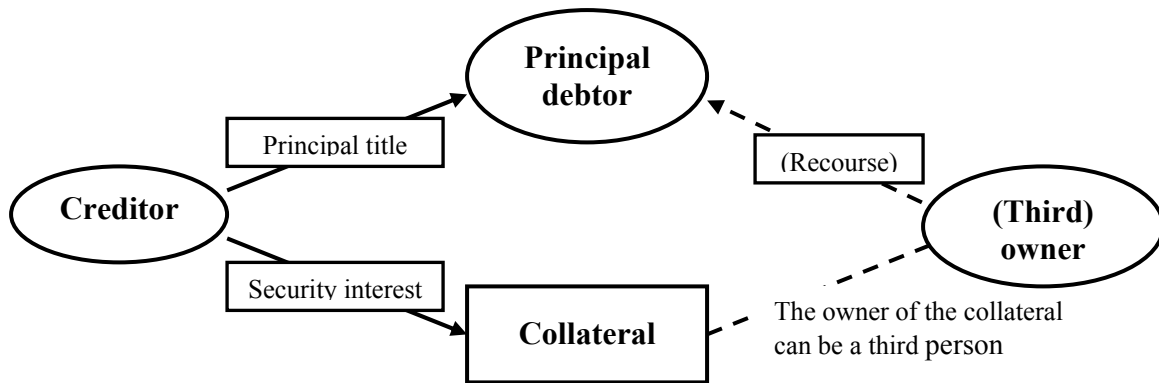
Personal security interests (guaranties) are determined by their degree of accessoriness, i.e., on the degree to which they depend on the principal title in validity and extend. In case of full accessoriness, the security interest is only valid as long as and up to the amount of the principal title, and enforcement of the security interest requires at least prior demand for satisfaction or lawsuit against the principal debtor. A non-accessory personal security title exists independently and is enforceable irrespectively of the principal debt, which leaves no basic difference between principal debtor and guarantor. In between these boundaries and legal limits, the possibilities for the detailed shape of a security interest are as manifold as human imagination, depending on the needs and the powers of the parties involved.

Real security (or collateral)

A real security interest is regularly created by (written) agreement between the creditor and the owner of the collateral (Figure 4). Generally, it does not matter whether the collateral is property of the debtor or a third person. If the collateral is not owned by the debtor, the third owner can usually claim recourse from the principal debtor for the satisfaction of the debt. The collateral may be moveable (e.g., a vehicle) or immoveable (e.g., land), tangible (e.g., a vehicle or land) or intangible (e.g., a contractual claim such as a receivable).

The secured creditor is usually (but not always) granted the right to exploit the specified collateral, the preconditions and modalities for the exercise of this right being determined in the security agreement. Again, the preconditions for the use of the collateral can vary widely depending on the security agreement, and so can the means of foreclosure in the event of default. Normally, the object is sold, the revenues are used to satisfy the principal debt, the surplus being returned to the owner of the collateral. It is also possible that the collateral is transferred to the secured creditor in case of default, at the same time settling the principal debt. Or else the creditor may be granted the profits realized by the use of the collateral (e.g., the rent for land) up to the amount of the principal debt. If the collateral is a claim, the creditor may as well be allowed to sue the third party debtor directly.

Figure 4. Typical Relationships in Real Securities



Collateral can be charged with more than one security interest. In this case the proceeds of the exploitation have to be distributed among the beneficiaries. Legal systems tend to prefer a sequential rather than a pro rata distribution: The creditors' rights are sorted and satisfied according to this (pecking) order. The common criterion to determine the rank (seniority) is temporal priority ("prior tempore potior iure"). Rank positions can be assessed easily if they are recorded in a public register, which is usual for immovable collateral.

Appendix 3. Illustrative Example of Bankruptcy Proceedings with Credit Risk Mitigants

In order to illustrate the relations between bankruptcy proceedings and security interests in a bankruptcy proceeding resulting in liquidation, we consider the example of a debtor whose assets and outstanding debt both amount to one million currency units.

We split up the outstanding debt into 10 credits of 100,000 currency units each, 2 thereof being unsecured, 2 being secured by guaranties and 6 secured by collateral. Two of the creditors shall have security interests in the same collateral, and another creditor (beneficiary) shall have included a foreclosure clause in the security agreement. We assume that four pieces of collateral, including the double-charged one, are owned by the debtor, one by someone else. In addition, one of the debtor's belongings shall be burdened by a security interest (amount: 100,000) of a beneficiary who is not a creditor. Two of the debtor's collaterals (including the double-charged one) shall have a market value of 150,000, the others of 100,000 currency units. This leads to Table 11.

Table 11. Overview Before the Bankruptcy Proceedings

	Credit	Security Title	Value (collateral)	Owner (of collateral title)
Creditor 1	100,000	None		
Creditor 2	100,000	None		
Creditor 3	100,000	Guaranty		
Creditor 4	100,000	Guaranty		
Creditor 5	100,000	Collateral 1	150,000	Debtor
Creditor 6	100,000	Collateral 2, 1 st rank	150,000	Debtor
Creditor 7	100,000	Collateral 2, 2 nd rank		
Creditor 8	100,000	Collateral 3	100,000	Debtor
Creditor 9	100,000	Collateral 4, foreclosure clause	100,000	Debtor
Creditor 10	100,000	Collateral 5	(irrelevant)	Third owner
Beneficiary	0	Collateral 6	100,000	Debtor
Total	1,000,000		600,000 + Collateral 5	

Now, we simulate the effect of bankruptcy, i.e., of formal bankruptcy proceedings ending in liquidation, using common basic legal rules. The caveat is that actual bankruptcy proceedings may substantially deviate from this simulation due to differences in national bankruptcy legislation (cf. Appendix 4).

At the beginning of the bankruptcy proceedings, the assets of the debtor are sorted and cleared. This includes the most important step concerning security titles: Beneficiaries of security interests in collateral owned by the bankrupt debtor can enforce their titles prior to distribution. Assuming in our example that the collateral can be sold at market value and that the costs of each sale amount to 10,000 currency units, we arrive at the following: The

revenue of the sale of Collateral 1 (140,000) is used by 100,000 to satisfy creditor 5 and the surplus of 40,000 falls to the debtor's assets, Collateral 2 (140,000) is first used to satisfy creditor 6 (1st rank interest) fully, i.e. by 100,000, and second to satisfy creditor 7 (2nd rank interest) by 40,000 units, Collateral 3 (90,000) is disbursed to creditor 8, Collateral 6 (90,000) is disbursed to the beneficiary and Collateral 4 (foreclosure clause) is alienated to creditor 9.

The remaining assets of the firm after this procedure have a total market value of 440,000 units. These assets (or their revenue) are now distributed among the creditors not yet satisfied. Again, the procedural costs (including e.g. the wages of an administrator, court fees, taxes or the cost of sales) are acquitted first. Assuming that these costs amount to 100,000 units,⁶¹ 340,000 units remain to satisfy a total of 570,000 remaining credit. Neglecting that some of these claims—such as the employees' wages—can be treated preferentially out of political reasons, and assuming a pro rata distribution, we arrive at the following outcome.

As far as the creditors have not yet been satisfied, they can still enforce their remaining securities.⁶² Creditors 3 and 4 can seek recovery from their guarantors, thereby again bearing the risk of default. Creditor 10 can enforce their security interest against the third owner and seek foreclosure of the collateral or affect its sale, depending on the terms of the security agreement. Creditor 8 has received ownership over the forfeited collateral instead of the credit.

Based on this stylized simulation, it has been shown that the recovery rate of each claim depends on the recovery rate specific to certain types of security titles as well as the pertinent coverage of the exposure (column 3) and the (overall unsecured) recovery rate in bankruptcy proceedings (column 4).

⁶¹ This is oriented on empirical evidence, see Section V.A.

⁶² In most cases, the security agreement allows them to do so already at an earlier stage, usually at the time of default.

Table 12. Overview After Bankruptcy Proceedings

	Credit	Privileged Recovery (Collateral)	Recovery from Bankruptcy Proceeding	Total Recovery Rate (Percent)
Creditor 1	100,000	0	59,600	59.6
Creditor 2	100,000	0	59,600	59.6
Creditor 3	100,000	0	59,600	59.6
Creditor 4	100,000	0	59,600	59.6
Creditor 5	100,000	100,000	0	100
Creditor 6	100,000	100,000	0	100
Creditor 7	100,000	40,000	35,800	75.8
Creditor 8	100,000	90,000	6,000	96.0
Creditor 9	100,000	Forfeited collateral	0	(Forfeited collateral)
Creditor 10	100,000	0	59,600	59.6
Average	100,000	82,500 (Creditors 5–8)	48,500 (Creditors 1–4, 7, 8, 10)	74.4 (Creditors 1–8, 10)

Appendix 4. Country-Specific Evaluation of Legal System

Bankruptcy Proceedings and Control Rights [Hyp. 1]

Hypothesis 1 concerns the duration, costs and the degree of the formality of bankruptcy proceedings.

Under the German Bankruptcy Code (“Insolvenzordnung” [InsO], 1999⁶³), bankruptcy proceedings can only be initiated by court decision following a request by the debtor or a creditor. Both liquidation and conserving the business as a going-concern are possible. In both cases, a public administrator is appointed to manage the proceedings. Important decisions require approval by the meeting of all creditors and/or by the court. In pending bankruptcy proceedings, there is an automatic stay.⁶⁴ Overall, the influence of the creditors on the proceedings is low, and the proceeding remains highly formalized, which leads to a long duration of bankruptcy proceedings and induces comparably high administrative costs. This was a main issue that led to a reform of bankruptcy legislation in 1999 besides the aim to facilitate rehabilitation instead of liquidation. Still, bankruptcy proceedings in Germany remain comparably lengthy and costly.⁶⁵

English bankruptcy law, which is governed by the “Insolvency Act” (IA, 1986) and the “Enterprise Act” (EA, 2002), basically knows two different forms of bankruptcy proceedings: liquidation and administration. Liquidation is executed rather informally and as fast as possible. In case of a voluntary liquidation, the debtor nominates the liquidator who has to be confirmed by the creditor(s). A compulsory liquidation has to be approved by court decision, which is made after a winding-up petition by a creditor. An administrator, in contrary, can only be appointed by court and requires the approval of all creditors for action. Within three months of appointment the administrator must propose a reorganization plan to be approved by a majority of all creditors. There is an automatic stay as long as the administration order is outstanding, and the administrator can stay some claims in addition. A third form of bankruptcy proceeding, receivership, was restricted by the EA (2002) to a few

⁶³ The German Draft Law on Restructuring Insolvent Companies is not discussed herein. Its key purpose is to further facilitating the restructuring of businesses. Further information can be found in the Internet (http://www.bmj.de/cln_093/SharedDocs/Pressemitteilungen/DE/2011/20110223_Mentalitaetswechsel_fuer_eine_andere_Insolvenzkultur.html?nn=1468940, in German).

⁶⁴ The status of automatic stay implies an automatic injunction that halts actions by creditors (with certain exceptions) to collect debts from a debtor who has declared bankruptcy.

⁶⁵ Data from the Small Business Act show that for Germany, the “cost to close a business and number of years closing a business” is higher than the EU-27 average. Further evidence in line with this data is presented in Section V.

exempt areas⁶⁶ and replaced by administration from 15 September 2003. As far as it is still admissible, receivership entitles the creditor to appoint a receiver who solely represents the interests of that creditor. The receiver takes full control of the firm and does not require approval by a court nor by other creditors for action. Since receivership has been widely abandoned, English bankruptcy legislation has become less informal and speedy than it used to be. Still, English bankruptcy proceedings overall can be considered less formal and substantially less lengthy than German ones, evidenced by information revealed through the EU Small Business Act.⁶⁷

In the US, the basic bankruptcy legislation laid down in the Bankruptcy Code has lately been reformed by the “Bankruptcy Abuse Prevention & Consumer Protection Act” (2005), promoting earlier decisions on restructuring. US bankruptcy legislation provides for two different types of proceedings: Chapter 7 is aimed at liquidation, whereas Chapter 11 is aimed to preserve business as a going-concern (cf. for the following: Franks et al. 1996: 86 ss). Liquidation under Chapter 7 is similar to liquidation under the English IA. However, Chapter 7 of the US Code does not require collaboration of the creditors and provides for the appointment of a trustee by the court to oversee the liquidation of the company. Chapter 11 allows the debtor to retain control of the firm and provides them with the exclusive right, at least for a limited period, to propose a plan of reorganization. Alternatively, a new management or a temporal trustee can be appointed by a court to monitor the reorganization process. The possibility for the debtor to remain in control can be an incentive, even for solvent companies to voluntarily chose Chapter 11 bankruptcy proceedings (such as Delta and Northwest airlines), e.g. to withdraw from expensive labor contracts. Chapter 11 has strong automatic stay provisions. Altogether, the US bankruptcy legislation provides for informal, short and thereby less costly proceedings compared with the two other countries. In terms of the control rights, creditors have, overall, less influence on the bankruptcy procedure than in the two other countries.

Characterization of the Legislation and Perception of Bankruptcy [Hyp. 2]

Hypothesis 2: It is assumed that banks are ultimately the stronger party compared to debtors, and therefore that in debtor-friendly systems (i.e. adverse conditions for banks) banks urge firms to restructure outside formal bankruptcy procedures (i.e., through out-of-court settlements), while in creditor-friendly systems formal insolvencies are more common.

⁶⁶ EA, Part 10, s248 ss., particularly s250 = amended IA, s72A to s72H. Receivership is still possible for beneficiaries of a floating charge and a) securities taken after 2003, b) a debt of at least £50 million with the issue of a “capital market investment”.

⁶⁷ In 2009, the time (1 year) and the costs (6 percent of the estate) for winding down a business were more favorable in the UK than in the EU on average (more than 2 years and almost 11 percent) and notably more favorable than for Germany (see also footnote 26). Further evidence for that is presented in section 5.

German legislation, in general, tends to be protective, and public perception of bankruptcy is negative, especially concerning the purpose of recapitalization and keeping business as a going-concern. Wanton bankruptcy to the detriment of the creditors is sanctioned criminally (s283 of the German Criminal Code [“Strafgesetzbuch”]). Hence, bankruptcy legislation tends to be creditor-friendly (favoring employees, in particular) while debtors tend to avoid the stigma of bankruptcy until there is no other option any more.

In general terms, English legislation is comparatively liberal. However, the attitude toward a bankrupt debtor is also basically negative. In extreme circumstances, bankrupt debtors are criminally liable, and directors can be held personally liable for wrongful trading, for example. Independent of the type of bankruptcy, employees’ wages enjoy priority (IA s19 s. [6–10]). Traditionally, the English bankruptcy legislation was described as highly creditor-friendly. This evaluation was particularly based on the proceeding of (administrative) receivership and must be reassessed since this proceeding has been prohibited by the EA (2002). Voluntary agreements between debtors and creditors are a traditional and commonly used possibility to restructure a company without legal bankruptcy proceedings.

In the US, bankruptcy is considered a misfortune rather than misbehavior. There are few reservations against recapitalization and restructuring through bankruptcy, and this possibility is conceded to companies by a legislation which is to be regarded very debtor-friendly, despite some changes toward a more creditor-friendly bankruptcy regime in 2005. Yet, a lot of reorganizations in the US take place outside formal bankruptcy proceedings. The workout of reorganization in these cases does not necessarily comprise all assets and is not supervised by a court.

Default Definition and Initiation of Proceedings [Hyp. 3]

Hypothesis 3: The preconditions for the initiation of bankruptcy proceedings in national legislation, i.e. the bankruptcy definition (in a narrower sense) and default definition (in a broader sense), affect credit risk.

According to the German Bankruptcy Code, formal bankruptcy proceedings can only be initiated by court order on application by the debtor or by a creditor. The court only initiates the proceedings in case of economic bankruptcy, which is indicated when the debtor cannot pay the claims by the time they are due. The insolvent can apply for bankruptcy proceedings slightly earlier, in case of imminent bankruptcy. Companies are further defined to be insolvent when the value of their assets is lower than their liabilities (ss 17 to 19 InsO).

In contrast, none of the English proceedings requires economic bankruptcy as a necessary condition. The initiation of a liquidation proceeding can be voluntary or compulsory.

Voluntary liquidation does not depend on economic bankruptcy of the debtor.⁶⁸ For the initiation of a compulsory liquidation, economic bankruptcy, as defined in ss123, 124 of the IA, is only one possibility among others (IA, Part IV, ss122 to 124).⁶⁹ Administration requires that the debtor is unable, or will be unable, to pay the debt, and the whole or part of the company may survive as a going-concern or there may be a more advantageous realization of the company's assets as compared with liquidation (IA, Part II, s8; see: Franks et al., 1996). The appointment of a receiver, as far as it is still possible, can be done by the beneficiary of a floating charge when there is a default under the terms of the security agreement or a bankruptcy event occurs (Franks et al., 1996).

The rules for the initiation of bankruptcy proceedings in the US are set out uniformly in Chapter 3 of the Bankruptcy Code which distinguishes voluntary and involuntary initiation. Voluntary initiation does not require anything else but the filing of petition by the debtor (Chapter 6, s301). The court does not audit the soundness of the filing. Involuntary initiation by creditors does not depend on the economic bankruptcy of the debtor, but is only possible against certain persons, particularly business or commercial corporations (Chapter 6, s303, Franks et al. 1996: 93). The notion of economic bankruptcy⁷⁰ therefore plays a far less important role in US bankruptcy law than in the two other legislations and, by and large, it is no prerequisite for formal bankruptcy proceedings.

Security Interests in Different Legislations [Hyp. 4]

We will now examine hypothesis 4, according to which there are no fundamental differences in national legislations concerning credit risk mitigation instruments, i.e., the legal patterns for standard security interests are similar.

Personal Security Interests

As outlined above, all personal security interests empower creditors to demand payments from the guarantors. The decisive criterion to distinguish personal security interests is the level of accessoriness, i.e., the degree to which they depend on the principal title.

The basic type of personal security interest in all three legal systems is accessory. It is called "guaranty" in English and US law (Andrews/Millett 2005: 2, 3ss., Clarkson et al. 1992: 627), and "Bürgschaft" in the German Civil Code (Bürgerliches Gesetzbuch [BGB], ss765 ss.).

⁶⁸ Rather, the IA allows the company to "make a statutory declaration to the effect that they have made a full inquiry into the company's affairs and that having done so, they have formed the opinion that the company will be able to pay its debts in full, together with interest at the official rate" (IA, Part IV, ss89, 90).

⁶⁹ Other possibilities are e.g. a special resolution by the company or that "the court is of the opinion that it is just and equitable that the company should be wound up".

⁷⁰ As defined in the US Bankruptcy Code, Chapter 1, s101 (32).

The German notion of “Garantie” does not denote a specific legal instrument, but various legal figures which to some extent comprise elements of security. The non-accessory type of personal security in English law is called “indemnity” (Andrews/Millett 2005: 10ss.). In US law, in contrary, an indemnitor is only liable for loss or damage, not for perfection. The non-accessory personal security in US law is called “suretyship” (Elder 1972: 6, Clarkson et al. 1992: 627). The German Civil Code (BGB) does not design a definite non-accessory personal security. Instead, “Schuldbeitritt”, i.e. co-signing of the third party to answer for the claim as a (second) primary debtor, induces the same legal consequences. All legal systems allow for variations of these standard forms by security agreement. An overview on the corresponding security types is given in Table 13.

Table 13. Comparison of Personal Securities

	DE	UK	US
Accessory	“Bürgschaft”	Guaranty	Guaranty
Non-Accessory	“Schuldbeitritt”	Indemnity	Suretyship
Variation possible	Yes	Yes	Yes

Real Securities

A comparison of real security interests is more complex, since these titles can be distinguished by more criteria than personal securities. Concentrating on our subject-matter, the valuation of security interests, we will restrict to the following major issues:

- (i) Whether the security interest can attach to intangibles (titles, particularly stocks and shares), mobile (e.g. vehicles) or immobile items (land).
- (ii) Whether the interest only attaches to and remains on a certain item specified in the security agreement (fixed title) or covers floating assets, such as raw materials in store or stocks at hand (floating title).
- (iii) Whether the security interest requires publicity, i.e. public filing or possession of the collateral (possessory security). If neither filing nor possession is required, it becomes difficult for creditors to check whether the item is already charged with another, senior security interest.
- (iv) Whether realization of the security interest is only possible by exploitation of the collateral, or whether foreclosure is possible.

The *German Civil Code* (BGB) knows (a) “Pfandrechte” as standard type of real security interests on immobile and mobile items as well as intangibles (ss1113, 1273, 1204 BGB). Besides, legal practice in Germany has developed the assignment of titles and the transfer of property (“Sicherungsabtretung” and “Sicherungsübereignung”, ss398, 929, 158 BGB) as additional instruments of real security. (b) The distinction between fixed and floating security

interests does not exist in German law. The collateral only has to be specifically described in the security agreement. However, descriptions like “all the stock in a specific warehouse” or the like are sufficient and create a security interest similar to a floating charge (Oechsler 2004: mn. 5 ss.). German security interests on land (“Grundpfandrechte”) automatically cover the equipment belonging to the land (s1120 BGB). (c) Publicity is a central issue of the German Civil Code: Real security interests in land have to be listed in a public register (s1115 BGB), and security interests in moveable collaterals can only be possessory (s1205 BGB). However, the need for non-possessory security interests lead to the use of the transfer of property and the assignment of titles as real security instruments in lending practice. (d) Foreclosure is disallowed for in German law. The standard form of exploitation is the sale of the collateral and distribution of the proceeds (ss1147, 1228 BGB).

English law with its division between common law and equity is highly complex as to secured transactions and knows (a) various types of real security interests. Perhaps the most common one is mortgage, which can be on land, goods or titles. Similar legal positions can be granted to the beneficiary by charges and debentures (Ali 2002: 103ss., McCormack 2004: 40ss., Perry 1981: 359ss.). Pledges and liens are distinct security interests which can only be on movables (Cranston 1997: 437, Ali 2002: 91ss.). Titles can be used as collaterals by assignment (Holden 1986: mn 22 –11, Ellinger and Lomnicka 1994: 662). The term “hypothecation” is frequently used in banking documents, but does not denote a distinct form of security (Ali 2002: 89). (b) Real security titles in English law, particularly mortgages and charges, can be either floating or fixed. A fixed security title covers only the fixed assets of the debtor, such as their land, whereas the floating title includes the floating assets, such as raw materials in store, or stocks at hand. This distinction can play a role concerning priority rights (Ali 2002: 109ss.; McCormack 2004: 40s.). (c) English common law requires public filing for mortgages on land or under some circumstances on movables. However, banking practice has developed equitable mortgages under seal (Perry 1981: 352s.). Mortgages and charges are non-possessory, while pledges and liens are only effective if the creditor is in possession of the collateral (Ali 2002: 86). (d) English law as well designs the exploitation by sale of the collateral and distribution of the proceeds as the standard form of satisfaction. However, foreclosure is allowed for under certain circumstances (Ali 2002: 104ss.). Some minor security interests – particularly the lien (Ali 2002: 91ss.) – only authorize the detention of the collateral by the beneficiary.

Perhaps the most straightforward pattern of real security interests was introduced consistently for the whole US by the Uniform Commercial Code (UCC, 1962; see Art. 9). (a) The UCC unified the law of real securities other than land and adopts a universal, generic concept of security interest in movables and intangibles (McCormack 2004: 71). The UCC also introduced the notion of “collateral” describing the security object. Land law in the US, including real security interests, though, remains State law and varies fundamentally. In general, this State law is derived from the British common law and traditionally knows the same real security instruments, i.e. mortgages and charges on land (Clarkson et al. 1992:

626). (b) The US UCC does not draw a distinction between fixed and floating security interests. It only requires that the collateral is specifically described in the security agreement, and security interests similar to a floating charge can be created by specifications like “all the stock in a specific warehouse” or the like (§ 9–204 UCC; McCormack 2004: 73). However, a description like “all the debtor’s assets” or “all the debtor’s personal property” is not regarded as sufficient (s9–108 UCC). (c) There is a general principle in the UCC that public notice of the security interest must be given (s9–308, McCormack 2004: 71, 73, 76). US State law is not uniform. (d) US law allows for foreclosure under certain circumstances (s9–620ss. UCC). However, the common form of exploitation of the collateral is its sale and distribution of the proceeds (ss9–609, 9–610 UCC). Just like in English law, some security interests only allow for detention of the collateral. State law concerning security interests in land is non-uniform.

Table 14 provides an overview of the different real security interests, leaving aside their denomination. This collocation shows that the differences between the national legislations are relatively limited.

Table 14. Summary of Differences in Real Securities

Security Interest	Publicity	Collateral	DE	UK	US
Mobiles	Possessory	Fixed	x	x	x
		Floating	x		
	Public filing	Fixed		x	x
		Floating		x	x
	Non-possessory	Fixed	x	x	x
		Floating	x	x	x
Immobiles	Possessory	Fixed			
		Floating			
	Public filing	Fixed	x	x	x
		Floating	x	x	x
	Non-possessory	Fixed	x	x	x
		Floating	x	x	x
Intangibles (titles)	Possessory	Fixed			
		Floating			
	Public filing	Fixed		x	x
		Floating		x	x
	Non-possessory	Fixed	x	x	x
		Floating	x	x	x
Foreclosure				x	x

Legend: ‘x’ denotes that the instrument exists in a legislation.

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