



Impact of Legislation on Credit Risk

How different are the UK and Germany?

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Luxembourg, November 2010

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Abstract

The analysis of credit risk and its impacting factors are important topics for the European Investment Fund (EIF, the Fund) as the Fund provides guarantees to financial institutions for portfolios of loans and leases to micro- and small and medium sized-enterprises (SMEs). In this context, the study also contributes to the current debate on the ongoing reform of legislation in Europe as part of the Lisbon strategy.

This study investigates the link between legislation and credit risk of corporate bank debt based on a cross-country study for the United Kingdom (U.K.) and Germany.¹ To this end, implied credit risk parameters (Probabilities of Default (PDs) and Loss Given Default (LGD)) reflecting the expected differences resulting from variations in legal systems are determined. These parameters are compared with empirical evidence to calculate the “net” impact of legislation, extending existing studies which found that there is an impact.

We find that differences in legislation do not result in material differences in default rates, while U.K. banks would recover approximately 14 percentage points of the exposure more than German banks. The difference in LGDs resulting from legislation is mainly driven by shorter proceedings in the U.K., and, to a lesser degree, by a higher portion of out-of-court default events and slightly lower legal costs. However, German banks adjust their behaviour by demanding more credit risk mitigants than U.K. banks do and thereby finally recover only 4 percentage points less.

JEL Classification Numbers: K22, G11, G18, G33

Keywords: Credit Legislation, Credit Risk, Recovery Rates

¹ The study is an element of a research project by Schmieider, C./Schmieider, P., which also includes the United States.

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Executive Summary

Previous studies have shown that differences in insolvency law matter for – (i) banks which may suffer higher losses eventually leading to financial instability if losses accumulate; and (ii) economic growth, as better legislation can help keeping businesses alive. With the globalization of economic activity, differences in insolvency legislation, which are often deeply rooted in legal and economic cultures and traditions, have become subject to enforced scrutiny.²

In Europe, it was discussed whether the stigma of insolvency, 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 sought to reduce the stigmatization of business failures to promote entrepreneurship.³ 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 evolving from differences in national insolvency and security legislations on the credit riskiness of corporate loans. The focus is on banks (which are usually senior creditors), seeking to minimize credit losses. As such, we leave other important complementary aspects aside, particularly whether and how legislation affects credit supply and economic growth. Likewise, we do not discuss the role of other creditors.

We contribute to the literature by systematically investigating differences in the credit riskiness of loans resulting from legislation. We study two countries representing two key law families, namely Germany (civil law) and the U.K. (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' behaviour (notably behavioural adjustment) and the credit environment (e.g. credit prices and credit supply) impacting credit risk. We investigate how formal (e.g. liquidation) and informal default/insolvency (such as out-of-court restructuring) procedures affect credit risk parameters depending on the country.

² This paper benefited from comments by Daniel Hardy. All errors are of the authors.

³ In 2007, the European Commission communicated the following statement: "Good national framework conditions for entrepreneurship are crucial to the full exploitation of the EU's 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 Commission 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 Commission will continue to support the Member States' efforts by raising the visibility of national good practices. To speed up the pace of reforms, the Commission 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.

For the default rates, we find that there are more informal default events in the U.K. as compared to Germany, but that overall the corporate default rate is relatively similar in both countries in the long run, i.e., if one accounts for macroeconomic circumstances.

We also find that differences in legislation result in noteworthy differences in LGDs: U.K. banks recover approximately 14 percentage points more than German banks. This “net” impact of legislation on the difference in LGDs is mainly driven by shorter proceedings in the U.K., and, to a lesser degree, by a higher portion of voluntary default events (henceforth: informal default or out-of-court settlement; resulting in higher recoveries) and slightly lower legal costs.

However, German banks adjust their behaviour by demanding more credit risk mitigants than U.K. banks do but finally still recover 4 percentage points less. Without behavioural adjustment, liquidation proceedings in Germany would have to be shortened by more than half to be at par with U.K. banks. As a caveat, one has to take into account that the vanishing of receivership procedures in the U.K. is likely to reduce the recovery for banks in the U.K. (not yet fully visible in the available data), in favour of a more business-friendly climate for entrepreneurs.

1 Introduction

The EIF provides guarantees for portfolios of SME or microcredit loans or leases to financial institutions. The guarantee operations can be broadly split into “mandate” and “own risk” activities. EIF’s mandate activity is backed by the European Commission through EIF’s management of the SME Guarantee Facility (SMEGF) as part of the Competitiveness & Innovation Framework (CIP), and by National and Regional Managing Authorities (JEREMIE initiative, Joint European resources for micro- to medium sized enterprises).

Under SMEGF, EIF provides guarantees and counter-guarantees for part of the expected losses for portfolios of SME or microcredit loans or leases to financial institutions. The objectives of the programme are to provide guarantees for the ultimate benefit of SMEs which would otherwise have limited access to finance, as well as to boost productivity, competitiveness and innovation capacity in the EU. For own risk transactions, EIF employs its own capital to credit enhance securitised SME loans or leases portfolios for capital market transactions.

The JEREMIE initiative, developed in cooperation with the European Commission (EC), offers EU Member States, through their national or regional Managing Authorities, the opportunity to use part of their European Union (EU) Structural Funds to finance small and medium-sized enterprises (SMEs) by means of equity, loans or guarantees, through a revolving Holding Fund acting as an umbrella fund.

Alternatively, EIF provides own risk credit insurance for similar portfolios to financial institutions on a bilateral basis. Through its credit enhancement activity, EIF achieves substantial added value by facilitating SME credit risk transfer from financial institutions to the capital markets. Consequently, EIF facilitates capital relief of financial institutions, therefore increasing their lending capacity to SMEs.

Against this background, the analysis of credit risk and its impacting factors is of great importance for the EIF. The study on the impact of legislation in credit risk is an element of a research project by Schmieder, C./Schmieder, P., which also includes the United States.

Despite the relevance of the issue, the literature has so far focused on a discussion whether legislation matters for the level of credit risk rather than aimed at quantifying its actual impact. As jurisdictions provide market participants with flexibility in terms of business behaviour, 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 behaviour (namely in terms of credit prices and demand for collateral) to the applicable legislation to maximize efficiency and minimize costs (Coase Theorem⁴). 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).

⁴ Ronald Coase described the economic efficiency of an economic allocation or outcome in the presence of externalities – under certain conditions bargaining leads to an efficient outcome regardless of the initial allocation of property rights (Coase, 1960).

Empirical studies have shown that there are indeed (behavioural) adjustments by market participants, for example in the assessment of creditworthiness (Djankov et al., 2007), the consideration of control rights in insolvency, 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).⁵

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

In this study we take the perspective of banks and leave other important complementary aspects aside, particularly whether and how legislation affects credit supply and economic growth. Such broader aspects are, for example, topics of the current VIVRE2 research project⁶, that aims – with a focus on SMEs – at providing a detailed comparison of the European insolvency codes (a related study compares the insolvency proceedings of France, Germany, and the UK (OSEO, 2008)).⁷

The rest of this study is organized as follows. In section 2 and 3, we seek to identify relevant dimensions which can account for differences in credit risk from a legal perspective and an economic perspective, respectively. Subsequently, in section 4, the previous findings are used to analyze and interpret legal differences between Germany and the U.K. In section 5, we compare our model-based result with empirical evidence. Section 6 summarises the conclusions.

2 Legal perspective to credit risk and hypotheses

2.1 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 U.K. ‘bankruptcy’ traditionally refers to individuals, ‘insolvency’ to firms (see Fletcher, 1990: 4, 9), whereas it is vice versa in the U.S. Under the German Insolvency Code (‘Insolvenzordnung’, 1999), the notion of ‘Insolvenz’, i.e. insolvency, covers both cases.⁸ ‘Bankruptcy’ (‘Bankrott’) is no legal term in Germany, but commonly used in everyday language. We will generally stick to *insolvency*

⁵ 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).

⁶ The project is a cooperation of Fonds National de Recherche (Luxembourg), University of Luxembourg/School of Finance, and University of Strasbourg/IEP Strasbourg.

⁷ In that context, it is worth mentioning that Régis Blazy has carried out research on this subject matter, focussed on the French legal system. See <http://ideas.repec.org/e/pbl101.html>.

⁸ It replaces the term ‘Konkurs’ of the old code (‘Konkursordnung’) prior to 1999.

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 insolvency) in economic terms. Legally, 'default' means non-performance in due time, regardless of the reason. The contents and function of the economic definition of default – namely to mark the threshold of insolvency – is corresponded by the legal prerequisites for the initiation of insolvency proceedings, albeit this does not necessarily require economic insolvency (see Hypothesis 3).⁹

2.2 Credit risk and insolvency legislation

The basic progress of an insolvency 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 Table 13 (Annex 1).¹⁰ Osterkamp (2006) proposes to add two elements to that list, namely the costs of an insolvency 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, insolvency 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 prior to insolvency is first come, first serve, insolvency codes regularly suspend the creditors' rights to enforce their claim outside the insolvency proceedings. An insolvency proceeding can result in liquidation or allow the debtor to stay in business and use the revenue generated to resolve the debts (going-concern). It depends on national legislation whether the creditors have broad powers to organize the recovery independently or whether the distribution of the debtor's assets is managed by a public administrator and monitored by a court. The procedural costs, which are induced by court fees, the fees of the administrator, sale costs etc., are usually deducted from the debtor's assets 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 Annex 2 based on a stylized example.

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

The balancing of creditors' control rights and public supervision of insolvency proceedings is a question of national policies and traditions. The key questions are whether a jurisdiction 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 upgrades rather the creditor's or the debtor's interests.

The number of formal insolvencies depends on the power of the two parties involved, namely creditors (our focus is on banks) on the one hand and debtors (firms) on the other. *It is assumed that banks are ultimately the stronger party, and therefore that in debtor-friendly systems (i.e. adverse conditions for banks) banks urge firms to restructure outside legal (hereinafter: formal)*

⁹ The economic definition is further discussed in section 3.

¹⁰ Wood (2005) distinguishes between 11 characteristics.

insolvency procedures (i.e. via out-of-court settlements), while in creditor-friendly systems formal insolvencies are more common (**Hypothesis 2**).

The frequency of insolvencies is also assumed to be influenced by the public perception on default. In some countries, insolvency 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.¹¹ In countries with a stigma, 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).

The latter considerations tended to concentrate on the factors reducing the debtor's assets in pending insolvency proceedings. However, the value of the debtor's assets at the beginning of an insolvency 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).¹² By contrast, the legal preconditions for the initiation of insolvency proceedings can differ substantially from this economic default definition: In order to disembarass debtors and enable them to restructure unprofitable business, insolvency legislation can allow the initiation of insolvency proceedings before the financial situation of the debtor has reached breakdown (see Figure 3). 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 insolvency proceedings in national legislation, i.e. the default definition (in a narrower sense) and insolvency definition (in a broader sense), affect credit risk (**Hypothesis 3**).

2.3 Credit risk and security titles

However, a model of insolvency proceedings which disregards security titles is incomplete. The fundamental reasoning of security titles is straightforward: Creditors grant debt because they believe in the solvency of their debtor when it comes to repayment. In order not to be confined to this belief, creditors demand some kind of insurance (securities) which they can fall back on to recover the debt should the debtor fail to perform, i.e. to mitigate their credit risk.

¹¹ 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".

¹² There has been substantial research to determine the default point, a prominent example being Moody's KMV.

2.3.1 Personal and real security

Securities can basically be subdivided into two main groups, which will herein be referred to as personal securities and real securities in legal terms or guarantees/sureties and collaterals¹³ in economic terms.

The first and foremost difference between personal and real securities is towards 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 towards 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'¹⁴). 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 subject to enforcement by the creditor just as any other debtor. The creditor can therefore also seize assets which the guarantor has acquired after the conclusion of the security agreement, while those that have been alienated by the guarantor are no longer available. The beneficiary of a real security interest (collateral), on the contrary, cannot seize all assets of a certain person, but is limited to the specific collateral concerned. However, alienation does not disburden the collateral, since the legal tie adheres to the collateral.

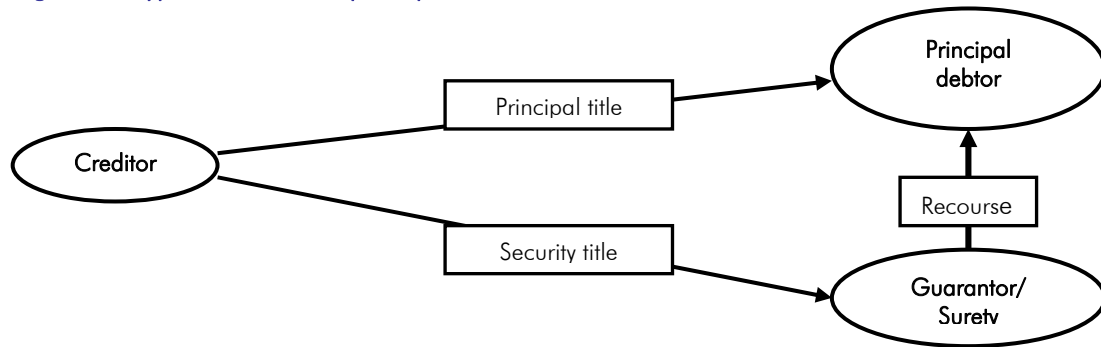
Personal security (or guarantee)

Since the value of a personal security (guarantee) depends on the assets of the obliged person, such security is only useful to the creditor if it involves a third person (guarantor). Personal security titles are created by agreement between creditor and guarantor. This security agreement determines the content of the security title, 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.

¹³ 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.

¹⁴ This term will be used herein, although it is a specific term of the US UCC (Uniform Commercial Code) and rarely used in English law.

Figure 1: Typical relationships in personal securities



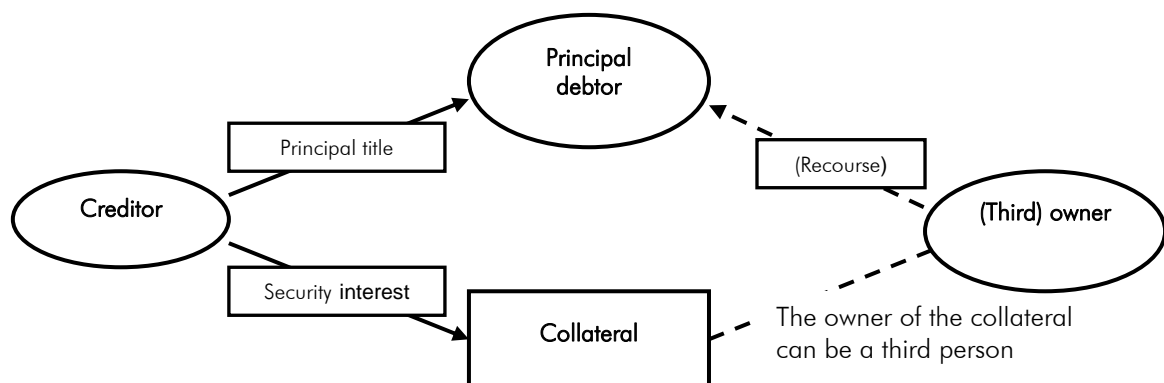
Source: Authors

Personal securities (guarantees/sureties) 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 title is only valid as long as and up to the amount of the principal title, and enforcement of the security title 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, the possibilities for the detailed shape of a security title are as manifold as human imagination, within the limitations of the legal framework, depending on the needs and the powers of the parties involved.

Real security (or collateral)

A real security interest is usually created by (written) agreement between the creditor and the owner of the collateral. 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 (land), tangible (a vehicle or land) or intangible (a legal title).

Figure 2: Typical relationships in real securities



Source: Authors

The creditor is usually granted the right to exploit the specified collateral, the preconditions and modalities for the exertion of this right being determined in the security agreement. Again, the preconditions for the exploitation of the collateral can vary widely within the legal framework and

boundaries of the instrument chosen, depending on the security agreement, and so can the means of exploitation. Normally, the object is sold, the revenues serving to satisfy the principal debt, the surplus falling to the owner of the collateral. It is also possible that the property of the collateral falls immediately to the creditor in case of default, at the same time settling the principal debt (so-called foreclosure). 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 be entitled to sue the third party debtor directly.

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, in general, 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 normally be assessed easily, for example by means of a public register.¹⁵

2.3.2 Valuation of securities and hypothesis

The value of a personal security title (guarantee/surety) depends on the solvency of the guarantor. If the guarantor is solvent, the creditor can entirely recover the title. 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).¹⁶

A creditor secured by a real security interest (collateral) does not depend on the solvency of another person, but is entitled to exploit 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 the market value of the collateral.

These basic rules for security titles are relatively clear-cut. It is therefore assumed that market participants adjust to specific conditions of national legislation only to a limited degree and restricted to arrangements like the avoidance of some collateral or guarantee types where the country-specific rules are unfavourable. Hence, *in respect of standard security types, the country-specific differences resulting from differences in credit risk mitigation instruments are assumed to be limited (Hypothesis 4).*

2.3.3 Insolvency proceedings and securities

Security titles, 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 insolvency denotes the participation in the insolvency proceedings. The

¹⁵ In Germany, public register are only available for real estate, unlike in the UK.

¹⁶ The discussion based on Basel II will also be applicable under Basel III rules, as there is no major change in the dimensions discussed herein.

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. An illustrative example is provided for in Annex 2.

3 Economic perspective to credit risk

The key challenge of economic credit risk modelling is to predict future default events in quantitative terms. This is usually done by using historical data, simulation techniques, quantitative theoretical modelling 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 modelling 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.

3.1 PD modelling

For PD modelling, 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. In economic terms, default usually occurs if a counterparty cannot repay debt. In general terms, this happens if the liabilities become too high, in the spirit of the Merton framework. Default usually becomes visible through one of the two following events (documented in the Basel regulatory framework): the past due of payments and/or the assumption of banks that debt is unlikely to be paid back (see BCBS 2006). After default has occurred, a counterpart can be saved (i.e. business goes on, usually through a restructuring of a firm and/or credit) or be liquidated (see Figure 3). The two key dimensions of default risk modelling with respect to country-specific legislation (the default definition and the value of guarantees) as assessed herein are listed below.

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 modelling 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.

Table 1: Determinants of PD modelling

Determinant	Country dependent	Effect on the PD
Default Definition	Yes	The more conservative the default definition, the lower the PD.
Guarantee as a security title	No ¹⁹	The higher the (likelihood of a positive) value of a guarantee, the lower the PD.

Source: Authors

3.2 LGD modelling

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

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

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 expenses²².

A stylized graph that illustrates our considerations used to analyze the impact of legislation is shown below for clarification (Merton, 1974). 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’ default event is assumed to occur should the market value of a firm’s assets fall below a certain barrier, the default barrier, i.e. when firms are unable to meet their debt obligations. There have been numerous studies to determine ‘typical’ default barriers (assets over liabilities).²³

In legal terms, mandatory default would usually be formal insolvency (see definition above). Firms can also default voluntarily, be it within the framework of legislation, i.e. a formal going-concern procedure such as administration in the U.K. (which is not allowed and/or foreseen in all jurisdictions, including Germany) or outside legal frameworks (for strategic reasons, e.g. restructuring of business), typically with the aim of keeping business as a going-concern by

¹⁹ The general measures and frameworks for guarantees 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”.

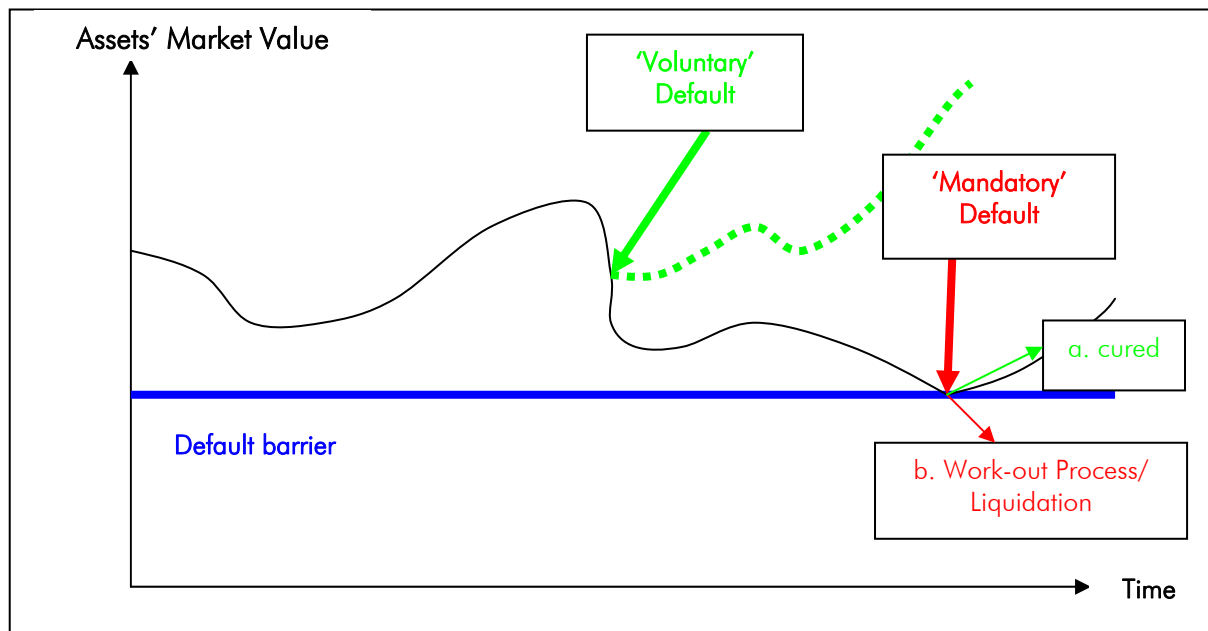
²¹ For example via the liquidation of collateral.

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.

²³ 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 insolvency procedures in the US, for example, the median level of debt is typically above the asset value. For Chapter 7 cases (of the US bankruptcy code), for example, Bris et al. (2006) report a median of 168 percent and for Chapter 11 cases the median is 123 percent.

adjusting business strategies in a pre-emptive manner (see dotted line below). The question becomes, in which way this influences credit risk.

Figure 3: Default process in a stylized way



Source: Authors

The determinants for LGD modelling 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.²⁴

Table 2: Determinants of LGD modelling

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 insolvency 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 ²⁵	The higher the discount rate, the lower the LGD.

Source: Authors

²⁴ 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 5.

²⁵ 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.

4 Comparison of the insolvency and security legislation of Germany and the U.K.

Next, we outline the legal differences between Germany and the U.K. based on the hypotheses developed in section 2.

While the legal system in Germany is uniform across the country, this is not the case for the U.K. For the U.K., we concentrate on English law and leave regional peculiarities aside. In fact, the basic and overall legal structure is the same throughout the U.K., except that some regions have own legislation, e.g. the Scottish Insolvency Code (2007).

4.1 Insolvency legislation

4.1.1 Insolvency proceedings and control rights [Hyp. 1]

Hypothesis 1 states that duration and formality are crucial factors for the costs of insolvency proceedings.

Under the German Insolvency Code ('Insolvenzordnung' [InsO], 1999), insolvency 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 insolvency proceedings, there is an automatic stay.²⁶ Overall, the influence of the creditors on the proceedings is low, and the proceeding remains highly formalized, despite the reform in 1999. This leads to a long duration of insolvency proceedings and induces comparably high administrative costs. This was a main issue that led to a reform of insolvency legislation in 1999 besides the aim to facilitate rehabilitation instead of liquidation. Still, insolvency proceedings in Germany remain comparably lengthy and costly.²⁷

English insolvency law, which is governed by the 'Insolvency Act' (IA, 1986) and the 'Enterprise Act' (EA, 2002), basically differentiates between two different forms of insolvency 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 their actions. 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 insolvency proceeding,

²⁶ 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 insolvency.

²⁷ 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 5.

receivership, was restricted by the EA (2002) to a few exempt areas²⁸ 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 their actions. Since receivership has been widely abandoned, English insolvency legislation has become less informal and speedy than it used to be. Still, English insolvency proceedings overall can be considered less formal and substantially less lengthy than German ones, evidenced by information revealed through the EU Small Business Act.²⁹

4.1.2 Characterization of the legislation and perception of insolvency [Hyp. 2]

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

German insolvency law, in general, tends to be protective, and public perception of insolvency is negative, especially concerning the purpose of recapitalization and keeping business as a going-concern. Wanton insolvency to the detriment of the creditors is sanctioned criminally (see section 283 of the German Criminal Code ['Strafgesetzbuch']). Hence, insolvency legislation tends to be creditor-friendly while debtors tend to avoid the stigma of formal insolvency proceedings until there is no other option any more.

In general terms, English insolvency law is comparatively liberal. However, the attitude towards 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. Traditionally, the English insolvency 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 insolvency proceedings.³⁰

²⁸ 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'.

²⁹ In 2009, the time (1 year) and the costs (6 % of the estate) for winding down a business were more favourable in the U.K. than in the EU on average (more than 2 years and almost 11 %) and notably more favourable than for Germany (see also footnote 26). Further evidence for that is presented in section 5.

³⁰ Evidence for that is presented in section 5.

4.1.3 Default definition and initiation of proceedings [Hyp. 3]

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

According to the German Insolvency Code, formal insolvency 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 insolvency, which is indicated when the debtor cannot pay the claims by the time they are due. The insolvent can apply for insolvency proceedings slightly earlier, in case of imminent insolvency. 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 insolvency as a necessary condition. The initiation of a liquidation proceeding can be voluntary or compulsory. Voluntary liquidation does not depend on economic insolvency of the debtor.³¹ For the initiation of a compulsory liquidation, economic insolvency, as defined in ss123, 124 of the IA, is only one possibility among others (IA, Part IV, ss122 to 124).³² 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 an insolvency event occurs (Franks et al., 1996).

4.2 Securities in different legislations [Hyp. 4]

We will now examine hypothesis 4: In respect of standard security types, the country-specific differences resulting from differences in credit risk mitigation instruments are assumed to be limited.

4.2.1 Personal securities

As outlined above, all personal security titles empower creditors to seize the assets of guarantors. The decisive criterion to distinguish personal securities is the level of accessoriness, i.e. the degree to which they depend on the principal title.

The basic type of personal security in the two legal systems is accessory. It is called 'guarantee' in English law (Andrews and Millet, 2005, Clarkson et al., 1992), and 'Bürgschaft' in the German Civil Code (Bürgerliches Gesetzbuch [BGB], ss765 ss.). The German notion of 'Garantie' does not denote a specific legal instrument, but various legal figures which to some extent comprise

³¹ 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).

³² 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'.

elements of security. The non-accessory type of personal security in English law is called 'indemnity' (Andrews and Millett, 2005).

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 3.

Table 3: Comparison of Personal Securities

	DE	U.K.
Accessory	'Bürgschaft'	Guarantee
Non-Accessory	'Schuldbeitritt'	Indemnity
Variation possible	Yes	Yes

Source: Authors

4.2.2 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:

- a) Whether the security interest can attach to intangibles (titles, particularly stocks and shares), mobile (e.g. vehicles) or immobile items (land).
- b) 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).
- c) 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.
- d) 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. 5ff.). German security interests on land ('Grundpfandrechte') automatically cover the equipment belonging to the land (§1120 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 (§1115 BGB), and security interests in moveable collaterals can only be possessory (§1205 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 by German law. The standard form of exploitation is the sale of the collateral and distribution of the proceeds (§§1147, 1228 BGB).

English law 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, McCormack, 2004, Perry, 1981). Pledges and liens are distinct security interests which can only be on movables (Cranston, 1997, Ali, 2002). Titles can be used as collaterals by assignment (Holden, 1986; Ellinger and Lomnicka, 1994). The term 'hypothecation' is frequently used in banking documents, but does not denote a distinct form of security (Ali, 2002).
- (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,; McCormack, 2004).
- (c) English common law requires public filing for mortgages on land or on movables. However, banking practice has developed equitable mortgages under seal (Perry, 1981). Mortgages and charges are non-possessory, while pledges and liens are only effective if the creditor is in possession of the collateral (Ali, 2002).
- (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). Some minor security interests – particularly the lien (Ali, 2002) – only authorize the detention of the collateral by the beneficiary.

Table 4 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 4: Summary of differences in real securities

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

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

Source: Authors

4.3 Summary

Table 5 summarizes the outcome of the previous sections. *Firstly*, the comparison revealed that the duration of the workout process tends to be rather lengthy in Germany and comparably short in the U.K., and the differences are particularly substantial for liquidation proceedings. The same order holds true for the legal costs of insolvency, which increase with the formality and duration of the proceedings. For the creditors' control rights, the order is reverse: there are many control rights in the U.K. (despite the vanishing of the receivership procedure), while the control rights are relatively balanced between creditors and debtors in Germany, where the procedure is generally handled by an administrator.

Secondly, in terms of the public perception of defaulting debtors there is a negative public perception in both countries and failing debtors are stigmatized.³³ 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.³⁴ To cope with this issue that has a negative impact on innovation, policy measures have been introduced at the EU level to cope with stigmatisation being deeply rooted in traditions, and distinguishes Europe from the US.³⁵ However, the U.K. perception is more generous vis-à-vis creditors when it comes to informal, out-of-court

³³ This conclusion has been drawn based on anecdotal evidence by market participants, including EIF employees. Likewise, the public perception of defaulting debtors is worse compared to the United States.

³⁴ European Commission (2009 a and b).

³⁵ In the context of the Lisbon strategy, several EU states have recently announced that they plan to reform their insolvency procedure in favour 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.

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. With the cessation of the receivership procedure, U.K. law has become more debtor-friendly. Accordingly, we disagree with previous studies, which frequently found U.K. law to be by far the most creditor-friendly legislation, owing to the receivership procedure which entitled creditors to appoint a receiver who solely represents their interests. The difference between the two countries mainly concerns the fact that formal proceedings can be initialized voluntarily by the debtors, an option that is not eligible in Germany. Compared to Germany, this somehow weakens the influence of creditors in the U.K.

Thirdly, the insolvency tends to be more formal in Germany: firstly, there is no voluntary initiation of insolvency proceedings; secondly, administrators are generally appointed by the court in Germany, while this is not always the case of liquidations in the U.K. and was particularly not the case for receivership cases; thirdly, German proceedings put equality on top of a preferably short duration, which makes the assessment of all claims (including very small ones) formal and thereby time-consuming and burdensome.

And *fourthly*, the common security titles – personal securities and real securities – used in the two investigated countries are, in substance and form, relatively similar. Thus, differences are expected to be triggered by behavioural adjustment rather than the underlying legal framework.

Table 5: Summary of differences between legislations³⁶

Findings regarding to...	DE	U.K.
1: Proceedings and Control Rights a. Duration b. Legal Costs c. Control Rights for Creditors	Long High Medium	Short Low/Medium Medium/High
2: Creditor-friendliness ➤ LaPorta et al. ³⁷ (1–4) ➤ Wood (1–10) Creditor-friendliness and Public Perception ➤ Own review (1-10) ³⁸	3 7 7: Stigmatisation of debtors (8), Creditor-friendliness of law (6)	4 9 6-7: Stigmatisation of debtors (7), Creditor-friendliness of law (6)
3: Insolvency code and default definition	Formal	Rather formal (with some exceptions)
4: Securities	Similar instruments, similar effects (amount of credit risk mitigants subject to empirical analysis)	

Note: Category 2 uses scales, where the lowest number indicates the lowest level of creditor-friendliness (La Porta, Wood) and stigmatisation (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 one biased towards creditors, while a rating of 5-6 indicates a neutral rating.

Source: Authors

³⁶ 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.

³⁷ The studies by La Porta et al. (1998) and Wood (1995) do not take into account recent changes in legislation for the two countries. For the U.K., 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).

³⁸ Our review includes the vanishing of receivership procedures in the U.K. since 2003.

5 Theoretical outcome vs. empirical findings

Subsequently, we determine quasi-theoretical (henceforth: implied) credit risk parameters (PDs, LGDs). These parameters are then compared with empirical evidence as a means to ‘display’ net differences in credit risk parameters resulting from legislations.

5.1 Theoretical outcome

5.1.1 Procedure

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 assessment for the portion of credit risk driven by legislation, one has to neutralize country-specific differences not driven by legislation. We have identified three main dimensions that have to be considered:

1. The type/nature of default events,
2. The credit environment (essentially cyclical effects as well as credit conditions, such as credit prices and credit supply), and
3. A potential adjustment of the behaviour of lenders (banks).

In terms of the first issue, we will make systematic use of our findings documented in section 4.³⁹ For the credit environment, we seek to investigate comparable conditions:

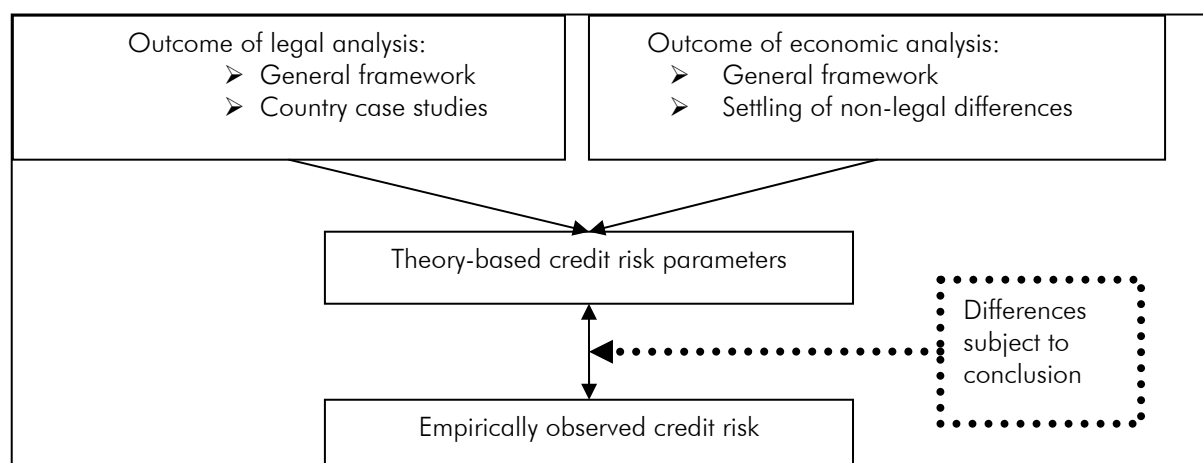
- (i) Credit prices are not directly relevant for our analysis in the first step, but will be considered for final conclusions;
- (ii) in terms of credit supply, we assume that there are no country-specific differences in the long run, i.e. that banks provide the economy with sufficient credit⁴⁰;
- (iii) we use through-the-cycle credit risk parameters to account for cyclical effects.

What remains is a potential adjustment of the lenders’ behaviour. By neutralizing various non-legal effects, we expect the implied credit risk parameters, i.e. credit risk parameters adjusted for effects driven by legislation to match with empirical evidence. We assume that the residual is behavioural adjustment. Our conceptual framework is graphically summarized in Figure 4.

³⁹ For a comprehensive analysis, it has also to be taken into account that the registration and classification of insolvencies is far from being basic. We assume that there are no substantial differences between the two investigated countries.

⁴⁰ Assessments of potential shortcomings in credit supply are regularly carried out as part of the IMF’s Article IV consultations. For both countries, these assessments do not reveal major signs for a credit crunch. The upcoming Basel III rules have been designed with a view to avoid deleveraging, which could trigger a credit crunch.

Figure 4: Conceptual overview



Source: Authors

5.1.2 Frequency of different insolvency proceedings

First, we review the frequency of different default procedures, which has been found to be relevant both for PDs and for firm-level LGDs. As shown in Figure 3, it is highly relevant from an economic perspective 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 in a substantially lower one than in case of mandatory default in economic terms and formal insolvency in legal terms.⁴¹ In this section, we distinguish three default categories: (i) informal/voluntary default (i.e. informal restructuring not resulting in default); (ii) formal insolvency of a going-concern type nature and (iii) 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.

According to empirical evidence, the portion of successful voluntary (informal) default procedures (i.e. voluntary default procedures that did not lead to formal insolvencies afterwards) of the total number of defaults is 13 percent for Germany and 25 percent for the U.K.⁴² For the remainder of the defaulted firms that entered formal insolvency procedures, the likelihood of the formally bankrupt firms being liquidated in the U.K. is approximately 62 percent (liquidations and ex-receivership), and 38 percent for keeping them as a going-concern (administrations). For Germany, where no separate default procedures aimed at going concern exists, we use a proxy, namely the likelihood that a firm entering formal insolvency will continue to operate based on data from Grunert and Weber (2009).⁴³ Accordingly, conditional on entering formal insolvency procedures 69 percent of the firms were liquidated, while 31 percent were successfully kept as a going-concern.⁴⁴

⁴¹ This is clearly shown by the observed LGDs reported by Franks et al. (2004) for formal and informal insolvencies in the U.K. and Germany, for example.

⁴² Data for the U.K. and Germany: Franks et al. (2004).

⁴³ Some (more disaggregated) data is taken from earlier versions of the 2009 published paper in the Journal of Banking and Finance (the 2005 version of the paper).

⁴⁴ Although the figures for Germany are not directly comparable (except on an aggregated level of formal insolvencies), the portion of going-concerns revealed by this study appears to be sufficiently conservative (i.e. not overstating the number of going-concern type insolvencies) to allow for comparisons with the frequency of going-concern type formal procedures in the U.K.

Table 6: Frequency of different Insolvency procedures chosen by firms

Country	Portion of Voluntary default ⁴⁵ (Percent)
	... Formal insolvency procedures			
	... Thereof Liquidation type (Percent)	... Thereof Going-concern type ⁴⁶ (Percent)	Total percentage of formal insolvencies	
DE	69	31 ⁴⁷	87	13
U.K.	62 ⁴⁸	38	75	25

Source: Authors, based on references mentioned in text.

5.1.3 Theoretical PDs

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:⁴⁹

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

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:

⁴⁵ 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.

⁴⁶ In this dimension, we report formal insolvencies with the explicit legal option to keep the firm as a going-concern, which is not eligible in Germany, so we use proxies as further explained in the text.

⁴⁷ According to Grunert and Weber (2009), 40 percent (48 of 120 firms) of the defaulted firms investigated in their study 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 insolvency procedures becomes 27 percent of all default events or 31 percent in conditional terms (assuming that the portion of voluntary default events on the total default events reported by Franks et al. (2004) holds true). A survey among more than 100 liquidators carried out in 2007 (thereby accounting for the 1999 reformed German insolvency 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.

⁴⁸ 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).

⁴⁹ We refer to the portion of defaults that ultimately occurred in an informal and a formal way, respectively. Part of the informal renegotiations still result in formal insolvencies, for example.

1. Firstly, how often firms in different countries use the option to restructure outside of formal insolvency proceedings and
2. Secondly, what portion of formal insolvencies can be prevented by early restructuring (i.e. are voluntary defaults);

A survey among German insolvency administrators revealed that in case of early restructurings the chance of being successful is 44 percent (Euler Hermes Kreditversicherungs-AG, 2006)⁵⁰, compared to 10 percent of successful internal restructuring in case of formal insolvency procedures (Euler Hermes Kreditversicherungs-AG, 2007).

We take a cohort of 100 hypothetical firms with the same level of credit risk in both countries. If one refers to the number of informal default events that have been successful, then one captures the first two dimensions: the portion of successful informal restructurings is 25 percent for the U.K. and 13 percent in Germany (see above). In relative terms, the PD for formal insolvency events in the U.K. is by 14 percent lower than in Germany (U.K.:DE = 0.75:0.87 = 0.86:1).

5.1.4 Theoretical LGDs

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

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

The overall LGD depends on the LGD pertinent to the three different default procedures, namely liquidation ('Liq'), going-concern type formal insolvency ('GC') and informal restructuring ('Informal'), and the probability for their occurrence ($Pr1$, $Pr2$, $Pr3$). The net proceeds in case of liquidation and formal going-concern type insolvency (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 insolvency (' DF ').

In line with Hypothesis 4, we presume that the average gross proceeds P from formal insolvencies are the same in the two countries considered herein, reflecting our previous assumptions: (i) security titles are similar in terms of their type (and thus quality) and value, as well as (ii) 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 two countries. This assumption will be compared with empirical evidence at a later stage.

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

⁵⁰ 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 insolvency code.

Next, we subtract the country-specific direct legal costs, and then calculate the LGD for liquidation-type insolvency (LGD_{Liq}) based on the cash flow weighted average duration of the work-out process⁵¹ and a discount rate of 12 percent.⁵²

For both the U.K. and Germany, there is no separate data on the legal costs of insolvency for liquidation-type insolvencies and going-concern type insolvencies, respectively. Hence, we use the same parameters for both procedures in each of the two countries (which reflects evidence from the U.S., for example). For Germany, there is also no separate data for the duration of the work-out period for going-concern-type formal proceedings. We assume 1 year, similar to the length in the U.K.⁵³

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 both 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 U.K., 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. We use LGDs of 22 percent for informal default events in both countries. The resulting procedure-specific LGDs are displayed in Table 7.

For Germany, the LGD for liquidation type insolvency becomes as high as 56.7 percent, while the figure for the U.K. is 38.3 percent. This clearly reveals that the substantially higher LGD for Germany result from the comparably long duration of the insolvency process. For going-concern type insolvencies, the LGDs are relatively similar at around 30 percent.

⁵¹ The duration broadly reflects the indirect costs of insolvency. See e.g. Bris et al. (2006).

⁵² 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.

⁵³ We thereby account for the fact that the scarce evidence (e.g., surveys) indicates that going-concern type procedures are comparably “straightforward” cases, and that the lengthy liquidation process does not (yet) apply to this type of insolvency. With the effort to increase their number, though, this assumption might have to be revised.

Table 7: Overview on LGDs for different default procedures⁵⁴

Country	Undiscounted proceeds P (1, Percent)	Direct legal costs ⁵⁵ (LCost) (2, Percent)	Undiscounted Net proceeds (3)=(1)-(2)	Duration of workout process (weighted average duration, years) ⁵⁶ (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
U.K.	80	12	68	0.86	38.3
<i>LGD_{GC}</i>					
DE	90	14.8	75.2	1	32.9
U.K.	90	12	78	0.86	29.2
<i>LGD_{Informal}</i>					
DE	NA	NA	NA	NA	22
U.K.	NA	NA	NA	NA	22

Source: Authors' estimates

As last step, we calculate the overall LGD. The LGD for Germany is 45.8 percent compared to 31.7 percent in the U.K., with the difference mainly driven by the long duration of the workout process in Germany, rather than by the lower portion of informal restructurings in Germany. It is also important to note that differences in legal costs do not appear to play a decisive role.

Table 8: Total LGDs calculated based on analytical concept (figures in percent)⁵⁷

Country	Formal Default		Informal Default		Total LGD
	Mean LGD	Frequency	Mean LGD	Frequency	
DE	49.3	87	22	13	45.8
U.K.	34.9	75	22	25	31.7

Source: Authors' estimates

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.

⁵⁴ The LGDs are firm-level figures based on average security titles in place.

⁵⁵ In all cases, we referred to the direct costs of insolvency measured as a portion of the firms' asset value at the time of insolvency. Data for the U.K.: 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.

⁵⁶ Data for the U.K. and Germany: Davydenko and Franks (2008), except for the duration for the going-concern type insolvency for Germany, which is based on expert judgment. Given the limited data for the duration of insolvency 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.

⁵⁷ The LGD for formal procedures in Germany is 69 percent * 56.7 percent + 31 percent * 32.9 percent.

5.2 Empirical evidence

5.2.1 Empirical evidence for the PD

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

We refer to the portion of registered formal insolvencies in order to account both for the changes in insolvency codes during recent years and for cyclical effects. We use the average insolvency rates (a so-called through-the-cycle credit risk parameter based on officially recorded insolvencies) for the period from 2000 to 2008 as reported by CreditReform⁵⁸. Accordingly, we arrive at a level of formal insolvencies of 0.88 percent for the U.K. and 1.2 percent for Germany, or a relative level of 0.73:1.⁵⁹

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 unfavourable economic development (also in the context of the German re-unification⁶⁰), whereby the through-the-cycle level of insolvencies for Germany seems to be overstated.

This assumption is confirmed if one looks at the number of formal corporate insolvencies per 1 million inhabitants for the period from 1980–2005 as reported by Osterkamp (2006). The respective average number of defaults is about 250 for the U.K. and 300 for Germany (or 0.84:1 in relative terms).

The figures for Germany were lower than the ones for the U.K. until 1993/1994, but have more than doubled since then, whereby the average figure for Germany becomes higher for the whole period. For the U.K., the figures include both benign periods and periods of stress during the 1990s. In sum, these figures appear to be valid to being used as an empirical benchmark. If one adds the informal default dimension, then the relative number of total defaults becomes 0.97:1 (U.K.:DE), i.e. both countries exhibit similar levels of defaults.

Table 9: 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)
U.K.	250	83.3 (=250/0.75-250)	333.3 (0.97)

Source: Authors' estimates

⁵⁸ We used the annual reports published by CreditReform on the insolvencies 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. If one includes the figures for 2009, the difference between the two countries becomes lower.

⁵⁹ For information: according to data from EulerHermes, in the crisis year 2009 the insolvency rate for Germany was 0.9% and for the U.K. 1.7% (EulerHermes (2010)).

⁶⁰ For long-term time series of German corporate insolvencies see the webpage of the German Federal Statistical Office (www.destatis.de).

The formal PDs based on our conceptual reasoning (U.K.:DE=0.84:1) matches with the empirical evidence (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.

5.2.2 Empirical evidence for the LGD

For the LGD, we refer to the study by Davydenko and Franks (2008) for the U.K. and Grunert and Weber (2009) for Germany. Both studies cover similar time periods without major cyclical stress and can be considered as the most representative studies for the respective country for SME loan-type credit. Both studies are based on actual bank data. For robustness purposes, the figures are compared with evidence observed by Davydenko and Franks (2008) for Germany.

For informal default events, we re-use LGDs of 22 percent for both countries.

Table 10 displays the undiscounted net proceeds conditional on the pertinent insolvency procedure (liquidation and going-concern type). As shown in the table, the proceeds for Germany exceed the ones for the U.K., by 6 percentage points for liquidation and about 8 percentage points for going-concern type default.

The discounted proceeds are displayed in parenthesis, which clearly reveals the impact of the long recovery process for Germany, whereby the discounted proceeds in case of liquidation become almost 13 percentage points lower than in the U.K.

Accordingly, the aggregate discounted LGD for formal defaults in the U.K. becomes 36.7 percent⁶¹ and the total LGD is 33 percent (Table 11). For Germany, the discounted LGD for formal procedures yields 39.5 percent, resulting in a total LGD of 37.2 percent.

Table 10: 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) ⁶²	1992-2003/ 120
U.K.	68.9 (62.5)	78.0 (70.8)	Davydenko and Franks (2008)	1994-2003/ 1,418

Source: Authors, based on sources mentioned

⁶¹ As Franks et al. (2004: p. 55) report only undiscounted LGDs, we have discounted the cash flows based on the country-specific duration.

⁶² 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 7.

Table 11: 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	22.0	13	37.2	45.8
U.K.	36.7	75	22.0	25	33.0	31.7

Source: Authors, based on sources mentioned

Table 11 reveals several key findings: for the U.K., the actual empirical LGD closely matches the conceptual LGD. Given that we sought to target the U.K. case in terms of the proceeds (Table 7), our conceptual framework seems to correctly depict the major effects.

With the cessation of receiverships in the U.K., formal (liquidation) LGDs might increase, but successful early restructuring could become more common, reflecting altered incentives of banks finding themselves in a weaker position. However, the investigation of the effect of the reform requires more recent data for the U.K.

For Germany, the empirical LGDs are substantially lower than the implied ones, suggesting that there is behavioural adjustment by German banks to arrive at more favourable credit terms and compensating for disadvantages relative to the U.K., in line with economic theory. Yet, the final LGDs remain slightly higher than in the U.K., driven by the higher number of liquidation-type insolvency cases with higher LGDs than in the U.K. (in addition to the long work-out process).

The figures reported by Grunert and Weber (2009) are more favourable than the data for Germany reported by Davydenko and Franks (2008). There are several reasons for that. A key one 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 confirms this consideration, but makes their outcome quite opaque, particularly as it is not further discussed due to confidentiality.

To determine the differences in terms of expected losses (EL) and unexpected losses (UL), we fix the total PD (i.e. formal and informal defaults) for Germany to 1.37 percent, in line with empirical evidence.⁶³ For the LGD, we use the empirically derived figures displayed in Table 11. As displayed below, portfolio credit risk originating from legislation in Germany is higher than in the U.K. - both for the EL and for the Basel II minimum capital requirements (the UL) the difference is about 15 percent.

⁶³ This PD corresponds to the default rate calculated based on CreditReform insolvency statistics from 2000-2007, adjusted for informal default events. See CreditReform (2008). The corresponding PD for the U.K. is 1.32 percent and for the US 1.5 percent.

Table 12: Portfolio credit risk per country based on theoretical credit parameters⁶⁴

Country	Expected Loss (Percent of Exposure)	Basel II capital requirements (Percent of Exposure)
DE	0.51	6.79
U.K.	0.44	5.96

Source: Authors' estimates

From a theoretical perspective based on arbitrage, such differences in credit risk can only be justified if there are additional factors that have not been considered yet, most importantly credit prices. There is an inconsistency between the U.K. and Germany, though, with U.K. banks charging similar or even slightly higher interest rates for comparable firms than German banks do (Davydenko and Franks, 2008), explained by the authors with lower competition in the U.K. This finding 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 U.S., displaying higher interest rates in less competitive markets. Hence, economic theory appears to remain valid overall.

As elaborated in the conceptual part (section 5.1), 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 behavioural adjustment by market participants, which is essentially determined by two factors:

1. The frequency of the 'choice' of different default 'procedures' (liquidation type formal insolvency, going-concern type formal insolvency, informal default);
2. 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.

Figures published by Davydenko and Franks (2008) suggest that there is no clear evidence for differences regarding the type of security titles for the two countries examined. In terms of the collateral type and its use for debt recovery, the differences between the U.K. 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 U.K. 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.

This leads us to a loaded question: What could German policy-makers do to be at par with the U.K.? There are several potential solutions: (i) German banks could ask for even more collateral, but that would be harmful for the economy, particularly given the post-crisis uncertainties; (ii) liquidation proceedings in Germany would have to be shortened by more than half to be at par with U.K. banks. While this goal appears ambitious at first sight, there could be a case for that.

⁶⁴ The expected loss is the product of the country-specific PD and LGD. The Basel II capital requirements are determined using the corporate formula for the country-specific PD and LGD as well as a maturity of 2.5 years.

The reason is that while aiming at a preferably fair distribution of the assets, the overall “cake” to be distributed shrinks considerably over time (in terms of net present value), whereby even those creditors that benefit from the current regime could recover less; (iii) another key goal could be to increase incentives to go through informal restructurings, as evidence shows that this can prevent liquidations.

6 Conclusion

This study investigates the impact of insolvency and security legislation on credit risk. We reviewed the main economic drivers of credit risk (PDs and LGDs) and thereby investigated how they can be influenced by legislation. Accordingly, we studied and compared the legal framework of Germany with the U.K., the latter based on common law and Germany based on civil law.

The motivation for this study was two-fold: (i) the financial crisis has shown that various elements of the financial system have to be re-assessed with respect to their contribution to financial stability or instability. In this context, increasing cross-border investments warrants that investors need to have a better understanding of potential differences in credit risk across countries. (ii) Legal frameworks have recently become increasingly subject to scrutiny, not only in terms of their efficiency, but also as to their contribution of economic growth.

This study sought to make use of additional empirical sources that have become available to undergo such a study. While the number of assumptions to be made was higher than desirable, various cross-checks have been used to make the result preferably robust.

Our key finding is that a U.K. bank with mostly domestic business would recover approximately 14 percentage points more than a German bank did for the same level of credit risk in economic terms (i.e., the same pool of firms). This difference in LGDs is mainly driven by shorter proceedings in the U.K., and, to a lesser degree, by a higher portion of voluntary default events and slightly lower legal costs. However, it has been found that German banks adjust their behaviour by demanding more collateral than U.K. banks do and thereby finally recover only 4 percentage points less.

For German banks to recover the same as U.K. banks do, formal proceedings would have to be shortened by about half, which is likely to be seen as a threat to the tradition of German insolvency law particularly keen at “equality”. The alternative to that is that informal proceedings become more frequent, e.g. like in the U.S., which means that the stigma of default would have to vanish – a confirmation of recent policy measures initiated via the Small Business Act for Europe. For the U.K. banks, the situation appears benign, but changes to legislation (i.e., the removal of receivership) are expected to worsen their stance.

In sum, the outcome suggests that further research is needed to disentangle the building blocks and to study recent changes in legislation and the business environment (the financial crisis), based on more detailed data. Once more data becomes available, the template put together can be further refined and extended to other countries.

Annex

Annex 1: Taxonomy of corporate insolvency codes

Table 13: Taxonomy of corporate insolvency codes

Field	Characteristic
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 guarantee?• 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?

Source: Smith and Strömberg (2005)

Annex 2: Example how to determine the value of credit risk mitigants in proceedings

In order to illustrate the relations between insolvency proceedings and security titles in a insolvency proceeding on 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 guarantees 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 forfeiture 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 14

Table 14: Overview before the Insolvency proceedings

	Credit	Security Title	Value (collateral)	Owner (of collateral title)
Creditor 1	100,000	None		
Creditor 2	100,000	None		
Creditor 3	100,000	Guarantee		
Creditor 4	100,000	Guarantee		
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, forfeiture 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	

Source: Authors.

Now, we simulate the effect of insolvency, i.e. of formal insolvency proceedings ending in liquidation, by the use of common basic legal rules as explained above. The caveat is that an actual insolvency proceeding may substantially deviate from this simulation due to differences in national insolvency legislation.

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

The remaining assets of the firm after this procedure have a total market value of 440,000 currency units. These assets (or their revenue) are now distributed among the creditors not yet satisfied. Again, the procedural costs (including e.g. fees for an administrator, court fees, taxes or the cost of sales) are acquitted first. Assuming that these costs amount to 100,000 currency units⁶⁵, 340,000 currency units remain to satisfy a total of 570,000 remaining credit. Neglecting that some of these claims – such as the employees' salaries – can be treated preferentially out of political reasons, and assuming a pro rata distribution, we arrive at the following outcome.

⁶⁵ This is oriented on empirical evidence, see section 5.1.

Table 135: Overview after Insolvency proceedings

	Credit	Privileged Recovery (Collateral)	Recovery from Insolvency 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)

Source: Authors.

As far as the creditors have not yet been satisfied, they can still enforce their remaining securities.⁶⁶ Creditors 3 and 4 can seek recovery from their guarantors, thereby bearing the risk of default of the guarantor. 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.

⁶⁶ In most cases, the security agreement allows them to do so already at an earlier stage, usually at the time of default.

Annex 3: List of Acronyms

- BCBS: Basel Committee for Banking Supervision
- BGB: Bundesgesetzbuch
- CRD: Capital Requirements Directive
- DE: Germany
- DF: Discount factor
- EAD: Exposure at default
- EBRD: European Bank for Reconstruction and Development
- EA: Enterprise Act
- EC: European Commission
- EIB: European Investment Bank
- EIF: European Investment Fund
- EL: Expected Loss
- EU: European Union
- GC: Going Concern
- IA: Insolvency Act
- IFI: International Financial Institution
- IMF: International Monetary Fund
- InsO: Insolvenzordnung
- IRB: Internal rating based approach
- LCost: Legal costs
- LGD: Loss given default
- Liq.: Liquidation
- P: Proceeds
- Pt: Probability
- PC: Procedural costs
- PD: Probability of default
- SMEs: Small and medium sized enterprises
- U.K.: United Kingdom
- UL: Unexpected Loss
- UCC: Uniform Commercial Code

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