

Lending to Lemons: Landschafts-Credit in 18th century Prussia

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Abstract:

The following paper describes the emergence of credit cooperatives, called ‘Landschaften’ and with it the birth of covered bonds in 18th century Prussia. Landschaften facilitated the refinancing of loans for Prussian estates by issuing covered bonds (Pfandbriefe) that were jointly backed by their members. They relied on a cooperative structure, joint liability, and local administration to overcome asymmetric information problems related to lending. Their emergence serves as an example for financial innovation in historical mortgage markets.

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1. Introduction

The 2007/08 financial crisis, which was preceded by a large housing bubble, has ignited interest in mortgage-backed securities and their regulation. It has also forced American banks to search for alternate ways to finance mortgages and reduce their dependence on the asset-backed securities market. Before this background, a covered bond bill was introduced in the US in 2010 (HR 4884 and HR 5823), but the bill narrowly failed to be included in the 2010 Dodd-Frank financial overhaul law.² It was reintroduced this year (HR 940), recommended by the House Financial Services Committee, and is now awaiting a House vote.

While covered bonds are popular in Europe and have remained stable investment options throughout the recent crisis, few economists know about their origins, when they were used, and why they proved to be such successful and safe financial instruments.³ This paper sheds light on the origins of the German Pfandbrief, which serves as template for covered bonds today.

Pfandbriefe were created by the Prussian Landschaften, mortgage associations of noble estates that facilitated the refinancing of loans to their members. They were launched by King Frederick II (Frederick the Great) in 1770, in order to support the Prussian landed gentry, often referred to as the Junkers, following the Seven Years War (1756-63). Landschaften were public institutions that did not have a profit motive and except for reserve funds did not hold their own capital.

The first of these Landschaften was the 'Silesian Landschaft' founded in 1770. Within quick succession other provinces followed suit. By 1790, five Landschaften had been created in different regions of Prussia: the Kur-und Neumärkische Ritterschaftliche Kreditinstitut (1777), the Landschaft of Pomerania (1781), the Landschaft of West-Prussia in Marienwerder (1787), and the Landschaft of East Prussia in Königsberg (1788) (Hecht, 1908, p. 10). These so-called 'old' Landschaften form the basis of this study. However, throughout the 19th century the Landschafts-concept spread to other regions of

² For current news coverage on the legislation, compare for example "An Effort to Adapt a European-Style Tool to US Mortgages" *The New York Times*, November 3rd, 2010

³ The German Pfandbrief-market is the largest individual bond market in Europe (Mastroeni, 2001).

the German Reich.⁴ While the old *Landschaften* were closed at the end of WW II, others were folded into modern *Pfandbrief*-issuing banks and some smaller institutions exist to this day.

From today's perspective, the study of *Landschaften* is relevant for a number of reasons:

First, as mentioned above, *Landschaften* provide the first successful example showing how safe bonds could be based on land (Frederiksen, 1894). They are the only institutional mortgage lender prior to the emergence of private mortgage banks in the mid-19th century, and while mortgage credit had been an important element in European finance since the Middle Ages, previous attempts at issuing mortgage backed debt, including John Law's 'système', had failed.⁵ *Landschaften* and their creation of the *Pfandbriefe* therefore present an excellent example for successful innovation in financial markets.

Second, *Landschaften* constitute a unique example of a non-bank financial institution taking on the role of a delegated monitor.⁶ In this function, they enrich the understanding of German financial history, which has predominantly been focused on the success of the large universal-style credit banks.⁷ *Landschaften*, as non-bank financial intermediaries were successful in recapitalizing the impoverished Prussian estates and they provided credit and liquidity while using minimal resources.

Third, by connecting the landholding Junker class to the financial market in Berlin, *Landschaften* supported the existing social structure of Prussia, known for its hierarchical order and extreme inequality in land distribution.⁸ However, as *Landschaften* were extended to include farmers and non-noble landholders in the mid 19th century, they expanded credit access and eased the transition from peasant to serfdom proprietorship

⁴ Other examples of *Landschaften* established outside of Prussia were the *Ritterschaftliches Kreditinstitut des Fürstentums Lüneburg* in Celle (1766/1790), the *Hamburgische Landschaft* (1782), the *Landschaft of Schleswig-Holstein* (1811), *Mecklenburg* (1818 and 1840), *Posen* (1822), *Württemberg* (1825), *Calenberg, Grubenhagen and Hildesheim* (1825), *Bremen und Verden* (1826), and the *Hannoversche Landes Kreditanstalt* (1840) (Frederiksen, 1894).

⁵ Compare Hofman, Postel-Vinay and Rosenthal (2009).

⁶ Compare Stiglitz (1990).

⁷ For a review of recent developments in research focusing on German financial history compare for example Burhop (2006), Guinnane (2002) and Fohlin (2007).

⁸ For a detailed discussion of land ownership, compare Eddie (2008)

(Frederiksen, 1894). Landschaften thus played an important role in the economic, political, and social development of Prussia and later the German Reich.⁹ Landschaften also enabled Junkers to expand the amount of leverage taken on against their estates. Whether the level of indebtedness of estates was excessive or sustainable remains a controversy, but to this day scholars have not focused on how the Junkers were able to leverage their estates to a relatively large degree.¹⁰ The current analysis of the Landschaften shows that their creation enabled Prussian landholders to take on a large amount of debt that was long-term and easily serviced. Also, Pfandbriefe constituted an attractive investment choice for capital holders.

In the following, this paper will focus on the common operational features of the Landschaften and demonstrate how they served as financial intermediaries. I will argue that despite some weaknesses, the stability and relative success of the Landschaften can be derived from their specific institutional design, which helped them overcome adverse selection, moral hazard, and auditing and enforcement problems related to lending. I will also briefly outline their role and function for the Prussian economy. The paper is organized as follows: Section 2 describes the economic conditions in Prussia at the time of the creation of the Landschaften. Section 3 discusses the features of the Landschaften and introduces a stylized model of credit intermediation. Section 4 provides empirical evidence of their performance. Section 5 concludes.

2. Economic Conditions in Prussia and the Creation of the Landschaften

Prior to 1848 Prussia was an absolute monarchy, ruled by the king and supported by the landed aristocracy, the Junkers, and the bureaucracy. Prussian society was strictly organized in a feudal class system and the representatives of these classes, especially the Junkers, controlled local affairs through manorial courts and police powers. The Junkers also organized economic activity and while they are often portrayed as showing little

⁹ Compare Gerschenkron (1946) for a discussion of the role of the Prussian Junker class for German economics and political development.

¹⁰ For a more recent discussion, refer to Schiller (2003) and Hess (1990).

interest in furthering industry, they were obviously concerned with the status of agriculture and their estates.

At the end of the Seven Years War in 1763, Prussia emerged as a regional power. However, economic conditions were bleak. The war had disrupted trade and economic activity and especially the areas east of the river Elbe had suffered from enemy occupation and having been the site of military operations. Farms were neglected and landowners, farmers and peasants were short on horses, cattle, sheep, fodder and seed (Henderson, 1962). To restore agricultural production, landowners and farmers were in need of long-term credits at affordable rates.

Before the war, landowners had relied on private credit intermediaries who offered a loan at about 6% interest plus $\frac{1}{2}$ to 1% commission, implying that credit had been available at 6-8%. Loans were usually granted up to half of the last sale price of the estate. The foundation for the formal use of land as collateral for loans had already been laid with the 1722 bankruptcy law, which stipulated the publication of the cadastral register (Jessen, p. 36). Revisions of the mortgage laws in 1748 and 1750 established a ranking for debts, which secured debt registered in first position a privileged status (Weyermann, p. 64). Nevertheless, verifying the security of a loan and ensuring its repayment was cumbersome and entailed high information and transaction costs for the lender. In fact, Borchardt (1961) claims that the lack of credit in Germany in the early 19th century was in fact not a problem of supply but rather of insufficient matching between creditors and debtors. Similar conditions probably also held for the 18th century.

However, the credit limit had been raised during the war, contributing to the high indebtedness of the manors (Mauer, p. 19). A study of the Kur- and Neumark in 1771 reveals that the average level of indebtedness of the estates was 53% of their value, but about 15% of estates were indebted over 100% of their estate value and some as high as 200% (Pr. Br. Rep 23B, Neumärkische Stände, Nr. 635). In addition, mortgage rates for the safest mortgage loans had climbed to 10% and the commission had widened to 2-3%, substantially increasing the cost of credit (Frederiksen, 1894). The agricultural crisis coincided with the financial depression and general credit crunch in the crisis of 1773. At the end of the war, speculative trading activities that had been profitable in wartime came

under pressure, leading to bank failures, especially of the bank houses Arend, Joseph and de Neufville. The financial crisis was transmitted through bills of exchange from Amsterdam via Hamburg to Berlin. In Berlin, Friedrich II had tried to halt the crisis through the refusal of Wechselstrenge (holder in due course) and bailouts. However, both measures only heightened the risk perception of foreign creditors and worsened the credit crunch (Schnabel and Shin, 2004). In addition, wartime inflation was met by post-war deflation. In the Mint edict of March 1764, the price of the Taler was set at 19.75 to the mark, effectively 40% below the pre-war rate. In 1765, Friedrich II passed a three-year general moratorium on all debts, but this was insufficient to restore the estates and it did not relieve the overall shortage of capital. At the end of the moratorium in 1768, many estates went into foreclosure. According to contemporary sources, liquidations of estates in which less than half of the outstanding debt could be recovered led to a complete collapse of agricultural credit (Weyermann, p. 66). Land as collateral no longer sufficed to attract individual loans and creditors shied away from all rural investments.

Landschaften were created in this vacuum of agricultural credit. The design of the Landschaften goes back to a proposal made by a Berlin merchant named Diederich Ernst Bühring in 1767. Bühring had spent the early years of his career in Amsterdam, gaining experience with trading bills of exchange that were used to finance economic activities in the Dutch colonies. Growing up in Bremen, Germany, he was also acquainted with Bremer 'Handfeste-Urkunden', bearer bonds that were backed with a claim on real estate belonging to the debtor (Jessen, p. 40-41).

Bühring's plan combined his ideas of these various financial instruments and stipulated the creation of a general mortgage institute, the 'General Landschaftskasse,' for all of Prussia that would hypothecate all of Prussia's noble estates. This General Landschaftskasse would issue bearer bonds at 4% and would guarantee the convertibility and punctual payment of interest rates. Estate holders would elect to be part of this mortgage bank and would pay 4.5 or 5% interest on their loans. The interest rate differential would be used for administrative funds and to assemble a reserve fund for emergencies.¹¹

¹¹ Compare Bühring's Plan, cited in Maurer (1907, p. 190-95).

The plan was presented to king Friedrich II in February of 1767 who forwarded it to his ministry of finance, Etat-Minister von Hagen. Von Hagen rejected the plan in March of 1767 and it is not clear whether the blueprint as looked at again, when the first Landschaften were established. It is thus unclear to what extent Bühring's plan was actually used in the establishment of the first Landschaft. However Bühring's ideas laid out the key details later to be implemented (Jessen, p. 38). Bühring is therefore often referred to as the conceptual father of the Landschaften. Also, in 1777, after the first two Landschaften had already been established by the crown Bühring was credited with the original concept of the Landschaftskassen (Jessen, p. 44).

In 1768, Johann Heinrich Casimir von Carmer who had become the new finance minister and minister of justice designed the new credit system to alleviate the noble estates from shortage of credit. Similarly to Bühring's original plan, he suggested a Landschaft for all of Prussia, but stipulated that all noble estates would be mandatory members of this new organization. The Landschaft would then issue covered bonds up to half the value of all estates and guarantee the interest payments as well as the principal, backing the Pfandbriefe with the joint liability of all estates. Furthermore, Pfandbriefe should circulate as quasi-money to alleviate the general shortage of credit.

Based on von Carmer's ideas king Friedrich II passed a cabinet order to found the first of the Landschaften, the Silesian Landschaft in August of 1769. In the summer of 1770 the statutes of the Silesian Landschaft were ratified by the general assembly of the Silesian feudal class and in December of 1770 the first Pfandbriefe were issued (Jessen, p. 47).

The creation of the Silesian Landschaft took up important elements of Bühring's as well as Carmer's original plans, but also differed in some key aspects. As von Carmer had suggested, the noble estates of Silesia were joined in a mandatory credit association and would jointly back all (Pfandbriefe) issued by the Landschaft. The key concept of the Pfandbrief however went back to Bühring's original plan, with the Landschaft guaranteeing the interest payments as well as the convertibility. Lenders could therefore rely on the Landschaft rather than on individual borrowers for their payments. They would purchase standardized Pfandbriefe rather than negotiating private loans, and benefit from reduced transaction costs and an emerging secondary market. The key

features of the Landschafts-credit for landholders were that it was long-term and affordable, so landholders were insured against low and variable returns. In addition, loans could not be called-in by the lender. This provided additional stability and security for the debtors.

(Insert Figure 1 here.)

An example of a Pfandbrief issued by the Silesian Landschaft on June 24th, 1774 can be seen in Figure 1. The picture shows a privileged Pfandbrief over 30 Reichstaler Courant, at 14 Reichstaler per mark fine silver. It is made out for the estate named ‘Jaschkowitz’ which is in the district of Toste in Upper Silesia and it is backed by all combined estates in Upper Silesia. Interest was payable in cash in Cosel or Breslau and the receipts of the bi-annual interest payments were stamped on the Pfandbrief. Interest payments were carried out through 1923 (noted on the back) and in 1929 this Pfandbrief was stamped worthless and exchanged for a new gold Pfandbrief.

3. The Design of the Landschaften and their Lending Mechanisms

This section details the design of the Landschaften and proposes a stylized model of intermediation to illustrate their role in the credit market. It also outlines the special organizational features that Landschaften relied on to overcome the asymmetric information problems related to lending.

3.1 The Design of the Landschaften

The design of the Landschaften anchored their function as intermediaries between lenders and borrowers. To obtain a loan, a landholder and member of the Landschaft would place a request with the Landschaft. Then the local assessor, who was also a member of the Landschaft, would assess the value of the estate and determine a credit limit that was either based on the net profit of the estate or its last sale price. After the credit was granted, the Pfandbriefe were handed to the estate holder the following Christmas or Johanni (Saint John the Baptist, June 24th). Estate holders could then

present these bonds to the Landschaft and ask to be paid in cash after a period of six months. Alternatively estate holders could sell the bonds themselves in the open market. Bonds were initially issued at 4% and borrowers had to commit to paying bi-annual interest payments in cash plus an added $\frac{1}{2}$ -1% for administrative purposes.¹²

(Insert Figure 2 here.)

To raise funds, the Landschaft sold Pfandbriefe to other buyers, especially urban capitalists that were seeking investment opportunities. Pfandbriefe carried interest payments of 4.5% or 5% and were first sold at their nominal value. With rising popularity their initial sale prices demanded a premium of $\frac{1}{4}$ to $\frac{1}{2}$ % and it became easier for landholders to sell them directly to the market rather than cashing them in with the Landschaft. Figure 2 describes the transaction, assuming that the Landschaft was presented with the Pfandbrief, Figure 3 describes how borrowers could sell their Pfandbriefe directly to investors. In both cases the Landschaft remained responsible for coupon payments to the lender and the borrower made regular interest payments (twice a year) to the Landschaft.

(Insert Figure 3 here.)

3.2 A stylized Model of Lending Intermediated by the Landschaften

Following Gehrig (1993) and Demsetz (1968) I introduce a simple model of credit intermediation to illustrate the functioning of the Landschaften and their role for historical credit markets. The model is displayed in Figure 4. Assume that in a non-intermediated search market, a continuum of borrowers (D) and lenders (S) meet at the unregulated equilibrium E, trading credit contracts at interest rate r and quantity Q . A financial shock, like the Seven Years War, now disturbs this market, making it harder for lenders to receive repayment of their loans. Lenders start calling back loans, increasing interest rates and restricting available credit. This increases pressure on borrowers, especially on those already experiencing financial strain. The credit market begins to resemble a lemons market, as described by Akerlof (1970) and may collapse (compare

¹² The 4% interest rate was adjusted later to 3.5%, then raised again. Over their lifespan, most Landschaften created different issues of bonds, all priced between 3.5% and 5%.

the intersection of D and S'' in Figure 4). The introduction of the *Landschaften* and their issuing and selling of the *Pfandbriefe* introduces an artificial demand (D') and supply (S') that revives the market.¹³ Borrowers can now receive loans in the form of *Pfandbriefe* from the *Landschaft* at interest rate r'' , while lenders can offer credit via their purchase of *Pfandbriefe* and receive a virtually guaranteed rate of r' on their loans. The difference between r'' and r' is used to cover the administrative costs of the *Landschaft*. While the intermediated equilibrium $E'E''$ remains inferior to the unrestricted pre-crisis equilibrium E it vastly improves on the crisis outcome and succeeds in re-instating the market.

(Insert Figure 4 here.)

The model predicts that in the intermediated market interest rates available for borrowers and lender should straddle the old equilibrium interest rate. Lending volume should rise compared to the crisis outcome, but fall short of the old equilibrium outcome.

The establishment of the *Landschaften* trumped the private credit market, which had collapsed in the face of the economic crisis. As can be seen in the next section, *Landschaften* were soon relied on by borrowers and their *Pfandbriefe* were well received by investors. As new financial intermediary, they operated as an information-sharing coalition, which unified borrowers, as well as a delegated monitor that provided enforcement.¹⁴ Replacing the collapsed private market of bilateral debt contracts by the *Landschaft* reduced transaction costs as the *Landschaft* pooled loans and created a standardized debt instrument. *Landschaften* could realize economies of scale and scope by including up to 2,500 borrowers¹⁵ and reaching deeper into the pool of creditors. As the *Pfandbriefe* were standardized, this also offered creditors an emerging secondary market that increased liquidity. *Pfandbriefe* of the Prussian *Landschaften* were quoted on the Berlin Bourse and were available to a wide audience of lenders.

¹³ Supply and Demand curves as generated by the *Landschaft* are kinked, since the *Landschaft* supplies credit and sells *Pfandbriefe* at fixed rates up to the aggregate credit limit. It is not guaranteed that this credit limit suffices to satisfy the existing demand but since all members of the *Landschaft* are entitled to some credit, the analysis does not fundamentally change.

¹⁴ This reflects the idea that the cost of capital falls with the size of the coalition, as outlined in Diamond (1984) and Leland and Pyle (1977).

¹⁵ By the early 20th Century, the East Prussian *Landschaft* even included over 15,000 estates that had issued *Pfandbriefe*.

The following section now turns to the institutional features that the Landschaften incorporated to address the information asymmetry problems related to lending and to operate as effective credit providers.

3.3 Adverse Selection

Adverse selection is an ex ante informational problem which captures that under certain conditions only borrowers that are a poor credit risk will be attracted into a market.¹⁶ In response, lenders will not be willing to supply capital to this pool of ‘lemons’. The market collapses and lending ceases as could be seen in the aftermath of the Seven Years War. To mitigate this lemons problem, the old Landschaften, except for the Kur-und Neumarkt, automatically included all noble estates situated within the geographic expanse of the Landschaft.¹⁷ While this did not change the overall destitute economic situation of the estates, it gave all estates equal credit access at fixed interest rates and thus increased the chances that a borrower would not be a ‘lemon’. Since all estates that were part of the Landschaft were also included in the joint liability, landowners had an incentive to rely on the Landschaft for credit, increasing participation and again improving the pool of potential borrowers.

Corresponding to the compulsory membership, all members of the Landschaften held a ‘right to credit’. Therefore, key to the mitigation of adverse selection was the determination of the credit limit. The assessment of the member estates prior to granting a loan followed two different mechanisms. Starting from the last sale price of the estate, the landholder could obtain a loan up to one quarter, one third or one half of this price, depending on when the sale had taken place. Alternatively, the net profit of the estate was assessed by a tax commissioner, and the estate holder could then obtain a loan of 15-20 times the assessed amount (Altrock, p. 25). To ensure a conservative assessment, the assessor could even be held personally liable for losses in the case of a too generous assessment (Weyermann, 1910).

¹⁶ This ‘lemons’ problem was first described by Akerlof (1970).

¹⁷ Landschaften built on the history of earlier financial functions of Prussian feudal organizations, which had provided banking services to its members. However, most of these old credit banks had been shut down by a decree of the king in 1717. Only the ‘Kreditwerk der Churmärkischen Landschaft’ had survived as the last of these old credit banks. It functioned as the credit institute for the Prussian upper class and remained in operation until 1820, issuing bonds that were traded on the exchanges of Berlin and Vienna (Jessen, p. 48).

Pfandbriefe were entered into the cadastral register of the estates and took precedence over all other outstanding debt. In cases where existing debt could not be extinguished prior to the Landschafts loan, the amount of capitalized debt was subtracted from the maximum loan value, but often landholders could exchange Pfandbriefe for existing debt up to the credit limit (Altrock, pp. 60/61). Pfandbriefe were also used to service standing obligations such as rent payments or payments resulting from inheritance or estate settlements (Ritterschaftliche Haupt Direktion, Rep 23A Kurmärkische Stände).

3.4 Moral Hazard

Moral hazard constitutes an interim problem in the lending process in which borrowers that have received funds engage in risky behavior, for example choosing a more risky investment project. Moral hazard can be avoided through improved incentives and monitoring. Without microdata on individual loans, it is hard to verify to what extent moral hazard presented a problem for the Landschaften. Generally, funds are described as being put to productive use, such as purchases of new agricultural machinery or construction or renovation of houses and barns on the estates. Some indication for moral hazard, however, might be the purchase of new land, which was fuelled by the Landschaft and set off a speculative boom in real estate. Estate holders could take out Pfandbriefe for an existing estate and use the proceeds to buy more land, which could then again be assessed and used as collateral for new loans. Changes in ownership of estates were frequent between 1780 and 1806 and the noble estates were consolidated in the 1780s and 1790s (Mauer, p. 21). In 1789 the King passed a law for Silesia that limited the extent at which new estates could be purchased with Pfandbriefe, however this law was difficult to enforce and was abolished again in 1791. While the Landschaften failed to set up an effective mechanism to prevent land speculation, the practice appeared to have attracted less followers over time.

The key mechanism for Landschaften to address moral hazard was the principle of joint unlimited liability. Issuing the Pfandbrief, two legal obligations were incurred that provided the borrower with additional security (Mauer, p. 3-4). First, the owner of the Pfandbrief held a claim against the estate to which the Pfandbrief was tied. This claim was a charge against the land on which the estate was situated, not against any private

property or assets of the owner. Second, the Pfandbrief constituted a claim against the Landschaft, meaning that the Pfandbrief was backed by all liquid assets of the Landschaft as well as all land of the member estates of the Landschaft, whether they had borrowed money or not. This joint liability feature resembled group-lending contracts used in modern microfinance groups and the design of the credit cooperatives founded in the mid-19th century by Friedrich Raiffeisen and Hermann Schulze-Delitzsch.¹⁸ Even though the joint liability was never called on in practice, it appeared to be an important signal, at least in the beginning and it increased the incentive for neighbors to monitor each other (Hagedorn, p. 58). Since Landschaften were relatively large institutions, local monitoring was not always easy. But all member estates of the Landschaft represented a specific social class, making the group fairly homogeneous and conscious of social stigma. Moreover, Landschaften built on the existing political and social order, continuing the organization of the ‘Stände’, which had historically ensured representation of the nobles. Landschaften were also subdivided in smaller regional groups for administrative purposes, which allowed for the possibility of monitoring.

3.5 Auditing and Enforcement

One large advantage of the Landschaften over private lenders laid in the fact that all monitoring was now relegated to a central authority. To help with auditing and enforcement, Landschaften relied heavily on local expertise and used local officers to inspect the estates and set the maximum loan amount.¹⁹ Landschaften were self-governed with elected officials coming from the membership. Landschaften were managed by the General-Landschaftsdirektion, headed by the Generallandschaftsdirektor (general director), elected for six years. Next to the director worked a corporate counsel, which also had judicial powers to be able to carry out foreclosure. In addition, three Generallandschaftsräte with complete voting rights were part of the Landschaftsdirektion. These had to be estate holders in the Landschaft and be fully employed in agriculture. In

¹⁸ A detailed discussion of the Raiffeisen credit cooperatives can be found in Guinnane (2001, 2002).

¹⁹ Landschaften also refrained from valuing life stock early on, as it was found that livestock was too variable and estate owners would ‘borrow’ life stock for the time of the assessment (Frederiksen, 1894).

contrast to the director and the counsel, which were employed by the Landschaft, all other positions were honorary. By relying on voluntary labor, Landschaften kept costs to a minimum.

The Landschaftsdirektion was equivalent to a board of directors and carried out the important decision-making and the day-to-day operations of the Landschaft. Members of the directorship were elected by a supervisory board, called Landschaftsausschuss that was designed to be representative of the membership of the Landschaft. It included 20-25 members, and met at least once a year to supervise the Landschaftsdirektion (Jessen, p. 119). Over time Landschaften supplemented the Landschaftsdirektion with additional tax and accounting committees that assisted with assessing the estates and supervising financial matters.

To strengthen their enforcement mechanism and provide a tool to address defaulting estate holders, Landschaften had the right to foreclose on estates that were in arrear with their payments. The foreclosure process provided a credible threat and even if not frequently, was employed on a regular basis. Due to the relatively conservative loan amount of half the tax value of the estate, Landschaften were usually able to cover the amount of the outstanding loan with the sale price.

3.6 Additional Measures

Further mechanisms, which boosted the stability of the Landschaften, were the accumulation of reserve funds, and over time, the introduction of amortization schedules. As alternative to collateral, Landschaften built reserve funds that were to be used to cover unexpected operating costs or irregular losses. Reserve funds were never used as a source of loan funds, however they represented a form of forced saving that added a level of security to the Pfandbriefe. The capital accumulated by the Landschaften resulted from the interest differential paid by the borrowers, as well as capital injected by the crown. For the Silesian Landschaft, for example, King Friedrich II extended a loan of 200,000 Talers at 2% interest (Frederiksen, 1894). However, not all Landschaften received this form of direct assistance. Moreover, the Landschaften seemed not to depend on these loans for their day-to-day operations. Over time, all Landschaften built sizable reserve funds, however, these assets were only used for emergencies and not to issue credit.

Landschaften varied in the extent to which the borrowers had to amortize their existing debt. While the Landschaften paid out the principal of the loans on demand, originally, the individual borrowers were only obliged to make regular interest payments to the Landschaft and the 'old' Landschaften did not carry provisions how the existing debt should be retired. Only over time did Landschaften introduce obligatory amortization schedules (Frederiksen, 1894). Between 1770 and 1777 borrowers could opt to retire their debt through bond payments as well as cash payments to the Landschaft. In 1777 the by-laws of the Silesian Landschaft stipulated that debts could only be extinguished with Pfandbriefe, which had the corresponding interest schedules. Only after 1785 cash payments were permitted again. The lack of amortization was seen as a structural weakness of the Landschaften and in the design of the subsequent Landschaften, for example Posen in 1818, provisions to pay off the debt were included from the start (Mauer, p. 168). For the 'old' Landschaften, however, estate holders resisted the amortization, especially during the agrarian crisis of the 1820s. But as economic conditions improved, the West and the East Prussian Landschaft began creating amortization funds to extinguish some of the existing Pfandbriefe. In 1832, the East Prussian Landschaft even raised the interest payments for the state holders by 1/6% (Mauer, p. 169). But in practice, these funds were nothing but expanded reserve funds for the Landschaft as they were never used to relieve the estates of their debt. Mandatory amortization by the estate holders was only introduced in the 1920s. (Jessen, p. 78).

Landschaften differed substantially from the later created mortgage banks (Hypothekenbanken).²⁰ In contrast to the Landschaften, mortgage banks were private and not public institutions. Their customers were not 'members' of the bank. Also, Hypothekenbanken did not hold reserve funds and had no right to foreclose on debtors that were in arrear with their payments. The issued mortgage bonds however were very similar between both kinds of institutions.

²⁰ The first operational German mortgage bank was the Frankfurter Hypothekenbank (1862). The Bavarian Hypotheken und Wechselbank had been established in 1834, but obtained the right to issue mortgage bonds only in 1864 (Jessen, p.16).

4. Empirical evidence

In the following section I present empirical evidence that is consistent with the presentation of the credit market model and highlights the importance of the institutional features of the *Landschaften*.

This evidence is tentative since data are scarce and often inconsistent. Nevertheless it shows that overall the *Landschaften* were successful in providing credit. Contemporaries describe the *Landschaften* as successful in averting further liquidations of Junker estates and credit their creation with stabilizing economic conditions. For example, Friedrich II claims in his memoirs that the Silesian *Landschaft* saved 400 of the best families of the province from ruin (Frederiksen, 1894). In fact, *Landschaften* lowered the cost of credit for agricultural estates from about 8% before the Seven Years War to below 5%, and *Pfandbriefe* circulated widely soon after their issue. While in Silesia, interest rates in 1770 had been 6, 8 and 10%, rates averaged 4.66% in 1777 and 4% in 1787 (Jessen, p. 67). *Pfandbriefe* were deemed extremely safe investment choices, often at par with government securities. They also increased the value of the estates that could be used as collateral and brought a stabilization and eventual rise in the price of land. In 1770 the value of all noble estates in Silesia was estimated to be 60 million Reichstaler, of which 22 million were registered debts. Already by 1790, the value of the estates had doubled and *Pfandbriefe* valued at 15 million Reichstaler were circulating (Jessen, p.68).

(Insert Figure 5 here.)

The number of *Landschaften*, as well as the number of estates that borrowed through the *Landschafts*-system (Figure 5) rose steeply, especially from the mid 19th century onward. With it also the total amount of *Pfandbriefe* increased (Figure 6), emphasizing their popularity in financial markets. *Pfandbriefe* were also popular investment choices abroad, to the degree that the government worried about interest payments that were paid to foreigners and tried to curb foreign sales (Franz, p. 26).

(Insert Figure 6 here.)

This trend corresponded with the changes in regulations of the *Landschaften*. Over time, they expanded to include smaller estates and farms. In 1808 the East Prussian *Landschaft*

was extended to include non-noble estates that belonged to the Köllmer, a group of free farmers. Likewise, forests belonging to the crown were incorporated starting in 1809 (Altrock, p. 17). Beginning in 1849, the East Prussian Landschaft included all estates of a minimum tax value of 1500 marks (Altrock, p. 108). The effect of the Landschaften for these smaller farms however remained limited and large estates took more advantage of the Landschafts-credit than smaller ones. In the second half of the 19th century the system of Landschaften solidified and expanded. Many Landschaften added additional financial services in the form of Darlehnskassen (savings and loan associations) and insurance companies (mostly fire and life insurance).

In 1860 for example the East Prussian Landschaft added the Landschaftliche Darlehnskasse. Also, similar to the central organizations of the Raiffeisen credit cooperatives, the Central-Landschaft for the Prussian States was founded in 1873.²¹ This central organization was a cooperation of twelve regional Landschaften. The Central-Landschaft issued unified Central-Pfandbriefe, which were thought to be more appealing to a wider group of buyers, however since the individual Landschaften still issued their own Pfandbriefe alongside the Central-Pfandbriefe, the Central-Landschaft's success remained below expectations (Jessen, p. 92).

Since Pfandbriefe were convertible into cash on demand at the Landschaft, they circulated as quasi-money and could be used directly by the estate holders as means of payment. Even though they were not legal tender, they were used as cash equivalent. This saved the transaction cost of converting them at the Landschaft. It also implied that the money supply was expanded by roughly the amount of Pfandbriefe issued.

Zöllner writes in his "Letters about Silesia" in 1793:

“Und im Grunde war es für die Provinz so gut, as wenn 14 Millionen Taler bares Geld in dieselbe gekommen wäre, weil diese Summe in Pfandbriefen vorhanden war, deren man sich zu allen Zahlungen eben so sicher und mit noch grösserer Bequemlichkeit als der Klingenden Münze bedienen konnte” (Zöllner, p. 399)

²¹ Compare Guinnane (1997) on the Raiffeisen centrals.

Translation: “In effect, it was as if 14 million Taler in cash had entered the province, as this sum was available in Pfandbriefe, which could be used for all payments with the same security and even greater convenience as coins.”

In practice, Landschaften issued two different kinds of Pfandbriefe. First, Capitalsbriefe (capital bonds), which constituted 90% of the total share of all Pfandbriefe and second Realisationsbriefe (realized bonds, 10% of the total). Realisationsbriefe could be exchanged on demand at the Landschaft into Prussian Taler. They were issued in denominations of 20-100 Talers, while Capitalsbriefe were denominated up to 10,000 Talers. For Capitalsbriefe, there was a six-months exchange period after which the Pfandbriefe could be cashed in (Jessen, p. 72). The Landschaft thus needed to hold reserves in the amount of all issued Realisationsbriefe, initially made available by the crown. At an exchange rate of 14 Talers to a mark of fine silver, Pfandbriefe were directly tied to the monetary base, but backed by land rather than specie. Often borrowers could pay obligations directly with the acquired Pfandbriefe, without cashing them in at the Landschaft.

(Insert Figure 7 here.)

Figure 7 shows the development of the prices of Pfandbrief yields of the five old Landschaften is shown in comparison with the 4% Prussian sovereign bond. These yields are indicative of major economic and political events of Prussia at the time, but their peacetime overall stability also speaks to the success of the Landschaften. It is also noticeable that frequently the Pfandbriefe traded at par or above the Prussian state bonds.

All Landschaften initially issued 4% Pfandbriefe, which were converted to 3.5% in the 1830s. From the 1830s forward, Landschaften issued a broader selection of Pfandbriefe with varying interest rates (3.5% - 5%) to compete with changing conditions in the credit markets. From then on, Landschaften also required borrowers to sell the Pfandbriefe directly and eliminated the rights of the Pfandbrief holders to present the bonds to the Landschaft on demand. In practice, however, this change had little effect since borrowers already preferred to directly monetize their debts.

The yields of the Silesian Landschaft remained below 4% from the outset and were stable until the beginning of the Napoleonic Wars. The Wars called into question agricultural productivity in Prussia. They also burdened East Prussia with approximately 260 million marks in wartime costs (Altrock, p. 110). In response, Landschafts members were granted extensions on their interest payments between 1807 and 1818 (Ristau). Also, after 1807, the Silesian Landschaft and the East Prussian Landschaft incorporated territories of the Prussian State as member estates. This allowed Prussia to request Pfandbriefe backed by these territories and thus raise funds to pay off war debts. Thus the Silesian Landschaft, as well as the East Prussian, was actively used to expand the government budget and the fiscal debt with the Landschaft was not amortized until 1900. However, other Landschaften refused to accept State territories into their domain, thus assuring their independence from the Prussian State (Jessen, p. 74).

The years 1807-1815, in which the yields of all Landschaften skip to their highest values, were also years of agricultural reform for Prussia. Following the proposals by Karl August von Hardenberg and Heinrich Friedrich Karl Freiherr von Stein the old feudal system was abolished and farmers were liberated (Jessen, p. 84). As part of the reforms, noble estate holders were compensated for the loss of agricultural labor with part of the land that had belonged to farmers. This additional land again could be used as collateral for the issue of new Pfandbriefe (Mauer, p. 52). The yields recovered with the end of the War and with the exception of spikes for East and West Prussia in the early 1820s remained stable until 1848 when the revolutions again called the German class system in question. Beginning in the 1840s, the Landschaften also struggled to attract capital due to the rising need for credit in industry, especially railroads and mining (Altrock, p. 113). Frequent Pfandbrief conversions also lowered their popularity in the 1860s. However, prices steadily recovered again after the German unification of 1871, trading close to par in the 1880s and 1890s.

In addition to the visual inspection of the Pfandbrief volume and prices, I use a simple panel approach to test the effectiveness of the design mechanisms implemented by the Landschaften on their stability. Relying on annual data for the five oldest Landschaften from their creation through 1907, I created an imbalanced panel including data on their outstanding interest payments, cash reserves, amount of Pfandbriefe issued, the price of

the Pfandbriefe, and institutional features such as their credit limit, whether they had mandatory membership, and whether they mortgaged crown lands. I also include a dummy variable indicating the time of a moratorium that was placed on all payments of the Landschaften after the Napoleonic wars. For control variables, I add the prices of Prussian bonds, as well as wheat and potato prices. Data were collected from 125 Jahre Ostpreussische Landschaft (1913), Brämer (1867), Hecht (1908), Jacobs and Richter (1935), Meitzen (1868), Ristau (1992), and Ministerium der öffentlichen Arbeiten in Pommern I. HA Rep 93B Nr 3267.

(Insert Table 1 here.)

Table 1 presents the results of a panel analysis using the outstanding interest payments and the cash reserves of the Landschaft as dependent variable. This analysis shows the financial strains that the Landschaften were under and determines which features allowed them to maximize repayment and to increase their reserves. Outstanding interest payments are negatively related to the Prussian bond yields and the mortgaging of crown lands, and positively related to Pfandbrief yields, the payment moratorium and the compulsory membership. Cash reserves rise with higher Pfandbrief yields, and the inclusion of the Domaenen and fall with higher bond yields, the payment moratorium and forced membership. The borrowing limit, which varied by Landschaft between 50-67% of the value of the estate, appeared not to have any effect in outstanding interest payments and reserves. While these results are suggestive, they indicate that the forced membership was a meaningful feature of the Landschaften and that the inclusion of crown lands supported rather than weakened the Landschaften that chose to pursue this.

5. Conclusion

Landschaften were public non-profit institutions that by issuing covered bonds, formalized the mortgage market in Prussia, beginning in the second half of the 18th century. Despite some perceived weaknesses in their design, such as the ‘right to credit’ for their member estates and the initial lack of amortization provisions, they were effective in providing credit to Prussian noble estates. They demonstrated how bonds

could be safely backed with land and thus institutionalized mortgage lending in Prussia, serving as an early predecessor for credit cooperatives as well as private mortgage banks. They also proved extremely durable, establishing an asset class of mortgage backed securities that remained popular to this day.

Landschaften assumed an important financial intermediary function connecting the landholding but cash-poor Junker class with credit sources in Berlin. Landschaften reduced transaction costs for lenders and borrowers and relied on joint liability, local monitoring and forced membership to avoid problems of moral hazard and adverse selection. They also cooperated with the crown, with some Landschaften even mortgaging crown lands and thus directly supporting government finances. Through the Landschaften, Junkers could easily take on large amounts of debt that were available long-term at comparatively cheap rates. The creation of a standardized debt instrument also enabled a growing secondary market, which increased the liquidity of mortgage loans. Since Pfandbriefe were issued in various denominations they also circulated as cash equivalent.

Then as now, the stability of the Pfandbriefe was anchored in their one to one correspondence to an underlying asset, which was guaranteed by the institution of the Landschaften. The historical example highlights successful financial innovation.

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Figure 2: Borrowing Intermediated by the Landschaft – Version 1

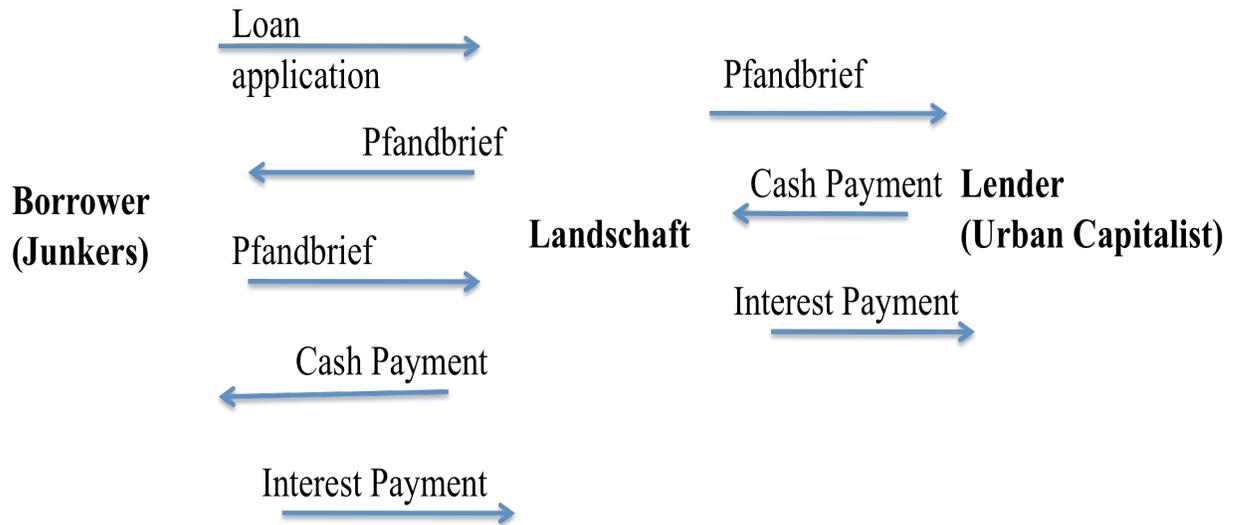


Figure 3: Borrowing Intermediated by the Landschaft – Version 2

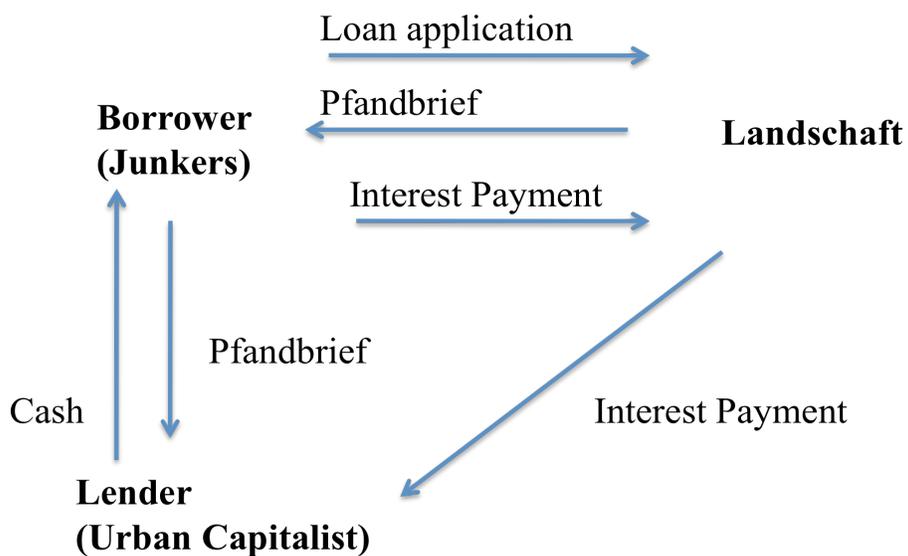


Figure 4: A Stylized Model of Credit Intermediation

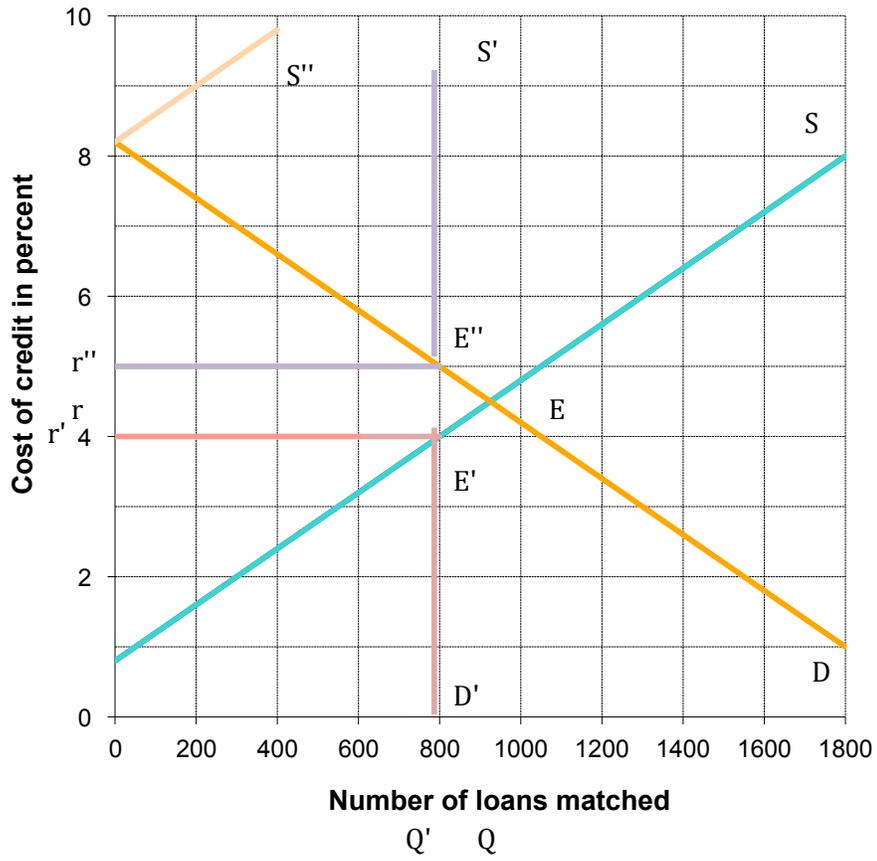
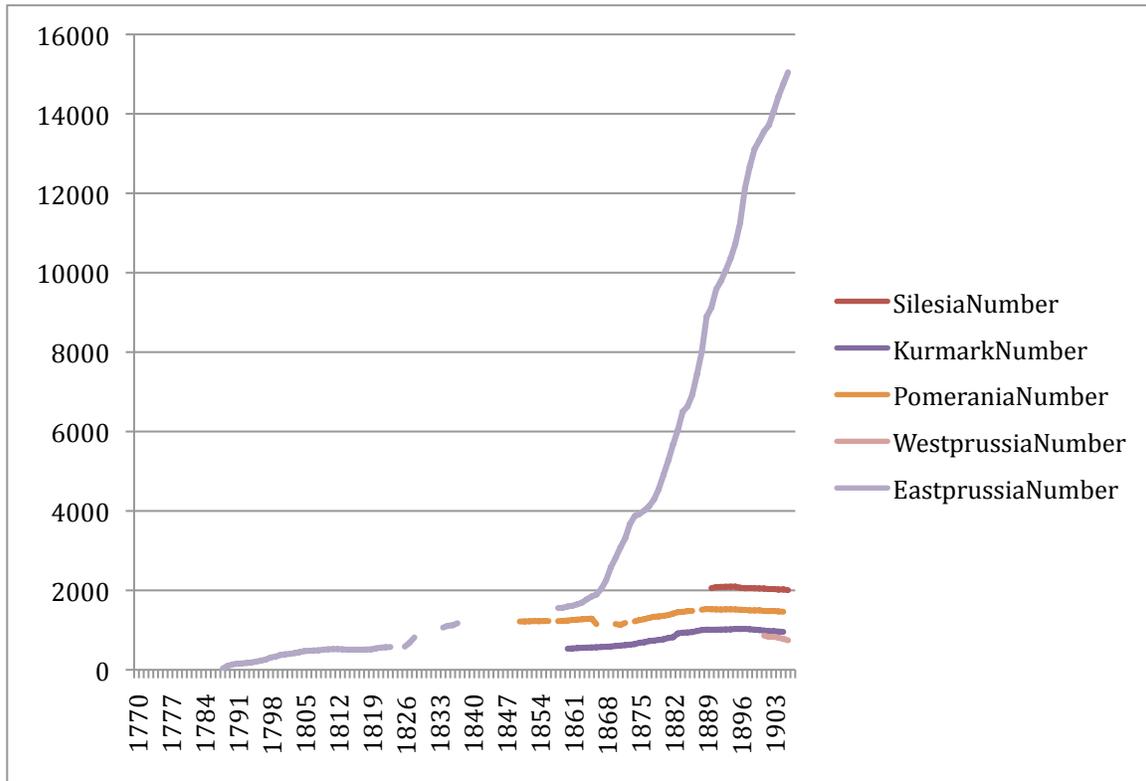
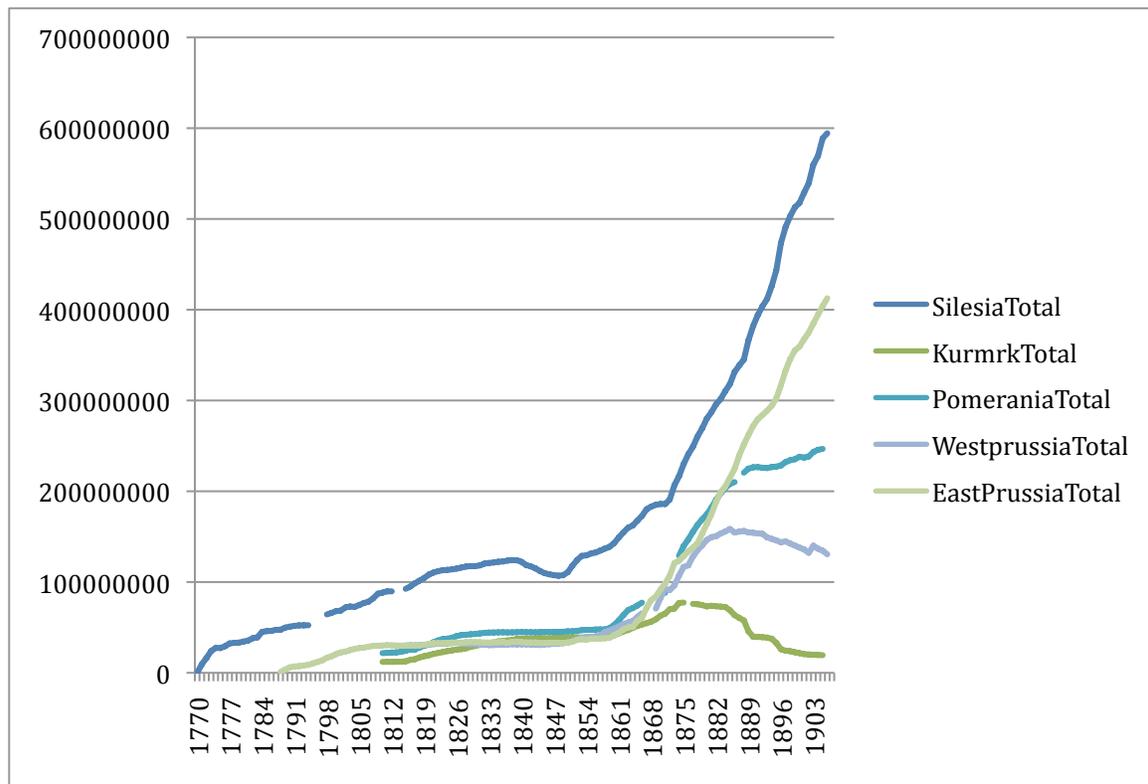


Figure 5 – Number of Estates that Issued Pfandbriefe



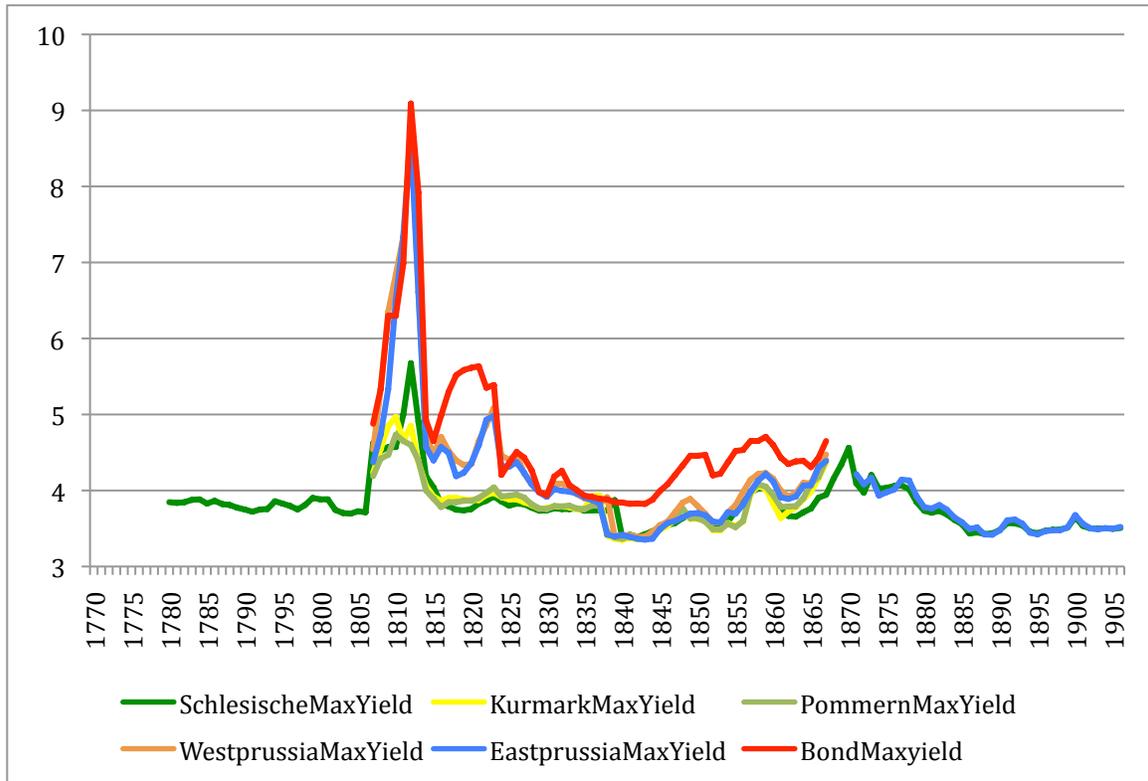
Source: Hecht (1908), Kur und Neumaerkisches Landschaftliches Kreditinstitut: Tableau der mit Pfandbriefen belegten Domänen (1817), Braemer (1867)

Figure 6: Amount of Pfandbriefe Outstanding (total issues, in Mark)



Source: Hecht (1908), 125 Jahre Ostpreussische Landschaft (1913)

Figure 7: Maximum Yields of Pfandbriefe for the Five Old Landschaften



Source: Hecht (1908), Meitzen (1868)

Table 1: Panel Analysis of Outstanding Interest Payments and Cash Reserves

	Model 1: Outstanding Interest Payments		Model 2: Cash Reserves of the Landschaft	
	RE	FE	RE	FE
Pfandbriefyields	0.0402** (0.0044)	0.0313** (0.0044)	0.0324** (0.0064)	0.0325** (0.0065)
Bondyields	-0.0176** (0.0032)	-0.0126** (0.0032)	-0.0098** (0.0031)	-0.0098** (0.0032)
Borrowing Limit	0.0188 (0.0350)	0.0144 (0.0554)	-0.0176 (0.0174)	-0.0175 (0.0266)
Domänen Included	-0.0109* (0.0048)	Omitted	0.0332** (0.0074)	Omitted
Payment Moratorium	0.0491** (0.0059)	0.0482** (0.0056)	-0.0222** (0.0061)	-0.0222** (0.0061)
Wheat Prices	-0.0002 (0.0001)	-0.0003* (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)
Potato Prices	0.0004* (0.0002)	0.0004* (0.0002)	0.0003 (0.0001)	0.0003 (0.0001)
Forced Membership	0.0155** (0.0056)	Omitted	-0.0437** (0.0080)	Omitted
R-squared (overall)	0.5381	0.5094	0.4676	0.2947
Number of Observations	286	286	101	101
Number of Groups	5	5	4	4

** indicates significance at 1%, * indicates significance at 5%.