

Mortgage Companies and Mortgage Securitization in the Late Nineteenth Century*

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Abstract

Mortgage-backed securities first gained widespread acceptance in the U.S. during the farm mortgage debenture movement of the 1880s when western mortgage companies issued bonds (called debentures) secured by farm mortgages that they had previously only brokered. This paper explains debentures as a low-cost funding mechanism for some mortgage loans that arose endogenously out of the mortgage brokerage system in the 1880s. Support for the explanation includes an analysis of debenture use across large mortgage companies in 1890, and the estimation of the selection rule one Kansas mortgage company used to allocate loans between its brokerage and debenture programs in 1887.

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Mortgage Companies and Mortgage Securitization before 1930*

1. Introduction

Securitization is often described as a post-1970 financial innovation that transformed the U.S. residential mortgage market, but it is a historically-connected process that actually began nearly a century earlier.¹ This paper examines an early and important episode in that process—the “farm mortgage debenture movement” of the 1880s—during which mortgage-backed securities first gained widespread acceptance in the nation’s capital market.² Before then the interregional market in agricultural mortgages was dominated by loan brokerage as western mortgage companies located in the midwest and Great Plains sold farm loans that they made and serviced to investors in the northeast and Europe. In the 1880s the more successful of these companies began to place mortgages into trust accounts and to issue bonds (called debentures) against this security.³ Their idea was not new: European mortgage banks had already been issuing mortgage-backed debentures for decades (Frederiksen, 1894a, 1894b; Palyi, 1934). The innovation met with initial success in the U.S., but nearly all of these companies failed during the western farm mortgage crisis of the 1890s. After the crisis, mortgage loan brokerage once again became dominant in the interregional mortgage market until 1916 when the federal government sponsored a farm mortgage securitization program within the Federal Farm Loan Bank system. The federal mortgage debenture system operated for nearly two decades before it also failed.⁴

The purpose of this paper is to explain how and why mortgage debentures were successfully introduced in the 1880s to a market that had previously been dominated by loan brokerage. Two facts about the episode are central to the story. First, mortgage securitization played a fundamentally different role during the debenture movement than it has in the modern

era because it combined, rather than separated, the funding of mortgages with loan origination and servicing.⁵ Second, debentures did not simply replace brokerage; instead, the two contracts were used side-by-side within the same markets and even within the same mortgage companies. The challenge, therefore, is to understand why only some mortgages were funded with debentures and why only some mortgage companies issued them. The argument offered here is that differences in the structure of the brokerage and debenture contracts generated differences in costs of funding mortgage loans.⁶ These differences in cost, combined with heterogeneity in the characteristics of mortgage loans, made brokerage the efficient funding mechanism for some loans and debentures the efficient choice for others. Differences in the characteristics of mortgage companies, on the other hand, determined which of them could issue debentures at low cost while continuing to broker loans.

The analysis of funding costs under the two contracts focuses on three specific costs that were of particular importance in the historical farm mortgage market: 1) the risk and term premium paid to investors, 2) the costs of marketing mortgage loans, and 3) the additional costs associated with servicing outstanding loans if the mortgage company failed. Differences in the levels of these funding costs under the two contracts are examined in detail in the first two sections of the paper. Loan brokerage required a costly marketing system and provided investors with incomplete risk diversification, but protected the mortgage company and its servicing network from financial failure. Debentures, in contrast, offered lower marketing costs and greater risk diversification, but placed the issuer at greater risk of financial failure.

The patterns of costs under the two contracts are used to formulate several empirical predictions about the debenture movement that are examined in the second half of the paper. To begin with, the analysis suggests that the costs of funding loans with debentures should have fallen

with the size, financial strength and reputation of the mortgage company. Given the historical context, these patterns suggest that the debenture movement was an endogenous innovation of the 1880s that was built upon a mortgage company's previous success in brokerage. Support for this explanation is reported in the third section of the paper where a sample of ninety-nine of the largest western mortgage companies is used to identify the characteristics of companies that had established debenture programs by 1890 and used the new security most intensively.

The analysis of funding costs also suggests that debentures were introduced primarily to fund mortgages that were difficult to broker because they did not conform to the market's standards for risk, size, term or legal form. This prediction is examined, along with several related hypotheses, in the last section of the paper using a sample of 689 loans that has been drawn from the mortgage ledgers of the J.B. Watkins Mortgage Company of Lawrence, Kansas. These loans were made in 1887 after Watkins had established his debenture program, so the sample is used to identify the rule he used to select loans for the company's debenture program and the impact that debenture status had on mortgage rates and the expected returns earned by Watkins and his investors. This evidence confirms that debentures offered a low-cost mechanism for marketing loans that were too risky, or non-standard in form, to be brokered.

The paper concludes by connecting the successes of the debenture movement to its failure. The debenture movement improved the allocative efficiency of the farm mortgage market by repackaging the cash flows on loans that could not be cost-effectively brokered, but it did so by exposing mortgage companies to greater risk of financial failure. The debenture movement collapsed in the 1890s, therefore, because it operated as designed: mortgage companies became vulnerable to systemic mortgage lending shocks by issuing debentures and nearly every one of them

did failed during the next farm mortgage crisis. The paper closes by assessing how this failure affected subsequent developments in mortgage securitization.

2. Mortgage Loan Brokerage: Backdrop to the Debenture Movement

Western farm mortgage brokers were one of several intermediaries that arose to integrate a regionally segmented capital market in the late nineteenth century U.S. and the most important to serve the nation's interregional mortgage market (Davis, 1965). Significant differentials in regional interest rates were the driving force behind these financial innovations; mortgage rates, for example, ranged from under six percent in the savings-rich northeast to 10 percent or higher in the Great Plains, south and west (Snowden, 1987). These sizable differentials allowed mortgage brokers to sell western loans at attractive yields in eastern markets while still covering the additional costs and risks of originating, marketing and servicing the loans.⁷ To understand how and why the debenture movement grew out of farm mortgage brokerage in the 1880s, we first need to understand the structure and function of that business.

J.B. Watkins of Lawrence, Kansas was a successful western farm mortgage broker, and his career is used throughout this paper to illustrate how the farm mortgage market actually worked.⁸ Watkins sold his first farm mortgage loan in 1873, and by 1880 the company employed an office staff of ten in Lawrence, a network of dozens of loan agents who originated and serviced loans in Kansas, Nebraska and Texas, sales offices in New York and London, and sales agents working in eleven other northeastern cities (Bogue, 1955, 86-90). The left panel of Table 1 presents a summary of Watkins's brokerage transactions assembled from the company's loan ledgers; between 1880 and 1886 he sold more than \$1 million in loans each year and serviced a portfolio of about \$5 million for his investors. The connection between annual originations and servicing volume reflects that the

standard farm mortgage loan during this era was written for a five-year term during which only interest was paid; at maturity these loans were either paid off or, more often, renewed.⁹

Mortgage brokers like Watkins provided an entire bundle of services for the out-of-state investor (Bogue, 1955, 85). Their loan agents located borrowers and assembled loan applications; the office staffs then screened applications, approved loans, prepared and recorded the loan documents, received payments from borrowers and forwarded the investor's share of the payments east. To facilitate the assignment of legal rights and the division of payments, the loans were normally "split" into a first mortgage that was assigned to the investor and a second note made out to the broker that specified additional semi-annual interest payments. The borrower also paid legal and recording fees and an up-front commission that the broker shared with his loan agent.

Marketing mortgages was particularly costly under the brokerage system. The brokerage company financed temporary imbalances in loan supply and demand by paying interest on investors' funds when loan applications were scarce and by holding inventories of completed loans when orders from the East lagged behind applications (Bogue, 1955, 123-4). Furthermore, both the broker and his investor incurred substantial costs during the cumbersome process of matching specific investors to particular loans. At first Watkins mailed lists of pending applications east and allowed investors to select their preferred loans. He eventually adopted standard industry practice by assigning loans to investors and mailing the applications and supporting documents back east for approval (Bogue, 1955, 90-92). Under this system investors had to spend effort and time, and could incur their own legal expenses, assessing the loan application, the mortgage papers and the value of the loan itself.¹⁰ If the investor rejected an assigned loan under this take-it-or-leave-it system, an alternative loan was sent east for approval while the original loan had to be reassigned to another

investor. The number of these reassignments that Watkins handled in each year is shown in the second column of Table 1.

The major risk borne by the broker was guaranteeing the performance of the loans he had sold. The information asymmetries between a broker and an investor located thousands of miles away were so profound that risk-sharing between the two had to be severely limited. The contractual solution was a loan sale with recourse; mortgage brokers promised to buy back or, more often, to replace loans that ceased to perform.¹¹ Watkins's experience illustrates how costly it could be to honor these guarantees. If a borrower missed a payment, the company paid the interest or principal to investors and taxes to local authorities out of its own funds; if the default became serious, Watkins replaced or bought back the loan and initiated foreclosure proceedings (Bogue, 1955, 90-92). So any mortgage that failed became a farm the company owned, and by 1883 these represented a total of 52,000 acres and Watkins had employed a full-time lawyer to manage the properties and administer the company's land sales department (Bogue, 1955, 122-3). The magnitude of this operation underscores that the major risk facing investors and guarantors in the western farm mortgage market was acquiring, managing and disposing of farmland.

The incentives and pattern of risk-bearing built into the brokerage contract were created by the practice of splitting the mortgage loan into two notes, and hinged critically on the second, interest-only note that was held by the broker. These second notes represented loan participations for the broker and generated the cash flow that funded his guarantee for the first liens held by the investor. Gorton and Pennachi (1995, 394) explore how loan participations and guarantees are used as alternative incentive mechanisms in modern markets when the seller of a loan provides costly credit services that are unobserved by the buyer; in the historical mortgage brokerage system both devices were used to insure full incentive compatibility. The second notes also provided all of the

risk pooling under the brokerage contract; the broker pledged to absorb any losses on the first liens he sold to investors with the revenue he earned from all of the second notes and his financial capital. If he honored the guarantee, the broker bore all credit risk; if he reneged on the commitment, each investor was left holding a risky loan.

Although the investor's exposure to credit risk depended entirely on the broker's ability and willingness to honor his guarantee, there was considerable uncertainty and debate at the time regarding the legal standing of a broker's guarantee and even whether it should be contractually explicit. Some brokers advertised guarantees of principal and semiannual interest payments; but many others insisted that a guarantee rested only on a broker's integrity, judgment and past track record.¹² Watkins did both. He did not advertise a guarantee during the first three years of business, but then did for the next four years until inquiries from investors concerning his health and personal financial condition became too troublesome. Then, some four years later, the company once again began to advertise its guarantee after it had been incorporated (Bogue, 1955, 126).¹³ But advertised or not, Watkins honored his guarantee throughout the period.

Boot, Greenbaum and Thakor (1993) explain why intermediaries such as loan brokers sometimes offer investors "moral" (or implicit) guarantees. They show, in particular, that such illusory promises can be more efficient than legally enforceable contracts for intermediaries that invest in both reputational and financial capital and whose failure would generate substantial deadweight losses. This is because the intermediary can avoid a costly and inefficient financial failure by breaking its non-binding promise and conserving scarce financial resources when under distress; it becomes efficient for such an intermediary to dissipate its reputational rather than its financial capital.

Darrow (1892, 30-33) unwittingly explains how the implicit promises the western mortgage companies made to investors can be rationalized within Boot, Greenbaum and Thakor's framework. Darrow criticizes most mortgage companies for deception because they guaranteed only to collect a mortgage borrower's payments and not the loan payments themselves. Darrow argued the distinction was meant to confuse investors, but it is consistent with the view of the brokerage contract offered here. The guarantee to collect payments was, after all, a company's commitment to service the loans it had sold even when it was under financial distress. Had the companies also guaranteed actual loan repayments, as Darrow argued they should have, their loan servicing operations would have been suspended when credit losses exhausted the company's resources. So the guarantee to service loans was explicit while the promise to guarantee actual loan payments remained implicit.

The reputational elements that Boot, Greenbaum and Thakor emphasize were clearly at work in the historical farm mortgage market. Brokers like Watkins spent money, time and great effort in building and maintaining reputations while operating on thin margins of financial capital relative to the volume of loans they marketed and guaranteed.¹⁴ Moreover, the failure of a broker would clearly have generated substantial deadweight losses of the kinds Boot, Greenbaum and Thakor emphasize: the loss of reusable information (embodied in the loan agents, office staff and legal personnel that had originated and serviced a portfolio of loans) and the costly liquidation of the farmland that invariably accumulated on the broker's books during distress.¹⁵ It is difficult to understate, in fact, the importance that the disruption of interregional mortgage lending networks played in the development of the historical mortgage market in the U.S. This consideration alone, in fact, has been used to explain why life insurance companies came to dominate interregional lending by the early twentieth century (Snowden, 1995a).¹⁶ So under the brokerage contract reputable

mortgage companies implicitly guaranteed borrowers' payments in order to maintain the contractual flexibility that was necessary to avoid a costly disruption of their loan servicing activities (Robins 1916, 99-100).

The implicit loan guarantee increased other funding costs, however, that shut some mortgage loans out of the brokerage market. The premium paid to investors, for example, compensated for the idiosyncratic risk on the single, unguaranteed loan they would hold if the broker suspended his guarantee. To assess this risk, moreover, investors had to personally inspect and approve each loan through the cumbersome marketing process described earlier. Brokers simplified the approval process by offering loans to investors on a take-it-or-leave-it basis, but they could do so efficiently only for mortgages that were relatively "standard" in size, maturity and legal form and which met a minimum level of credit quality.¹⁷ Some loans could not be brokered, therefore, because the costs of funding them through brokerage was too high.¹⁸ This limitation proved to be an important stimulus to the development of the debenture.

3. The Mortgage Debenture as an Alternative to Brokerage

A brokered loan represented a senior claim on a first mortgage that was guaranteed, if the borrower defaulted, by an implicit and unsecured claim on the mortgage company's assets. A mortgage debenture, in contrast, was a debt contract issued by a mortgage company that was secured with a senior claim, if the company defaulted, on a specific pool of mortgage loans. Debentures were created with a trust agreement; the mortgage company placed loans into a trust account and then issued an equal face amount of debenture bonds that had been certified by the trustee (Darrow 1892, 22).¹⁹ The securities were issued in series, normally \$100,000 in size, that were typically secured by a pool of between 100 and 200 loans. If the company defaulted on its

debenture payments, the trustee took possession of the specific pool of loans behind each series and liquidated the loans on behalf of the investors.²⁰

By creating new securities to fund pools of mortgage loans, western mortgage companies introduced two elements of modern securitization during the debenture movement. They were not the first institutions to use this financial instrument; by 1880 German and French mortgage banks had for decades been issuing debentures that were secured by mortgage pools. The U.S. farm mortgage companies were not chartered or regulated as mortgage banks, however, so by the late 1880s state governments where most of the new securities were sold—Connecticut, New York and Massachusetts—required western companies that operated within their boundaries to report basic financial data on a regular basis. Table 2 summarizes the information that these “foreign” mortgage loan companies reported to either the New York or Massachusetts regulator in 1890.²¹ The companies are grouped in the table by the years in which they were organized so that each row reports the group total or average for the companies of a particular age.

The summary data establish several important generalizations about the debenture movement. First, debentures were a widely deployed financial innovation in the 1880s that had a substantial impact on the nation’s farm mortgage market. Sixty-two of the ninety-nine companies that were licensed to operate in New York or Massachusetts had established debenture programs by 1890 and together they had issued \$48.7 million of the new securities, or about one-tenth of the outstanding farm mortgage debt in the western Plains.²² Second, the debenture was still in limited use in 1890—one-third of the licensed mortgage companies had still not issued the security, no group of companies of any age had securitized more than 30 percent of their outstanding mortgage loans, and the industry as a whole had placed only 19 percent of the debt it had marketed behind debentures. Finally, debentures and brokerage continued were used together in the same mortgage

markets and even by the same mortgage companies. This section explains each of these patterns by explaining debentures and brokerage as different contractual responses to the particular financial contracting problem that was characteristic of the interregional farm mortgage market.

The comparison of the debenture and brokerage contracts will be facilitated by first noting some important differences between the debenture contract and the modern mortgage-backed security (MBS). First, debentures were direct claims against the mortgage company that originated and serviced the underlying mortgage loans, while the issuer of an MBS (either a government-sponsored enterprise (GSE) or private entity) purchases the loans it securitizes from independent intermediaries that make and service the mortgages.²³ Second, mortgage debentures were not credit-enhanced by external third party agreements that are commonly used in the modern MBS market.²⁴ In particular, the trustee did not guarantee the performance of the mortgage company's debentures or the quality of the loans in the underlying mortgage pool; its only responsibility was to certify that the loan documents were legally sound and conformed to the standards of the trust agreement (NY 1890-91, p. 21). As a result, debentures were the sole liability of the mortgage company, and by issuing them the company made a formal commitment to absorb all of the credit risk on the mortgages that it made and serviced. Finally, debentures did little to transform the timing, term or liquidity of the payments from the underlying mortgage loans as they simply "passed through" their cash flows by offering five-year terms, semiannual coupon payments, and minimum investments equal to a small-sized mortgage.²⁵ The modern MBS, in contrast, enhances the liquidity of the underlying mortgage loan payments and is often used to alter their timing and maturity.

These marked differences between the debenture and the modern MBS indicate that securitization played a fundamentally different role during the debenture movement than it has in

the modern era. Unlike the MBS, debentures were not introduced to separate the funding of loans from origination and servicing, or to facilitate off-balance sheet financing. Instead, companies that issued debentures brought mortgage loans onto their balance sheets so that they could fund, as well as originate and service, them.²⁶ The debenture movement, therefore, used securitization to introduce a new form of intermediation to the nation's farm mortgage market—European-style mortgage banking—whereas modern securitization has played an important role in the disintermediation of the nation's residential mortgage market.

From this perspective, the western mortgage company can be usefully compared to Diamond's (1984) delegated monitor that provides low-cost mortgage origination and servicing to uninformed investors. Under the efficient, incentive-compatible contract in Diamond's model, the delegated monitor becomes a traditional intermediary that offers investors its own risk-free security while absorbing all of the credit risk on loans that it holds on its own balance sheet. Two features of the western farm mortgage market created impediments to Diamond's solution. First, it was difficult during the late nineteenth century to construct a well-diversified portfolio with farm mortgages that were drawn from the same or similar local and regional markets.²⁷ Second, a mortgage company risked a costly disruption of its loan servicing network if it pledged to absorb all credit risk and then failed.

The brokerage contract described in the last section made sense in this environment. Under it the mortgage company implicitly guaranteed to absorb credit risk until doing so compromised its incentives to perform as a delegated monitor. At that point the company suspended its loan guarantee in order to preserve its loan servicing operation. So brokerage imposed idiosyncratic lending risk on investors on a conditional basis in order to avoid the costs associated with a

disruption in loan servicing. The inefficiencies in risk-bearing, however, resulted in high marketing costs that excluded some mortgages from the brokerage market altogether.

The debenture contract provided an alternative solution to brokerage that was closer to Diamond's. Under the contract the incentive for a mortgage company to serve as a delegated monitor was provided by its explicit commitment to use all of its financial resources to absorb losses on the loans that it marketed. When these resources were exhausted, investors bore all remaining lending risk and also had to replace the loan servicing that the mortgage company provided. Under the debenture contract the mortgage company was a Diamond-like intermediary that issued risky debt, and the tradeoff that shaped the contractual differences between debentures and brokerage can be easily described with this in mind. First, debentures assembled mortgages into pools so that investors shared risk if the company defaulted.²⁸ Second, debentures exposed the mortgage company to the formal legal processes of default, receivership and even liquidation.²⁹ The debenture contract was used instead of brokerage, therefore, when the benefits associated with pooling loans offset the costs of exposing the company to a legal default and, perhaps, bankruptcy.³⁰ The explanation of the debenture movement proposed here, therefore, is simply that securitization was used to fund mortgages that gained the most from being pooled and were issued by mortgage companies that had the lowest probabilities of default; other mortgages and companies continued to use brokerage. The discussion below connects this reasoning to specific characteristics of mortgage loans and companies so that these hypotheses can be empirically examined.

Under the debenture contract investors were left holding a senior proportional claim on the cash flow from the designated pool of mortgage loans that were held in trust if the company defaulted.³¹ The return on this security, therefore, was the average return on the loans in the pool which was less risky than the return on any single loan of equal quality that served as security in the

brokered loan market.³² As a result, the debenture contract provided more efficient risk-sharing after a default than brokerage provided after the suspension of the loan guarantee because no investor had to bear, even conditionally, the idiosyncratic lending risk on individual loans.³³ Moreover, by diversifying lending risk across investors after a default, debentures provided the mortgage company with an opportunity to market loans that were difficult to broker, or which could not be brokered at all, because of a high level of idiosyncratic risk. Mortgage companies would have chosen to securitize these kinds of loans, moreover, because they carried higher mortgage rates and earned a higher spread above the debenture rate, than mortgages that could be easily brokered.

Besides providing greater efficiency in risk-bearing, the mortgage pool permitted companies to originate and market debenture mortgages more efficiently than brokered loans. Investors that held debentures cared about the average quality of the loans in the pool, not their idiosyncratic risks or characteristics. Since the trustee assured the average quality by certifying that debenture mortgages met the criteria specified in the trust agreement, investors did not have to personally inspect and approve loan documents.³⁴ So the origination and placement of loans behind debentures involved only the company and its trustee; as a result, the investor did not have to be compensated for inspecting loan documents, performing the legal and administrative tasks of a mortgagee, or repeating the entire process if the loan performed badly and had to be replaced (Darrow, 20-21). The reduction in investor costs were offset, to some extent, by the costs that the mortgage company incurred in setting up and operating the debenture business—payments to the trustee, and the legal and administrative costs associated with issuing and registering the debt instruments. These types of costs should have been subject to economies of scale, however, so as the size of a mortgage company grew so too should have the cost advantages of marketing debentures relative to brokered loans.

For debentures to be a cost-effective alternative to brokerage, these benefits from pooling had to more than offset the expected costs associated with default and liquidation. But mortgage companies, including those that issued debentures, were not subject to substantial regulation, let alone to minimum capital requirements. So a mortgage company had to convince investors it had a sufficiently low probability of default in order to establish a debenture program. Diversification within and among the company's loan pools helped to establish creditworthiness, so large mortgage companies with spatially dispersed lending operations should have had an advantage. So too would companies whose owners contributed large amounts of liquid financial capital to serve as a buffer. Mortgage companies could also lower their probability of default by operating their debenture program alongside an established brokerage business. A company using both contracts could choose, if under distress, to suspend its guarantee on brokered loans and divert financial resources to meet its fixed obligations on debentures.³⁵ Just the prospect that a mortgage company might engage in such activity, of course, could have prevented some companies with weak reputations from issuing any debentures. But companies that could establish both types of funding operations used the reputational capital they had accumulated in brokerage to provide their debenture programs with additional financial flexibility and a lower probability of default.

The differences in the structure, benefits and costs of the brokerage and debenture contracts lead to two sets of implications about the debenture movement. First, the pattern of growth within the brokerage business before 1880 determined the capacity of mortgage companies to issue and to use debenture financing after that date. Mortgage brokers knew about the debenture contract years before they adopted it, and the interpretation of the debenture contract offered here explains why. Prior to 1880 western mortgage companies were too small and local in orientation to construct well-diversified portfolios and were too poorly capitalized to protect against default and liquidation if

they issued debentures.³⁶ Successful mortgage companies like Watkins's became capable by 1880 of using all three methods described above to reduce the probability of a default: large size, stronger financial resources, and reputable brokerage operations that provided the new program with a source of financial flexibility and support. These resources were limited, however, and companies that established debenture programs still had to grow their operations in concert with their brokerage operations rather than replacing them. We examine these generalizations in the next section of the paper by using the company-level data that underlies Table 2 to identify the characteristics of mortgage companies that issued debentures and used them most extensively.

The second implication of this analysis is that debentures were introduced primarily to fund mortgages that were difficult to broker or, perhaps, could not be brokered at all. While any mortgage loan would have benefited from the risk diversification and marketing advantages associated with being pooled, the greatest benefit would have accrued to mortgages with high idiosyncratic risk or with non-standard sizes, terms or legal forms—the same loans that would have been difficult to broker. These types of loans also generated the largest spreads between the mortgage rate and the debenture rate, so companies had the incentive to securitize them first. Anecdotal evidence from Watkins's business records establish that his company used debentures to fund loans that he could not broker.³⁷ In the last section of the paper we examine this issue more systematically by using a sample of loans drawn from Watkins's original mortgage ledgers to investigate how he chose mortgages for his debenture program and what he gained by doing so.

4. Issuing Debenture Securities

A closer look at Table 2 reveals that variation in the use of debentures among mortgage companies was closely related to the age of the firm. The 35 companies that were less than four

years old in 1890, for example, had issued only \$1 million of debentures although together they had already brokered more than \$17 million in mortgage loans. In contrast, the 14 companies that had operated for more than ten years issued one-third of all outstanding debentures and used them to market 30 percent of all the loans they sold. Watkins was a latecomer among these older firms since he did not issue debentures until 1887. He made up for the slow start, however, and by 1890 had marketed a higher share of mortgages behind debentures (39%) than the average even for other older firms. Watkins had planned to completely replace his brokerage business with debentures, and the share of loans that he brokered declined from nearly two-thirds in 1887 to less than 20 percent in 1891. But brokered loans still represented 60 percent of the company's outstanding mortgage portfolio in 1890.³⁸ Watkins's experience illustrates that even the older mortgage companies that led the debenture movement continued to rely on active loan brokerage operations.

The discussion in the last section concluded that debentures would have been particularly attractive, relative to brokerage, to large companies that could exploit their scale to reduce marketing costs and to lower overall portfolio risk through diversification. The analysis indicated that participation in the debenture movement also should have been greater for financially strong firms and those with significant reputational capital in brokerage. In this section we explore the role that these considerations played in the two decisions mortgage companies actually faced in the 1880s—whether to establish a debenture program and, if so, how large to grow it relative to their brokerage business. Both decisions are captured in the following model for the company-level data underlying Table 2:

$$\begin{aligned}
 \% \text{Debenture Loans}_i = & \beta_0 + \beta_1 \cdot \text{Size}_i + \beta_2 \cdot \text{Capital}_i / \text{Loans}_i & (1) \\
 & + \beta_3 \cdot \text{Real Estate}_i / \text{Assets}_i + \beta_4 \cdot \% \text{ Loans Paid}_i + \beta_5 \cdot \text{Age}_i \\
 & + \beta_6 \cdot \text{South-West} + \beta_7 \cdot \text{Plains} + \beta_8 \cdot \text{Northeast} + u_i .
 \end{aligned}$$

The dependent variable in (1) is the share of outstanding loans that each company marketed behind debentures so its value is zero for firms that had not established a debenture program by 1890. The right-hand side variables capture variations in scale, financial strength and reputation across the companies that should have influenced their ability and incentives to issue and use debentures. There was substantial variation in company size, for example, as firms that had been established before 1885 had an average total volume of loans outstanding in 1890 five times larger than younger firms (see Table 2). Size is measured in the empirical specification as the natural logarithm of this variable.³⁹

The next four variables in the specification are included to measure the relative financial strength and reputation of each company. The former is captured in two ways—by the ratio of paid-in capital to outstanding loans and by the percent of each company's assets that were held in real estate. It is worth noting that the group averages in Table 2 appear to contradict one prediction made in the last section—older companies that used debentures most frequently held lower, rather than higher, average amounts of capital per dollar of outstanding loans than did younger firms which either did not issue debentures or used them sparingly. The share of assets held in real estate is included as a second measure of financial strength because, as emphasized earlier, the primary risk facing western mortgage companies was the acquisition of illiquid land through foreclosure. The firm's reputation as a loan broker is also measured in the model in two ways— by the natural logarithm of the firm's age and by the percentage of loans which the company had ever marketed that had already been successfully paid off (see column 5 and 6 of Table 2). Age should pick up the impacts of longevity, including reputation, that are unrelated to firm size and financial strength and both it and the share of loans paid off are interpreted here as proxies for reputation in brokerage

because no company issued debentures before 1883, and all of them brokered loans before issuing debentures. Both reputational variables are expected to be positively related to debenture use.

Besides the factors that made a particular mortgage company a good candidate to issue debentures, participation in the debenture movement also would have been encouraged by the availability of mortgages that would have gained most from being securitized—loans that had high levels of idiosyncratic risk or other characteristics that made them unsuitable for brokerage. The state regulatory reports do not provide information about individual loan characteristics at the company level, so regional dummies representing the location of the home office of each company are included in the specification to capture variations in the mix of loans types that they marketed. To incorporate the known geography of the debenture movement, the specification allows for differences in debenture use between the 52 companies located in the Great Plains where the debenture movement was centered (the Dakotas, Nebraska and Kansas), and the 26 companies that were located in the omitted, and more established, Midwest region (Minnesota, Iowa and Missouri). Separate dummies are also included for eleven southern and western companies and ten companies that had home offices in the Northeast but operated lending networks in western markets.⁴⁰ Besides differences in loan types, the regional dummies will also control for regional differences in mortgage law and regulatory stringency, and other fixed effects.

Thirty-seven of the firms in the sample issued no debentures, so specification (1) was first estimated as a tobit model. The tobit formulation was strongly rejected, however, in favor of the two-part model that is reported in Table 3.⁴¹ In this alternative specification a probit is used to model the decision to establish a debenture program, while a truncated regression captures factors that influenced the share of loans that were marketed behind debentures for companies that had established a program. A cursory look at the results in Table 3 show that the two-part model is

preferred because the right-hand side variables play different roles in the probit and the share regressions.

The results of the probit model indicate that the decision to establish a debenture program was closely tied to firm size and the amount of paid-in capital per dollar of loan marketed. The impact of company size was large as well as highly significant; a one unit increase from its mean logarithmic value (that is, from \$.89 to \$3.3 million of loans), increased the probability of establishing a debenture program by 38 percent. Despite the striking pattern in Table 2, it was the size of a firm, and not its age, which influenced whether a company established a debenture program. This result supports the argument that debentures were introduced because of the greater risk diversification and marketing efficiencies they generated relative to brokerage—two elements that should have been strongly influenced by scale. The probit results also show that the apparent negative correlation between debenture use and financial capital in Table 2 is misleading as well as counterintuitive—the relationship becomes positive, as the analysis in the last section predicts, after controlling for company size. So investors were aware of and sensitive to the increased probability of a costly default that was associated with the debenture contract. Finally, coefficients on the regional dummies indicate that debentures were attractive to all farm mortgage companies located outside of the omitted Midwest region; only the Great Plains effect was statistically significant but the West-South and East coefficients are also large and positive and their standard errors might only reflect the small number of companies in each group.

The results of the truncated regression reported in Table 3 show that a different set of factors determined how intensively a company used its debenture program once it had been established. Neither firm size nor paid-in capital, for example, had a significant impact on the share of loans marketed behind debentures; the most important influences were the share of assets held in

real estate and the age of the firm. The negative impact of the former indicates that companies with weak financial resources marketed smaller shares of their loans behind debentures, presumably to maintain an adequate buffer against default. The primary measure of financial strength, paid-in capital per dollar of loans, also had the expected positive impact on debenture share although its statistical significance is just outside normal confidence ranges (a p-value of .08). A similar pattern appears for the two variables that are employed here to measure a company's reputational capital—one of them (the age of the company) has a large and highly significant impact while the second (the percent of each company's loans that had already been paid off) had the expected positive effect but only at a slightly higher than conventional level of significance (p-value of .07). These results confirm the existence of complementarities between the two lending technologies as a mortgage company could rely on a long and successful history as a broker to market a larger share of loans through its debenture program.

The significant positive impact of the Northeast dummy in the share regressions reflects that five of the six companies in the sample that marketed more than 60 percent of their mortgages through debentures were headquartered in northeastern states. The extensive use of securitization by these companies suggest that proximity to the investors, rather than to western loan origination and servicing operations, eased some of the financial and reputational constraints on the expansion of their debenture businesses. These advantages might have included more stringent examination by in-state regulators, familiarity with the investing public, or advantages in contracting trustee and registration services in the securities market.

The importance of financial and reputational strength in the share regressions indicate that a company's ability to service the debt they created when issuing debentures constrained the growth of a debenture program even after it had been established. This result is critical to understanding the

structure of the debenture movement. A mortgage company could not simply replace their brokerage operation with a debenture business—by doing so the probability of a default, and the expected costs of a disruption in loan servicing, would increase beyond the benefits debentures provided in risk diversification and marketing costs. This constraint on the growth of individual debenture programs might explain why Watkins, and perhaps other mortgage company owners, was unable to abandon brokerage after establishing their debenture businesses. So securitization grew alongside brokerage in the 1880s as company owners contributed more financial capital, kept illiquid real estate off their balance sheets, and maintained their reputations in brokerage. We now examine whether the interpretation of the debenture movement offered here can also explain how debenture programs were actually used.

5. Selecting Loans for the Debenture Program

J.B. Watkins had an opportunity to establish a debenture program when he incorporated his company in 1883, but the company did not issue its first security until 1887 (Bogue, 1955, 126-30). The Farmer's Loan and Trust Company of New York, one of the most respected firms in the business, acted as the company's trustee for its debenture program and the manager of Watkins's New York office was designated as mortgagee for the loans placed in the trust account. Before accepting a loan the trustee inspected the borrower's note, the property appraisal and the land's title; after \$100,000 of loans had been placed into trust an equal amount of five-year debenture bonds was certified by the trustee and then sold through the company's London and New York offices. Once established Watkins's debenture program grew rapidly; he planned to issue 10.2 million debentures between 1887 and 1893 and most of these were issued before the company's receivership in April, 1894 (see Table 1).⁴²

In this section of the paper a sample of 689 mortgage loans that Watkins made in 1887 is used to examine three issues that should clarify why debentures were used and how debenture programs actually worked. The impact that loan characteristics had on the returns earned by investors is explored first in order to assess how risk was measured and priced in the brokerage and debenture markets. The sample is then used to identify the rule that Watkins used to assign 224 of the sample loans to his debenture program and the remaining 465 to brokerage. Finally, the impact of debenture status on the returns earned by Watkins and his investors is examined to assess how the contract changed the level and distribution of funding costs among the parties.

The data for each sample loan was drawn from the company ledgers in which Watkins and his staff entered information at the time each loan was made. The loans are typical of those that Watkins had brokered since 1873; they were all on Kansas farmland and negotiated through his established loan agent system.⁴³ Descriptive statistics for the sample are presented in Table 4 by debenture status; the two types of loans were written, for example, on similar-sized farms. The average brokered loan was larger (\$628 to \$536), however, and so carried a higher debt per acre ratio (\$4.51 to \$3.76) than the average debenture loan. On the other hand, a higher percentage of debenture loans were written for short, three-year terms or for amounts outside the normal range of loan size (\$400 to \$700). Debenture mortgages were also located an average of 42 miles farther away from Watkins's Lawrence office than brokered loans, and were disproportionately concentrated in the most western region of the state.⁴⁴ Finally, the company's securitization activities were not spread evenly through 1887 as the proportion of brokered loans in our sample fell from three-quarters in Quarter I to one-third in Quarter IV.

The last four lines in Table 4 provide information about the average interest rate paid by Watkins's borrowers and the average returns that Watkins, his loan agents and investors

expected to earn under the loan contracts. These were computed from the commission payments, annual interest charges and loan amounts that were recorded in Watkins’s ledgers.⁴⁵ Interest rates on loans that were placed behind debentures averaged 68 basis points higher than rates on brokered loans, while Watkins earned higher average returns on debenture loans than on brokered loans (4.05 % versus 3.06%) and investors earned lower returns (5.54% versus 6.12%).

The basis of all the empirical analysis in this section is a hedonic model in which mortgage rates and expected returns vary across loans because of differences in lending terms, location and market conditions. For the effective mortgage rate the specification is:

$$\text{Effective Rate}_i = \alpha_0 + \alpha_1 \cdot \text{Debenture}_i + \sum \beta_j \cdot \text{Loan Terms}_{ji} + \sum \gamma_k \cdot \text{Location Characteristics}_{ki} + \sum \delta_m \cdot \text{Market Conditions}_{mi} + u_i \quad (2)$$

j = 2, 3, 4, 5 ; k= 6, 7, 8; m= 9, 10, 11, 12, 13, 14.

The first group of regressors (j = 2, 3, 4, 5) control for the impact that loan size, term-to-maturity and debt per acre of land had on mortgage rates. Interest rates should have decreased with increases in loan size and term as compensation for the fixed costs of originating a loan, and increased with the borrower’s leverage as measured here by the debt per acre.⁴⁶ The second group of explanatory variables (k= 6, 7, 8) controls for locational features of each loan that are chosen to measure agricultural production risk that increased from east to west across Kansas with variations in soil conditions, rainfall amounts and the age of agricultural settlement. In the specification these effects are captured with the “miles from Watkins” variable, a “Western Kansas” dummy, and an indicator if the loan was in a “Newly Settled” county.⁴⁷ The remaining six variables (m = 9, 10, 11, 12, 13, 14) are included to control for specific local market or firm-level influences that affected mortgage loan demand or supply. Three quarterly dummies, for example, are included to measure variations in market clearing rates over the calendar year,

while the remaining variables measure Watkins's own market activity—the company's lending volume in each county, an indicator that it recently suffered a foreclosure in that county and the involvement of a "Big Loan Agent" who had booked more than 100 loans for Watkins since 1880.⁴⁸ Finally, debenture status is controlled for to capture differences in average rates (or expected returns) on debenture and brokered loans that remained unexplained after controlling for all of the other influences.

Estimates for the hedonic specification of effective mortgage rate are reported in the first column of Table 5. The model explains nearly three-fourths of the variation in mortgage rates and passes a simple specification test—the controls for loan terms, location risk and market conditions explain the entire 68 basis point differential between average mortgage rates on brokered and debenture loans. The signs and magnitudes of most estimated coefficients are also reasonable, such as the 20 basis point reduction in rates for a large-sized loan and a 39 basis point increase for a short-term loan.⁴⁹ The debt per acre variable, on the other hand, was insignificant which could indicate either that it serves as a poor proxy for the true debt-to value ratio or that mortgage companies adjusted loan term and size, instead of leverage, to control lending risk. The locational measures of lending risk, on the other hand, trace out substantial interest rate premia that range from 200 basis points in central Kansas to nearly 400 in the most western areas of the state, and an additional 48 basis points if the loan was located in a newly settled county. Borrowers paid significantly lower rates in markets in which Watkins's own lending was heaviest, but mortgage rates were unaffected by either a recent company foreclosure or the presence of a high-volume loan agent.⁵⁰ The estimated coefficients on the quarterly dummies, finally, indicate that the general level of rates fell by a total of approximately 60 basis points over the course of the year.

The hedonic specification does a good job of capturing lending costs and risks as they were priced in the primary farm mortgage loan market. In the remainder of this section the same model is used to investigate the three empirical issues regarding Watkins’s debenture program that were described earlier. First, the returns that investors earned on debenture and brokered loans are modeled as probit functions of the hedonic specification because investors earned only either 6% or 7% in the brokered market, and only 5% or 6% on debentures.⁵¹ The regression estimates, which are shown in the second and third panels of Table 5, are in marked contrast to those of mortgage rate model—differences in individual loan characteristics and locational measures of risk had no impact on the returns earned by investors.⁵² These results might appear at first to be surprising, but they are actually consistent with the analysis of both the brokerage and debenture contracts presented earlier. For instance, the returns paid to investors on brokered loans were not negotiated; instead, mortgages that satisfied certain loan criteria were offered to investors at a fixed rate and on a take-it-or-leave-it basis. Individual loan characteristics did not influence debenture rates, in contrast, because investors cared about the risk on the entire mortgage pool that secured their investment, and not the return on any one loan within the pool. So the pattern of investor returns within the sample is consistent with the characterizations of both the debenture and brokerage markets that have been offered here.

In contrast, individual loan characteristics played a central role in Watkins’s decision to broker or securitize a particular loan. This result is shown in the right-hand panel of Table 5 where the results of two probit models of debenture status are reported. The first model employs the complete hedonic specification used in the effective mortgage rate specification, while the second restricts the regressors to variables that an investor would have observed had the loan been brokered—the “Mortgage Papers Information” set. The data cannot reject the hypothesis

that Watkins's decision to securitize was based only on the smaller set of variables which means that the decision to securitize a loan was, in fact, a decision not to broker. From this perspective, Watkins avoided brokering loans that were small in size, short in term, had high debt per acre and were located in western Kansas far away from Watkins's office. Investors would have rejected mortgages like these had they been brokered because they would have represented high-cost and high-risk alternatives to the "average" Watkins's brokered loan. The debenture selection regression provides direct evidence, therefore, that Watkins, and presumably other mortgage companies, used their debenture programs to market loans that could not be easily brokered, or could not be brokered at all.

The final issue to be explored with the Watkins's loan sample is how debenture status affected the level and distribution of lending costs. The returns a borrower paid to Watkins, his investor and the loan agent in the field represented the total cost of funding his mortgage loan. To investigate each of these funding costs elements, all three return series were modeled using the complete hedonic specification. The estimates of these regressions, along with the effective mortgage rate model that was previously shown in Table 5, are reported in Appendix Table 1.⁵³ Together the four models explain how much the borrower paid for his loan (the mortgage rate regression) and how this cash flow was divided between the investor, Watkins and Watkins's loan agent. For purposes of discussion we focus on the in-sample predictions of the four models rather than on the regression results themselves. To this end, the first entry in each column of Table 6 reports the difference between the average mortgage rate, or one of the average expected returns, for debenture and brokered loans as reported earlier in Table 4. The remaining rows in Table 6 decompose these actual differences into four components as predicted by the hedonic

regressions: the amount that was due to the differences in average loan terms, in average locational characteristics, in average market conditions, and in debenture status itself.

The decomposition of the 68 basis point differential between the average mortgage rate on debenture and brokered mortgages, for example, is shown in the first column of Table 6. The decomposition shown there presents the results of the effective mortgage rate regression discussed earlier in a more useful and compact form. Thirteen basis points of the difference in average mortgage rates was due to the relatively small size and short maturity of the average debenture mortgage, while sixty-three basis points of the difference was attributable to its location; debenture mortgages were located further west and in more recently settled counties than the average brokered loan. Differences in average market conditions, on the other hand, actually lowered the average rate on debenture mortgages by nine basis points relative to the average for brokered loans. Finally, the differences in average loan terms, location and market conditions explain all but an insignificant one basis point of the actual difference in the average mortgage rates between the two groups of loans.

The decomposition of the difference in average mortgage rates dramatizes the impacts of the debenture selection rule that was estimated above. The mortgages Watkins placed behind debentures had higher risk, due to location, and higher per dollar investment costs, due to their small size and short term, than the loans he brokered. The remaining three columns reveal how the additional payments borrowers made on these relatively risky and high cost loans were distributed among the parties. Virtually none of it (in fact, an insignificant reduction of two basis points) was used to raise the returns investors earned on debentures because, as we have seen, they were insensitive to the characteristics of individual loans in the mortgage pools. The higher average mortgage rate paid by borrowers on debenture mortgages, instead, was split between

Watkins (a combined 48 basis points higher return) and his loan agent (a 20 basis points increase). This result is expected because under the debenture contract these two parties bore all of the extra idiosyncratic risks and costs associated with serving this type of borrower.⁵⁴

In addition to the impact that differences in debenture and brokered loans had on returns, the last line of Table 6 shows that debenture status itself increased Watkins's return on the average debenture mortgage by 54 basis points, and reduced the investors' return by nearly an identical amount. This transfer in returns was expected because marketing costs under the debenture contract were shifted from the investor to the mortgage company as trustee services and security registration replaced investor approval of individual loans.

The analysis of the Watkins loan sample provides support for three elements of the interpretation of the debenture movement that have been offered in this paper. First, the rate paid to investors was insensitive to individual loan characteristics in both the debenture and brokerage markets; in the first case because of mortgage pooling and in the second because only a restricted type of loan was suitable for brokerage. Second, mortgage companies used their debenture programs to market loans that would have been difficult to broker or would not have been brokered at all. Finally, mortgage companies earned higher gross expected returns on debenture mortgages, and investors earned lower gross returns, because the implementation of a debenture program involved a more efficient marketing system that shifted marketing and administrative tasks from investors to the mortgage company.

VI. Conclusion

The debenture movement of the 1880s represented the first time that mortgage securitization was successfully introduced on a broad scale in the U.S. The explanation of the episode that has

been offered here relies on the comparison of mortgage funding costs under debentures and loan brokerage which, at the time, was the relevant alternative lending mechanism. From this perspective the bottom line is simple—debentures offered more efficient risk sharing and lower-cost marketing than brokerage, but generated higher expected costs of financial failure. The tradeoff between these considerations, when combined with heterogeneity in farm mortgages and farm mortgage companies, determined which loans were securitized and which companies took the lead introducing debentures to the American capital market. The explanation also provides insight into the purpose and timing of the financial innovation. Debentures were introduced to fund mortgages that did not meet the standards for loan size, maturity and credit quality as they were applied in the brokerage market. The innovation did not emerge as a credible alternative to brokerage, however, until some mortgage companies had grown large enough in size and accumulated sufficient financial and reputational capital so that they could issue debentures without increasing the expected costs of financial failure by too much.

The debenture movement broadened access to the interregional farm mortgage market and improved its efficiency, especially for loans and borrowers that had been poorly served by brokerage. But a full accounting of the debenture movement must also confront its subsequent failure. Weather shocks in the early 1890s and the financial panic of 1893 wreaked havoc on western agricultural regions and only nine of the 99 mortgage companies that were licensed to operate in New York and Massachusetts in 1890 were still licensed to do so in 1896 (see the third column of Table 2). The argument made in this paper predicts a high failure rate for companies involved in the debenture movement since they had increased their vulnerability by issuing their own debt to fund mortgages. The crisis was severe enough, however, to dramatically affect even those companies that had not issued debentures, such as the firms less than five years old that are

shown in Table 2. The 1890s mortgage crisis turns out to be a poor testing ground to assess whether the costs of failure were higher under debentures than brokerage for yet another reason—the available regulatory reports provide no systematic information about the companies after they became unlicensed. We do not know, for example, whether a company lost its license to operate in New York or Massachusetts because it had failed, or simply because it suspended loan marketing operations in those states.

The failure of the debenture movement can be assessed more meaningfully, in any case, by considering that the crisis of the 1890s ushered in a two-decade period during which loan brokerage once again dominated the interregional farm mortgage market; a period that ended in 1917 when the debenture programs of the Federal Farm Loan Bank system began to operate. The explanation that has been offered here for the appearance of the debenture movement in the 1880s also provides a plausible explanation for the disappearance of debenture securities a decade later. In particular, if the mortgage crisis of the 1890s reversed the gains in size, financial strength and reputation that had allowed mortgage companies to issue debentures in the 1880s, then companies that survived the crisis would have been left running brokerage-only operations until they had restored their capacity to issue debentures at relatively low cost. This explanation, if correct, could lead to a reassessment of the strong opposition of the Farm Mortgage Bankers Association to the creation of the FFLB system and the tensions that arose between the separate publicly- and privately-financed securitization programs that were sponsored within it (Robins, 1916; Schwartz, 1938; O’Hara, 1983).

An alternative explanation of the disappearance of mortgage debentures after the 1890s, and one that is also consistent with the explanation of the debenture movement offered here, is that investors became more cautious towards privately-financed securitization programs after watching

the debenture movement fail. Market participants might have been surprised to learn, for example, that it took until 1922 to settle the claims of the investors who held the debentures of the Watkins's company—nearly three decades after the company stopped issuing the securities (Bogue, 1955, 203-4). They also might not have anticipated that the Watkins example was in many ways a best case scenario; he took the unusual step of staying actively involved in the liquidation of the company's assets by serving as receiver, while owners of other failed mortgage companies simply walked away from their defunct loan servicing operations. Concerns about the potential losses associated with debentures would also have been raised by the published reports of eastern regulators in the 1890s that documented egregious abuses of debenture programs as mortgage companies approached default.⁵⁵ Against this backdrop investors might have come to believe that regulatory oversight of the kind provided by FFLB securitization programs was necessary given the delicate balance between solvency and incentives they had witnessed during the debenture movement (Palyi, 1934).

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Notes

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1. For an overview on securitization in modern mortgage markets see Kendall and Fishman (1996). Wachter (1990, 164-67) provides a typical historical overview of mortgage securitization—it begins with a brief mention of the creation of FNMA in 1938 and quickly jumps to events in 1968 and after. See Snowden (1995b) for details and interpretation of pre-1930 developments.
2. Throughout this paper securitization refers simply to the issue of mortgage-backed securities.
3. In this paper we use the terms bonds and debentures interchangeably. In modern usage bonds are usually thought of as secured debt while debentures are unsecured. The use of the term debenture for a bond secured by a mortgage pool was common in the late nineteenth century.
4. Beginning in 1910 a rural credits movement revived the debate about the advantages of European mortgage banking that resulted in the Federal Farm Loan Bank system. Herrick and Ingalls (1915) provide an excellent overview. O'Hara (1983) explains that most private mortgage companies were shut out of the federal system by high capital requirements and prohibitions on interstate lending and then disadvantaged by being outside a system that

benefited from a federal tax exemption. The failure to establish European-style mortgage banking led to profound institutional differences between U.S. and continental mortgage markets that continue to explain the relative slow adoption of American-style securitization in Europe. See Lea (1994), Munsberg (1997) and Coles (1999).

5. Some motivations for securitization that are relevant for the modern era are not plausible explanations for the debenture movement. Regulatory motives, for example, were not at work since the western mortgage companies were not regulated as financial institutions. Later in the paper we also dismiss securitization by debentures as a means to increase the liquidity of farm mortgages or to repackage prepayment risk.
6. The joint use of the two funding mechanisms by the western mortgage companies raises issues similar to those associated with a post-1980 surge in loan sales by modern commercial banks. In their review of the literature on the latter phenomenon, Berger and Udell (1993, 230-31) note that the key challenge is to explain how a bank can benefit by selling information-intensive loans to uninformed outsiders rather than funding them with deposits. For debentures the question becomes how a mortgage company could benefit by retaining loans and funding them with debt rather than brokering them. The explanation for the debenture movement here is close in spirit to the explanation Gorton and Pennachi (1995, p. 395) offer for bank loan sales with its emphasis on the relative costs of funding loans with deposits or sales. Differences in risk preferences among investors that play important roles in some explanations of modern bank loan sales, such as in Benveniste and Berger (1987) or James (1988), are not emphasized here.
7. The rate of return eastern investors earned on western mortgages ranged from 7% early in the 1880s to 6% late in the decade (see Table 1 for the returns Watkins's company paid during the

decade). At the same time yields on high-grade railroad bonds, the investment that dominated formal securities markets fell from 5.6% to 4.6% (Carter, 2006 (Historical Statistics) series Cj1196). Nominal interest rates and nominal loan amounts are reported and used throughout the paper because the economy experienced mild deflation of less than 1% per annum during the 1880s (Carter, 2006 (Historical Statistics) series Cc1-Cc2).

8. We know a great deal about Watkins's career and business practices from *Money at Interest* (Bogue, 1955) that is relied on heavily throughout this paper.
9. During the late nineteenth century short-term farm mortgages generally were renewed several times before being paid off (Mappin, 1889); there was no motive, therefore, to securitize mortgages in order to repackage prepayment risk as in the modern residential mortgage market.
10. Darrow (1892, 1-5), in his guide for eastern investors, recommends an extensive inspection of the loan documents, including hiring an attorney, before the purchase of a brokered loan.
11. The Vice President of the Farm Mortgage Bankers' Association explained the importance of recourse nearly a century ago in strikingly modern terms (Robins 1916, 82-4): "The farm mortgage banking house ... enables [the client] to invest with even greater assurance of safety and convenience in mortgages on lands thousands of miles away, than he could in a mortgage on his neighbor's home or farm. . . As a result, the farm mortgage banker . . . cannot allow his client to suffer the loss of a single dollar, for his client would make no allowances in the case of loss—he would lose confidence in his banker and would wholly discontinue buying from him."
12. The debate on the legal standing of the broker's guarantee during the period was extensive, see (Preston 1922, 282; Robins 1916, 86-9; Darrow 1892, 29-38).
13. Besides the direct commentary by contemporaries, the ambiguity of the status of the broker's guarantee was underscored in annual reports licensed mortgage companies made to eastern

regulators—many companies did not divide their loans into guaranteed and unguaranteed totals although asked to do so. These reports are described more fully below with Table 2.

14. Watkins's experience illustrates how reputation, financial capital and moral guarantees intertwined in farm mortgage brokerage during the late nineteenth century. Watkins invested substantial time, effort and resources into building his reputation during the early 1870s by mailing circulars, placing advertisements in eastern newspapers, corresponding tirelessly with potential investors and even paying for some of them to personally visit Lawrence to inspect his agency and the Kansas farm mortgage market (MAI, 79-84). During these early years Watkins also cultivated and expanded networks within the Quaker church by employing members of that church as representatives in New York, Philadelphia and England (p. 87).
15. Fisher (2006) and Baker et al (2004) explain how the equity of redemption arose in Anglo-American mortgage law as a contingent assignment of rights under default that encouraged renegotiation to avoid the deadweight losses that could occur with a forced transfer of land and real property. The emphasis here is on interruptions in the supply of renegotiation services due to the financial failure of a mortgage company that increased the costs, and so distorted the outcome, of mortgage loan renegotiations.
16. Snowden (1995a) argues that life insurance companies became the most important clients of farm mortgage companies in the 1920s because only these very large companies could absorb the costs of servicing mortgages and foreclosed land if a mortgage company failed.
17. Darrow (1892, 6-18), Robins (1916, 164-96) and published advertisements of western mortgage companies all contain extensive discussion of the restrictions on brokered loans to insure that the mortgage will be written on occupied and improved quality farm land that carried debt-to-value ratios no higher than one-third, or occasionally one-half.

18. Credit rationing would not have been the only inefficiency associated with brokerage since borrowers might have been forced to alter the amount or term of their loan away from optimal levels in order to meet the standards required to qualify for mortgage credit.
19. Watkins chose the respected Farmer's Loan and Trust of New York as his trustee, and their agreement stipulated that the company deliver the borrower's note, a description and appraisal of the mortgaged property, and the property's title clearance to the trustee's New York office. Once these documents were verified the trustee certified an equal amount of five-year debenture bonds against this collateral in series of \$100,000. These securities were then sold through Watkins's offices in New York and London offices (MAI, 131).
20. As a practical matter, these liquidations occurred only when all of the company's assets were being allocated under a general receivership.
21. The data behind these estimates were drawn from New York and Massachusetts state reports; a few companies might not have operated in these two most important states. Moreover, the reports did not include companies that conducted business only through mail order.
22. The discussion in this section focuses only on the first three, and the second from the last, columns of Table 2; the remainder of the table is examined in greater detail in the next section. The estimates for the share of the western farm mortgage debt issued by these companies can be found in Snowden (1995a, Table 1).
23. In the modern, private label MBS market legally independent special purpose vehicles are created to hold mortgage loans and issue securities.
24. The implicit federal guarantee of the mortgage-backed securities issued by the government sponsored enterprises continues to be an important and controversial feature of the modern

mortgage securitization. Private label securitizations, on the other hand, rely on elaborate underwriting and risk-sharing agreements so that the securities qualify for investment grade bond ratings. (Kendall and Modigliani, 1996, ch. 7 and 8).

25. The debentures of the western mortgage companies were close in structure to those of European mortgage banks, but by 1880 European debentures were actively traded in formal securities markets at yields comparable to government debt. The debentures of the American companies, in contrast, were not actively traded in secondary markets and sold at yields above those for high-grade railroad bonds. Mortgage companies were aware of the potential advantages of repackaging mortgage loans into more liquid and marketable securities, but attempts to do so, such as small savings certificates, did not represent progress far before the companies came under pressure from the 1890s mortgage crisis. For discussions see, Bogue (1955, 133) and Darrow, 1892, 27).
26. Berger and Udell (1993, 228-38) discuss the differences in on- and off-balance sheet securitization.
27. The general pace and pattern of western agricultural development during the late nineteenth century was influenced by long waves in railroad building and settlement (Harley, 1980), the emergence of Argentina, Australia and Canada as competitors in grain production (Rothstein, 1960), the seasonal instability of the banking system (Calomiris and Gorton, 1991) and systemic weather shocks.
28. The argument here suggests that an alternative contractual arrangement that might have dominated both brokerage and debentures would have been one in which pools of mortgages, rather than single loans, were brokered to investors. An obvious problem with this arrangement, however, would have been the high costs of legally assigning many mortgage loans to many

investors, as well as the complications that would arise if any of these loans failed and had to be reassigned to the mortgage company under the companies guarantee. Brokerage and debentures both simplified these complications as the investors owned all of the mortgagee's rights under brokerage unless they were reassigned to the company, while the company owned the mortgagee's rights under debentures until a default occurred.

29. The trustee was normally required to take possession of the pools of loan that secured a debenture sixty days after a default. As a practical matter, however, the company generally requested that it be placed in receivership before a formal default and would often be appointed the receiver. See Chamberlain (1896) for a description of receiverships during the 1890s.
30. A formal analysis to derive general conditions under which either debentures or brokerage would be efficient is complicated by the fact that the contracts stipulate different contingencies (default versus the suspension of the loan guarantee) which affect the incentives for companies to service loans and, therefore, the distribution of returns on the underlying loans even if they were identical in some ex ante sense. The goal of this discussion is to identify characteristics of loans that were likely to have increased the relative benefits and costs under the two contracts for purposes of empirical prediction.
31. If the claim on the mortgage pool's cash flow did not satisfy the obligation, debenture investors could also exercise a general claim on the company's unsecured assets.
32. The loan pool behind a debenture also offered modest overcollateralization in the event of default; the loans held in trust carried interest rates higher than the yield promised on the debentures because they had not been "split", like a brokered loan, into a first and second note.

33. Watkins made explicit use of the risk-bearing advantages associated with the mortgage pool to promote his own debentures, (Bogue, 133).
34. Darrow (1892, 23) advised investors to inspect all of the loans placed in trust behind debentures. But Watkins (Bogue, 1955, 130-131) turned out to be correct in predicting that they would not.
35. Debenture holders were creditors with claims to the unsecured assets of the company (including the second notes on brokered loans) that were senior to investors in the brokered markets.
36. An obvious question is why outside investors did not supply financial capital to credit-constrained mortgage company owners so that they could have developed debenture programs earlier. Such attempts were made, but failed, in the 1870s by New York financiers under the leadership of Pierpont Morgan. See Brewer (1976) for an account of the episode, Snowden (1995a) for an interpretation of it, and Ker (1963) and McFarland (1983) for other accounts of attempts to introduce European practice into the American farm mortgage market.
37. Watkins made extensive use of his debenture program to market three types of loans that he had trouble selling through brokerage: Texas lien notes, mortgages made out to the company on land it had seized through foreclosure, and agricultural land Watkins owned in Louisiana. All of these were allowed for in the trust agreement (Bogue, 1955, 130-31).
38. By 1890 Watkins was placing more than sixty percent of new loans behind debentures (\$739,000 out of a total of \$1,186,000; see Table 1). Bogue (1955, 126-30) recounts Watkins's plan to discontinue his brokerage business.
39. Total loans outstanding, rather than company assets, is used as a measure of the size of the firm's lending operations because brokerage loans were off the company's balance sheet.

40. The “South and West” category included one Georgia company and ten others headquartered in Colorado, Texas, California and Washington, while the home offices of the 10 “East” companies were located in New Hampshire, Connecticut, New York and Massachusetts.
41. The tobit model assumes each variable has the same affect on the latent variable—the share of loans securitized—above and below zero, whereas the alternative two-part model allows each variable to have a different impact on the binary decision to establish a debenture program and the share to securitize once established. The specification test used here is the likelihood ration test from Greene (2003, 770) which rejects the tobit at the $p=.0001$ level (the log likelihood for the tobit specification was -299.0 yielding a chi-square $(9) = 39.2$). The truncated regression corrects the standard errors of the coefficient estimates for the excluded observations.
42. The company’s records are not clear as to how much of the last \$6.4 million of these planned issues were actually distributed before the receivership of April, 1894.
43. Excluded from this sample were loans that Watkins made in Texas and Louisiana, loans made outside Watkins’s normal lending network, and approximately 100 mortgages on farms in western Missouri and eastern Kansas; by 1887 nearly 90 percent of Watkins’s Kansas mortgages were in western two-thirds of the state.
44. The miles from Watkins variable was calculated as the Euclidean distance between Lawrence and the center of the six mile square that contained the farm located by the range and township designation in the mortgage ledgers. Each loan was also located within one of five sub-regions that were laid out in an east to west pattern beginning just west of the 97th parallel. The West Kansas sub-region began 180 miles west of this point and extended to the boundary of the state—a width of approximately 80 miles. Specification tests revealed that

only this most western region had explanatory power after controlling for the miles from Lawrence variable.

45. The effective interest rate was calculated by dividing average annual interest and commission payments by the discounted loan amount; this simple interest rates is very close to the true "yield to maturity" for the non-amortized, balloon loans in our sample. The expected returns for Watkins, his loan agent and the investor were calculated as the annual average interest each was scheduled to receive (and commission payments for Watkins and his loan agent) expressed as a percentage of the full loan principal. As a result, the sum of the investor's, Watkins's and the loan agent's returns does not equal the effective interest rate because the latter was computed relative to the discounted loan amount. The investor's return on a debenture loan was set to the coupon rate on the debenture series that it secured.
46. Loan amount to property value is a common measure of idiosyncratic credit risk in mortgage markets, but the amount of land, and not its appraised value, was recorded in the company's ledgers.
47. Counties are identified as "Newly Settled" if no mortgage lending activity occurred there in 1880 as reported in the "Report on Mortgages" (1895) of the Eleventh Census.
48. Watkins's market shares were computed by comparing the number and amount of loans he made in each county for each year between 1883 and 1886 to the total mortgage debt made in each county as reported in the 1890 Census of Mortgages. Watkins's lending volume is measured for the 1883-1886 period so that it captures only outstanding loans in 1887. His share was no larger than 5 percent for any county in Kansas, and was much lower for most counties, so the variable should not be interpreted as a measure of market power. The "Big Agent" dummy was assigned to eight of Watkins's loan agents who made many more

mortgages than all others between 1883 and 1886. The foreclosure status for each loan was determined by checking entries in ledgers called "Mortgages Maturing" as well as records of foreclosed lands. Loans that were "deeded" or "in suit" were classified as foreclosed.

49. The mortgage rate would have had to vary according to the size and term of the loan given that the lender absorbed fixed costs. To see how, note that to recoup \$20 in fixed costs on a \$600, five-year loan the borrower would have to charge 66 basis points per year, 50 basis points for a five-year \$800 dollar loan, and 110 basis points for a 3-year \$600 loan—all are very close in magnitude to the estimated coefficients in the model. The "term effect", it should be noted, could also include a reinvestment risk premium since the general level of western mortgage rates declined gently throughout the 1880s.
50. Watkins's county-level lending volume is measured in \$100,000 in the specification which means that the estimated rate was 73 basis points lower in the county in which Watkins lent the greatest volume (\$203,000). This effect could either indicate company-specific economies of scale in the lending network or that competition among mortgage companies was strongest in counties where Watkins was most active.
51. The results were the same if the investor rates are estimated with a linear probability specification.
52. The quarterly dummies and Watkins's local lending volumes that affected the investors' returns are best interpreted as measuring the impact of local or temporal excess demands on equilibrium rates and returns and not the impact of the loan's own characteristics.
53. Recall that the effective rate is not the sum of the returns earned by Watkins, the investor and the loan agent because the returns are calculated using the discounted loan amount as

base while the effective interest rate is calculated using the entire loan amount. The four equations, nonetheless, represent a seemingly unrelated system. Each equation has been estimated separately because GLS procedures are no more efficient when identical sets of regressors are used (Greene, 2003, 343).

54. The loan agent faced lending risk because he was expected to help service a loan with no additional compensation after the borrower defaulted (Snowden, 1995a, 221-5).

55. Accounts of abuses in the debenture programs of mortgage companies include the use of defaulted mortgages, tax liens, and company stock as collateral and the use of company insiders as trustees (New York, 1891, pp. 16-9). See Snowden 1995b, 279-81 for a more discussion of the regulators' findings and criticisms of both operating and failed farm mortgage debenture companies.

TABLE 1

J.B. Watkins Mortgage Brokerage and Debenture Operations

Year	Watkins' Brokerage Business					Watkins' Securitization Business ^a					
	Number of Loans: Brokered	(Busted)	Total Amount Made (\$000s)	Avg. Loan Amount (\$)	Avg. Loan Rate (%)	Debentures Number Series	Face Amount (\$000s)	Mortgage Loans Placed In Trust a: Number	Total Amount (\$000s)	Avg. Amount (\$)	Avg. Rate (%)
1880	1,126	(220)	635.6	565	10.68	--	--	--	--	--	--
1881	1,675	(323)	1,018.1	608	10.00	--	--	--	--	--	--
1882	859	(76)	607.8	708	9.48	--	--	--	--	--	--
1883	968	(65)	894.8	924	9.95	--	--	--	--	--	--
1884	1,278	(58)	1,105.2	865	9.88	--	--	--	--	--	--
1885	1,669	(79)	1,433.8	859	9.78	--	--	20	15	735	9.48
1886	1,970	(140)	1,685.3	856	10.11	--	--	231	182	787	8.38
1887	1,039	(101)	963.6	927	9.99	8	800	602	515	855	9.71
1888	540	(41)	557.5	1,032	9.78	10	1,000	381	605	1,587	10.00
1889	539	(45)	865.5	1,606	9.84	10	1,000	343	611	1,781	9.68
	All Loans 1880-1889					All Loans 1880-1889					
	11,663	(1148)	9,767	837	9.95	28	2,800	1,577	1,927	1,222	9.45
1890	329	(17)	447.4	1,360	9.16	10	1000	326	739	2267	8.67
1891	125	(17)	107.5	860	8.41			522	761	1458	8.41
1892	91	(17)	100.0	1,098	8.29	64 ^b	{6400} ^b	375	409	1092	7.49
1893	208	(13)	299.0	1,438	7.09			108	165	1525	8.08
	All Loans 1890-1893					All Loans 1890-1893					
	753	(64)	954	1,267	8.24	10	7,400	1,331	2,074	1,558	8.16

^a Mortgage placed in trust could be reassigned to different series and were valued at the original face value of the loan.

^b These are the number of series Watkins planned to issue between 1891-1893. Company records are unclear as to how many were certified or sold to investors.

TABLE 2												
Western Mortgage Loan Companies Operating in Massachusetts and New York in 1890												
Age of Companies (Year Established)	Number of Companies			Cumulative Loan Volume			Totals in 1890 (\$ millions)				Percent of	
	Licensed	Issuing	Licensed	(\$ millions)		Per	Assets	Out- standing Loans	Deb- entures Issued	Paid-In Capital	Outstanding Loans	
	In 1890	Deben- tures	In 1896-97	Made	Paid Off	Cent Paid					Deb- entures	Paid-In Capital.
J.B. Watkins Company												
18 Years (1872)	Y	Y	N	15.9	8.3	52%	5.7	7.6	3.0	0.8	39%	10%
All Companies (Including Watkins)												
11-20 yrs. (1872-79)	14	11	4	107.1	52.6	49%	27.5	54.5	16.4	5.6	30%	10%
6-10 yrs. (1880-84)	23	19	3	186.2	49.6	27%	47.7	136.6	24.2	10.8	18%	8%
5 yrs. (1885)	15	9	1	34.1	8.0	23%	11.5	26.1	5.5	3.6	21%	14%
4 yrs. (1886)	12	9		24.0	9.1	38%	5.2	14.9	1.7	2.5	11%	16%
3 yrs. (1887)	11	5	1	10.0	1.6	16%	3.2	8.4	0.4	1.5	5%	18%
2 yrs. (1888)	11	4		5.5	0.3	6%	2.5	5.1	0.2	1.3	4%	25%
1 yr. (1889)	13	5		5.3	0.4	8%	2.5	4.9	0.4	1.4	8%	29%
Total	99	62	9	372.2	121.7	33%	100.0	250.5	48.7	26.7	19%	11%

Source: Massachusetts: *Annual Report of the Commissioner of Foreign Mortgage Corporations*, First (1890) and Second (1891).

New York: *Annual Report of the Superintendent of Banking, Relative to Foreign Mortgage, Loan and Investment Companies*, 1891.

TABLE 3

**Determinants of Issuing Debentures and Share of Loans Behind Debentures in 1890
99 Western Mortgage Loan Companies Operating in Massachusetts and New York**

Variable	Probit: Debentures = 1			Truncated Regression: Debenture Share		
	Coefficient (s.e.) ^a	Marginal Effects ^b $\partial F(x,u)/\partial x_i$ (s.e.) ^a		Coefficient [s.e.]	Marginal Effects ^b $\partial \text{Share}(x)/\partial x_i$ (s.e.) ^a	
Loans Outstanding in 1890 (ln)	0.968** (0.220)	0.384**	(0.088)	6.60 (7.14)	1.65	(1.85)
Paid-In Capital/Loans Outstanding	0.018* (0.005)	0.007**	(0.002)	0.42 (0.23)	0.11	(0.06)
Real Estate / Assets	-0.027 (0.017)	-0.011	(0.007)	-3.76 (2.00)	-0.94*	(0.38)
Paid-Off Loans/All Loans Made	-0.009 (0.010)	-0.004	(0.004)	0.63 (0.42)	0.16	(0.09)
Age of Company (ln)	0.099 (0.254)	0.039	(0.101)	32.93** (8.27)	8.25**	(2.99)
Located in South or West	0.418 (0.524)	0.165	(0.202)	26.37 (15.31)	6.61	(3.62)
Located in Great Plains	0.757* (0.358)	0.284*	(0.134)	-13.64 (12.56)	-3.42	(3.42)
Located in Northeast	0.818 (0.571)	0.304	(0.189)	50.23** (13.19)	12.58**	(3.44)
Constant	-13.717** (2.981)			-171.83 (106.42)		
Sigma Constant				26.30** (3.97)		
Observations	99			62		
(Pseudo-R2)	0.33			0.41		
Log Likelihood /	-298.98**			-235.58**		
Chi²(8) / (F(8,53))	27.17**			37.34**		

^a Robust Standard errors. * significant at 5%; ** significant at 1%.

^b Marginal effects for continuous variables measured at their means with regional variables set to zero (Midwest omitted region). Marginal effects for regional variables measured for a change from 0 to 1 measured at the means of the continuous variables.

TABLE 4
689 Mortgages Made In Kansas In 1887:
Watkins' Brokered And Debenture Mortgages

	Brokered Mortgage Loans		Loans Placed Behind Debenture	
Number of loans :	465	67.5%	224	32.5%
Average (s.d.):				
Amount of loan (\$)	\$628	(355)	\$536	(303)
Size of farm (acres)	145	(48)	148	(32)
Debt per acre	\$4.51	(2.20)	\$3.76	(2.07)
Miles from Watkins	245	(56)	287	(66)
Number of Loans:				
Less than 5 years	31	6.7%	67	29.9%
Small loan (amount < \$400)	77	16.6%	63	28.1%
Large loan (amount > \$700)	100	21.5%	22	9.8%
Western Kansas	49	10.5%	84	37.5%
Quarter I	184	39.6%	59	26.3%
Quarter II	118	25.4%	14	6.3%
Quarter III	104	22.4%	45	20.1%
Quarter IV	59	12.7%	106	47.3%
Average (s.d.):				
Effective annual interest rate	10.09%	(1.10)	10.77%	(1.36)
Rate paid to agents	0.55%	(0.26)	0.71%	(0.33)
Watkins' return	3.07%	(1.00)	4.05%	(1.17)
Rate paid to investors	6.12%	(0.33)	5.54%	(0.50)

TABLE 5
Mortgage Rates, Investors' Rates and Debenture Choice: 689 Kansas Loans

Variable	Effective	Probit: Investors' Rate		Probit: Debenture = 1		
	Mortgage	Brokered	Debenture	"Full"	Mortgage Papers	
	Rate	7% Rt.=1	6% Rt.=1	Information	Information	
	n=689	n=465	n=224	n=689	n=689	Marginal
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Effects ^b
	[s.e.] ^a	[s.e.] ^a	[s.e.] ^a	[s.e.] ^a	[s.e.] ^a	[s.e.] ^a
Constant	8.34** (0.24)	-0.59 (0.75)	2.82* (1.41)	-3.24** (0.67)	-2.88** (0.58)	
Debenture Loan	0.01 (0.06)					
Loan Characteristics						
Large Amount	-0.20** (0.07)	-0.46 (0.24)	0.54 (0.41)	-0.40 * (0.19)	-0.38** (0.19)	-0.12 * (0.05)
Small Amount	0.03 (0.07)	-0.54 (0.32)	-0.37 (0.26)	0.52** (0.17)	0.53** (0.16)	0.19 (0.06)
Short Maturity	0.39** (0.09)	-0.02 (0.40)	0.02 (0.22)	1.06** (0.17)	1.07** (0.17)	0.40 (0.06)
Debt/Acre (ln)	-0.06 (0.09)	-0.08 (0.30)	-0.49 (0.43)	0.72** (0.22)	0.74** (0.22)	0.25** (0.07)
Location Measures						
Miles from Watkins (ln)	2.34** (0.18)	-0.24 (0.51)	-0.99 (1.01)	1.33** (0.49)	1.05** (0.38)	0.36** (0.13)
Western Kansas	0.54** (0.09)	0.63 (0.42)	-0.01 (0.32)	0.40 * (0.20)	0.51** (0.18)	0.19** (0.07)
Newly Settled	0.48** (0.08)	-0.51 (0.33)	-0.36 (0.29)	0.19 (0.18)		
Market Conditions						
Watkins's Loans (\$000)	-0.36** (0.06)	0.51 * (0.21)	-0.77 * (0.37)	0.18 (0.20)		
Watkins's Foreclosure	0.08 (0.07)	0.13 (0.20)	0.33 (0.31)	0.21 (0.16)		
Loan by Big Agent	0.10 (0.06)	-0.04 (0.18)	0.11 (0.22)	-0.12 (0.13)		
Made in Quarter II	-0.31** (0.07)	-0.62** (0.19)	-0.82* (0.40)	-0.78** (0.18)	-0.77** (0.18)	-0.22** (0.04)
Made in Quarter III	-0.63** (0.07)	-0.81** (0.25)	-1.86** (0.32)	-0.01 (0.16)	0.02 (0.15)	0.01 (0.05)
Made in Quarter IV	-0.57** (0.07)	-1.27** (0.44)	-0.73** (0.24)	0.89** (0.15)	0.92** (0.15)	0.34** (0.05)
R² - Pseudo R²	0.74	0.14	0.20	0.26	0.25	
Log Likelihood		-147.1	-124.5	-323.2	-324.7	
(F(14,674)/	156.8**					
Chi2(13/9)		38.4**	49.4**	181.1**	178.5**	

^a Robust Standard errors. * significant at 5%; ** significant at 1%.

^b Marginal effects for continuous variables measured at their means with dummy variables set to zero.
Marginal effects for dummy variables for a change from 0 to 1 at the means of the continuous variables.

TABLE 6
Sources of Differences in Average Mortgage Rates and Returns for Debenture and Brokered Loans
(Predicted Differences Based on Hedonic Models for 689 Kansas Loans)^a

Variable	Difference Between Average Debenture and Brokered Loan ^b :			
	Effective Mortgage Rate	Investors' Return	Watkins's Return	Loan Agent's Return
Actual Difference in Average (Debenture Loan-Brokered Loans)	0.68	-0.58	0.98	0.16
Predicted Difference Due To^c:				
Differences in Average Loan Terms	0.13 **	0.00	0.06 *	0.07 **
Differences in Average Measures of Location	0.63 **	-0.02	0.42 **	0.13 **
Differences in Average Market Conditions	-0.09 **	-0.03 **	-0.04**	-0.01 **
Debenture Status	0.01	-0.53 **	0.54**	-0.03

^a For complete regression results see Appendix Table 1.

^b The stars report tests for the joint significance of each group of variables. * significant at 5%; ** significant at 1%.

^c The differences in predicted effects for the average debenture and the average brokered loans using the regression estimates reported in Appendix Table 1. The table reports the sum of the predicted effects for all variables within each group.

APPENDIX TABLE 1
Mortgage Rates and Agents', Watkins's and Investors' Returns

Variable	Effective Mortgage Rate n=689 [s.e.]^a	Agent's Return n=689 [s.e.]^a	Watkins's Return n=689 [s.e.]^a	Investors' Return n=689 [s.e.]^a
Constant	8.34 ** (0.24)	0.17 ** (0.06)	1.68 ** (0.31)	6.36 ** (0.15)
Debenture Loan	0.01 (0.06)	-0.03 (0.02)	0.54 ** (0.07)	-0.53 ** (0.04)
Loan Characteristics				
Large Amount	-0.20 ** (0.07)	-0.04 ** (0.02)	-0.05 (0.09)	-0.03 (0.05)
Small Amount	0.03 (0.07)	0.01 (0.02)	0.12 (0.09)	-0.10 * (0.05)
Short Maturity	0.39 ** (0.09)	0.26 ** (0.04)	0.14 (0.09)	0.03 (0.05)
Debt/Acre (ln)	-0.06 (0.09)	0.00 (0.02)	-0.05 (0.10)	-0.04 (0.05)
Location Measures				
Miles from Watkins (ln)	2.34 ** (0.18)	0.42 ** (0.05)	1.86 ** (0.23)	-0.10 (0.11)
Western Kansas	0.54 ** (0.09)	0.18 ** (0.03)	0.06 (0.10)	0.03 (0.05)
Newly Settled	0.47 ** (0.08)	0.05 * (0.02)	0.44 ** (0.09)	-0.06 (0.04)
Market Conditions				
Watkins's Loans (\$000)	-0.36 ** (0.06)	-0.09 ** (0.02)	-0.27 ** (0.09)	0.03 (0.05)
Watkins's Foreclosure	0.08 (0.07)	0.01 (0.02)	-0.02 (0.08)	0.04 (0.04)
Loan by Big Agent	0.10 (0.06)	0.08 ** (0.02)	-0.08 (0.06)	0.02 (0.03)
Made in Quarter II	-0.31 ** (0.07)	-0.06 ** (0.02)	-0.05 (0.09)	-0.16 ** (0.04)
Made in Quarter III	-0.63 ** (0.06)	-0.07 ** (0.02)	-0.21 ** (0.07)	-0.27 ** (0.04)
Made in Quarter IV	-0.56 ** (0.07)	-0.06 ** (0.02)	-0.36 ** (0.08)	-0.15 ** (0.04)
(R²)	0.74	0.62	0.58	0.40
(F(14/674))	156.80	73.40	73.20	23.6

^a Robust standard errors (Huber-White sandwich estimator) reported.