Contract Choice in the Interwar US Residential Mortgage Market

Jonathan D. Rose

Federal Reserve Bank of Chicago

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Abstract

This paper studies mortgage contract choice in US history using a first-of-its-kind sample of residential loans from 1930 and 1940, linked to the decennial censuses. Contracts at the time featured a variety of durations and amortization requirements. As a result, contract choices reflected borrowers' reactions to the risks posed by different contracts. The majority of borrowers chose contracts with the longest available terms, despite required frequent amortization, likely in order to avoid refinancing risk. The most creditworthy borrowers preferred short-term contracts, though, confident that they could refinance at will. That said, the combination of short terms and frequent amortization was unpopular, used disproportionately by the least creditworthy and black borrowers. Between 1930 and 1940, contract use shifted toward longer term contracts, reflecting the advent of federal involvement in the residential mortgage market.

 Contact information: jonathan.rose@chi.frb.org.

1 Introduction

This paper studies residential mortgage contract choice in United States history. In particular, the analysis focuses on the economics of contracts with short terms, around 1-5 years in length, which have all but faded away from the modern mortgage market, but which were once commonly used, particularly before the Great Depression. The main goal is to understand why borrowers may have used short-term contracts instead of a longer-term alternative of around 8-15 years, and in the process to elucidate why short-term contracts became uncommon in the post-war market.

The main incentive for borrowers to use short-term contracts was the ability to avoid frequent principal payments, which were generally required on longer-term contracts but not necessarily on short-term ones. For borrowers with potentially volatile incomes, such as business owners or seasonal workers, the ability to make principal payments at a schedule of their own choosing could be advantageous. The offsetting disadvantage of a short-term contract was refinancing risk. The salience of this concern was also likely to differ across borrowers, with a less creditworthy borrower, for example, perhaps more concerned about their ability to refinance. Overall, no single contract was optimal for every borrower. Instead, borrowers chose contracts in the context of the risks they were willing to tolerate.

To explore how borrowers reacted to these risks historically, I introduce a new dataset of mortgage loans outstanding as of 1930 and 1940, based on municipal land records in Baltimore, MD. I link these data to the 1930 and 1940 household censuses, which provide characteristics of the borrowers and their households. I also compile some credit history information from the land records.

I find that short-term contracts were the choice of the socioeconomic elite, but only if those contracts did not require regular principal payments. These well-off borrowers—with relatively well-paying jobs, big properties, live-in servants, good credit histories, and additional indicators of socioeconomic status extracted from the census—likely had access to any contract they desired, and chose short terms. I suggest that these borrowers were willing to take on refinancing risk because they viewed themselves as creditworthy and able to refinance at will if needed. In addition, they may have valued the option to pay down their loans at a pace of their own choosing, or not at all.

In contrast, contracts that combined short terms with frequent principal payments tended to be used by the least creditworthy borrowers. In addition, black borrowers were slightly more likely to use such contracts in the raw data. In both cases, the use of such contracts was likely less the result of a choice among contracts and more the result of difficulties in accessing other contract types. The least creditworthy borrowers, such as those who had maxed out their mortgage credit and taken out additional chattel loans on furniture inside their houses, were likely seen by lenders as too risky for long terms or infrequent payments. Black homeowners, in turn, were a group that faced severe discrimination in credit and housing markets in this period.

Finally, medium-term (typically 8-10 years, in Baltimore) frequently amortized contracts were the choice of the masses. These choices likely reflected borrowers' preferences to avoid refinancing risk, even as they took on the the requirement to make frequent principal payments, which could pose risks for those with uncertain income streams. In addition, the widespread use of these contracts likely reflects the preference of lenders to require frequent amortization by borrowers with average credit quality. Indeed, contemporary discussions describe amortization payments as a useful way to monitor and maintain contact with borrowers whose creditworthiness was otherwise relatively opaque. Likewise, the lenders who made these loans tended to be small-scale neighborhood lenders, arguably more able to observe soft information about borrowers.

Contract choice was also influenced by a number of other factors, including interest rates and leverage. However, interest rate variation was relatively low, and borrowers could always obtain higher leverage through multiple mortgages. Overall, the basic patterns described above persist within subsamples of loans with similar interest rates or limited leverage.

Between 1930 and 1940, borrowers reduced their use of short-term contracts. One explanation for this shift could be that preferences changed, as the Depression led borrowers to take refinancing risk more seriously, after lenders pressured for repayment of short-term loans. However, the data show the most pronounced shift away from short-term contracts among borrowers with high socioeconomic status, who would have been the least likely to come under refinancing pressure. Another explanation (not mutually exclusive with the first) is that the federal government—which became involved in the nonfarm residential mortgage market for the first time during the Depression—implemented policies that subsidized or otherwise encouraged longer-term contracts. In particular, the policies of racial exclusion by the Federal Housing Administration are

well known, and federal policies in general targeted middle and upper class white borrowers for long-term contracts.

Long-term contracts continued to spread after 1940, slowly but steadily. The median contract term for single-family homes was still only 12 years in 1950, then reached 20 years in 1960, 25 years in 1970, and 29 years in 1980. Borrowers able to obtain FHA or VA contracts saw their loan terms lengthen faster than borrowers in the conventional market. Today, widespread access to long-term 30-year contracts is supported in part by the government-sponsored enterprises, Fannie Mae and Freddie Mac. Both remain in conservatorship of the federal government at the time of this writing, with an unclear future. Consumer advocates have expressed concern that reforms to Fannie and Freddie could create difficulties for consumers in obtaining long-term mortgage contracts. The period studied in this paper provides a fresh point of view for thinking about that concern. The 1920s are the most recent time in US history in which nonfarm residential mortgage contract choices were relatively little shaped by federal policy to favor long-term contracts. The analysis therefore supplies an historical perspective on what types of borrowers have come to benefit from policies to promote long-term contracts since the Depression.

2 Data and Background

The interwar period was a dramatic one for the housing market. House prices advanced significantly during the 1920s and then plummeted during the early 1930s, perhaps by about one-third or more (Shiller 2000, Snowden 2006, Fishback and Kollman 2014). Nonfarm homeownership likewise trended up during the early 20th century in the US, peaking before the Depression and then falling during the 1930s amidst a major foreclosure crisis and associated changes in the pattern of household formation (Fetter 2014, White 2014, Brocker and Hanes 2014). While urban homeownership had become increasingly common, as of yet there was essentially no federal government policy aimed at supporting it (Snowden 2010).[1] As the mortgage market grew to meet

[1]The only involvement of the federal government came through through its regulation of nationally chartered banks. National banks were small players in the mortgage market, in part because of fairly tight limits placed on them by statute. In particular, total exposure to real estate lending was limited to a small fraction of banks' capital. National banks wrote only short-term loans, as by law until 1927 they could only write mortgage loans on nonfarm properties with terms of one year or less. In 1927, the limit was raised to 5 years, and then raised further in 1935 to 10 years, or longer if insured by the FHA. These laws also regulated other contract characteristics, especially the loan-to-value ratios. State banks were able to be more involved in mortgage lending, depending on state law. See Behrens (1952).

the demands placed on it during the 1920s, the resulting patchwork featured a variety of lenders and contracts that had evolved without much direction from policymakers. This patchwork market exposed borrowers to a variety of risks, perhaps largely dormant during the prosperous 1920s but no longer during the exigencies of the 1930s. Economic historians have written relatively little about mortgage credit in this era, though, in part because of a shortage of micro data needed to make progress on key questions.

This paper therefore introduces a micro dataset of mortgages loans in the US during the inter-war period. Specifically, the data are a one percent sample of owner-occupied properties, and the mortgage loans on those properties as of 1930 and 1940, from the city of Baltimore, Maryland, constructed using municipal land records. I follow the same *properties* from 1930 to 1940. The appendix details the sampling.

While the main limitation of these data is that they are limited only to one city, they represent a significant advancement beyond existing data. The only other data set containing individual mortgage loans in the pre-Depression 1920s or 1930s is a dataset constructed by the NBER in 1947. Unfortunately, that data has some sampling biases and contains no information about borrowers.[2]

I link each property from the land records to the 1930 and 1940 censuses, by name and address.[3] The match has a 96 percent success rate in 1930, and 95 percent in 1940.[4] The final sample yields 987 owner-occupied households in 1930, with 539 first mortgage loans, 171 second mortgage loans, and 24 third mortgage loans. From 1930 to 1940, the number of owner-occupied homes in the sample dropped from 908 properties to about 400 first mortgages. In the remainder of this section, I will focus on the data in 1930, and a later section will return to the 1940 data.

[2]The NBER data have bias due to the survey being conducted in 1947, and due to the exclusion of several categories of lenders.

[3]I use the IPUMS preliminary complete count census data; see Ruggles, Genadek, Goeken, Grover, and Sobek (2017). The 1950 complete count census data are not yet available. In principle, the analysis could be extended backwards to 1920 and before. However, since a large amount of new construction took place during the 1920s, extending the analysis back to 1920 would probably require resampling in 1920. In contrast, new construction was limited between 1930 and 1940.

[4]The most common reason for the match between the land records and the census to fail is that the census and the land records positively identify different people as owning the house. Usually this appears to be because the resident is purchasing the house on a sales installement contract, so that they do not yet own the deed and therefore would not show up in the land records, even though they occupy the house and might consider themselves owners when asked. Often, such occupants do eventually acquire the deed in the land records. Otherwise, for a small number of properties I cannot find any owners at all in the land records, probably because of a filing error in the land records. The final sample excludes one mortgage that was unreadable due to faulty preservation, and any households that were purchasing their homes through installment contracts.

Table 1: Breakdown of Mortgage Loan Contract Types in 1930

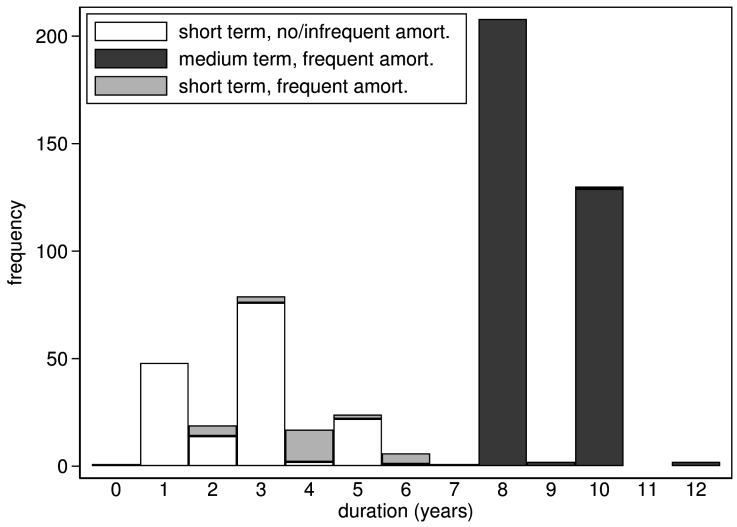
	First Mortgage		Second Mortgage	
Type of contract	Number	Percent	Number	Percent
Short term, no amort.	139	25.8	46	26.9
Short term, infrequent amort.	25	4.6	8	4.7
Short term, frequent amort.	32	5.9	61	35.7
Medium term, frequent amort.	341	63.3	53	31.0
Other	2	0.4	3	1.8
Total	539	100.0	171	100.0

Notes: A term is considered short if it is 7.5 years or less, medium if it is 7.5-15 years, and long if more than 15 years. Amortization is considered infrequent if it is semiannual or annual, and frequent if weekly, monthly, or quarterly.

Table 1 displays a breakdown of the sample by type of contract associated with the first mortgage loans. The most common contract in Baltimore was the medium-duration frequently amortized loan. These loans also nearly always carried a fixed interest rate and full amortization. Here, I define a duration as medium if it has a maturity of more than 7.5 years. In Baltimore, the most common durations were 8 or 10 years. In other parts of the country, terms of about 12 years were relatively more common, and it's not clear why Baltimore differed on that front, beyond a divergence in the long-term evolution of its lenders dating back to the 19th century. These medium duration loans also carried either monthly or weekly amortization designed to fully extinguish the loan by the end of its term.[5]

[5]Contemporary sources describe most borrowers with weekly amortization as choosing to pay it on a monthly basis. See "Home Building and Owning Encouraged in Baltimore," *Baltimore Sun*, 11 June 1922. I abstract in this paper from the exact mechanics of amortization used. Rose and Snowden (2014) discuss in detail the types of amortization used by building and loan associations. The predominant method prior to the Depression involved the creation of a sinking fund, into which a borrower would make payments which would be invested in the equity of the association. The loan would be extinguished once the sinking fund reached the principal value of the loan. Borrowers would therefore pay interest on the full amount of the loan for its entire life, but would also receive dividend payments on their sinking funds. Baltimore associations, however, had largely abandoned this form of amortization by the 1920s. Most often they implemented amortization using the "drop-share" method, in which borrowers would buy shares one by one, and once each equity share was bought it would be used to extinguish an equal amount of the loan, i.e. the share would be dropped. Elsewhere this was more commonly known as the "cancel and endorse" method, referring to the cancellation of part of the loan in return for the share being endorsed over to the association. Direct reduction is the more modern form of amortization, in which each payment directly reduces the outstanding principal. There is little economic distinction between the direction reduction, drop-share, and cancel and endorse methods. The direct reduction method became standard by the end of the 1930s. The old sinking fund method lost much popularity during the Depression, as it exposed borrowers to risk through their equity share investments, and those investments suffered greatly during the Depression.

Figure 1: Distribution of Durations on Mortgages in 1930



Notes: Amortization is defined as infrequent if it is semiannual or annual.

The next most common contract type in Table 1 had a short duration with no amortization. I define a duration as short if it was 7.5 years or less, though Figure 2 shows that, in Baltimore, one and three year contracts were most common. Other short-term loans did carry amortization requirements, some on a frequent basis (defined as quarterly, monthly or weekly), and others less frequently. Generally, interest payments on loans with amortization were required at the same frequency as the amortization payments, and were semiannual on loans without amortization.

Table 2: Stated and actual durations of mortgage contracts

Type of first mortgage	Number	Mean stated duration	Mean actual duration	Mean difference
Short term, no amort.	139	2.4	11.5	9.1
Short term, infrequent amort.	25	3.5	9.7	6.1
Short term, frequent amort.	32	4.1	9.3	4.6
Medium term, frequent amort.	341	8.6	9.7	1.1
Other	2	22	13.5	-8.5
All	539	6.6	10.1	4.5

Upon maturity, a short-term contract generally could either be refinanced into a new loan or

carried as a demand loan at the willingness of the lender, with payments of interest continuing at the same rate and frequency. In practice, many loans persist in the land records far past their stated terms. Indeed, Table 2 shows that short-term, unamortized contracts actually had the longest average actual durations. Of course, the actual durations reflect a number of factors, such as foreclosures and early pay downs. The choice to continue on a demand basis would have exposed borrowers to risk of their loans being called by their lenders. Borrowers nevertheless may have preferred this option in order to avoid the fees associated with refinancing loans into new contracts. Whatever the case, lenders generally conducted a prudential reassessment at maturity, for example of loan-to-value ratios.[6]

Table 3: Breakdown of First Mortgage Lenders in 1930

	First Mortgage		Second Mortgage	
Type of lender	Number	Percent	Number	Percent
Builders	8	1.5	8	4.7
Building and Loans	354	65.7	92	53.8
Commercial Banks	21	3.9	3	1.8
Individuals	50	9.3	59	34.5
Insurance Companies	14	2.6	0	0.0
Mortgage Companies	21	3.9	7	4.1
Savings Banks	71	13.2	2	1.2
Total	539	100.0	171	100.0

Turning to the lenders, Table 3 displays a breakdown of the sample by type of lender that held the loan as of 1930. (Some loans were sold in the secondary market after origination and therefore the lender owning the loan in 1930 could differ from the lender that originated the loan). Building and loans (i.e. the institutions that were known as savings and loans after the 1930s) dominated the Baltimore market, funding about two-thirds of the first mortgages. The remaining loans were held by a variety of lenders, including savings banks, insurance companies, commercial banks, mortgage companies, builders, and individuals.[7]

[6]Similar practices appear to have prevailed in Baltimore and in other cities as well. In Boston, savings banks reportedly tended to loan mortgage money on "3 year notes which are held indefinitely on demand after maturity." In New York, "banks and trust companies, mutual savings banks, and mortgage companies formerly made short-term loans and either renewed or allowed them to run as open mortgages." See Home Owners Loan Corporation Papers; the Baltimore Survey Report is in box 89; the Boston report in box 42, and the New York report in box 116.

[7]Some of the loans held by individuals were actually held in trust accounts at commercial banks, and the underwriting was often conducted by the trust department officials; however, since the loans were funded by individuals,

Finally, the Baltimore housing market had one unusual feature: the prevalance of leasehold properties. To this day, Baltimore has a large number of properties owned subject to long-term leases, typically 99 years with the option to renew, and therefore indefinite in practice. According to Table 4, 64 percent of mortgaged properties in the data were owned as leaseholds, compared to 51 percent of non-mortgaged properties.

Table 4: Leasehold ownership in 1930

	Leasehold ownership	Fee simple ownership	Percent leasehold
Not mortgaged	228	220	50.9
Mortgaged	346	193	64.2
Short term, no amort.	41	98	29.5
Short term, infrequent amort.	4	21	16.0
Short term, frequent amort.	25	7	78.1
Medium term, frequent amort.	275	66	80.6
Other	1	1	50.0
All	574	413	58.2

Residential leasehold properties are common in some foreign countries but are rare in the US, primarily confined to Hawaii, rural Pennsylvania, and Baltimore. The annual payments required from the leasehold owner to the fee simple owner are known as ground rents. The term "ground" in "ground rent" is misleading, suggesting that the fee simple owner has some claim to the ground but not the structure, which is not true. In economic terms, ground rents are essentially a financing method. Most ground rents in the data were worth about 10-25 percent of house value on a capitalized basis, with the average equaling 18 percent of value.

Some lenders were reluctant to lend on leasehold properties because of lien priority issues. A ground rent holder has a first lien on a property, above any mortgages, though still below any tax liens. Lender preferences to avoid leasehold properties could affect the mix of contracts in the data if they reduce borrowers' abilities to obtain certain contracts. However, ground rents were not exogenous constraints, as they could be redeemed at the option of the leasehold tenant at a price fixed by law. The details of the redemption transaction are somewhat complicated, but essentially by the beginning of 1930 any lease created after 1884 or before 1925 was redeemable. The price of

and since the banks themselves may not have even had the legal ability to own the loans, I classify these as held by individuals.

redemption was generally capped at a 6 percent capitalization. As a result, an optimizing borrower with a redeemable ground rent could obtain a contract with the lender of his or her choice by executing a redemption, essentially refinancing the ground rent in the process. A redemption would have been especially easy to arrange at the time of purchasing a home, as the transaction cost would be lower since title attornies reportedly offered this as a marginally priced service.

3 Risks and tradeoffs for different mortgage contracts

A 1934 survey of potential mortgage borrowers provides some insight. In the survey, 25 percent of respondents expressed a preference for short-term (defined as 3-5 year) unamortized contracts, while the rest preferred long-term (8-13 year) fully amortized contracts.[8] This paper seeks to understand the basis of such preferences. The basic argument of this section is that no single contract was optimal for every borrower, and instead borrowers formed preferences by considering the importance for them of the risks presented by each of the contracts outlined in the previous section.

In the 1920s and 1930s, the key risks to borrowers when considering mortgage contracts were *refinancing risk* and *income risk*. *Refinancing risk* applies to short-term contracts, which upon maturity require borrowers to seek refinancing with the same lender or a different one. Therefore, borrowers carried the risk that they may be unable to refinance, for example if the value of their houses declined, eroding their equity positions, or if their own personal creditworthiness fell. In practice, in this period, not all borrowers actually refinanced at maturity. Instead, borrowers commonly had their loans "carried" by the lenders, who could call them due at any time. This of course did not resolve the refinancing risk, and instead perhaps only intensified it.

Income risk applies to borrowers with uncertain income streams, who as a result may wish to avoid frequent amortization. Volatile income sources create the possibility that borrowers may not be able to satisfy frequent payments. For example, a borrower with seasonal income, or higher than average risk of unemployment, might prefer a loan with no amortization or infrequent amortization. Likewise, business owners or self-employed professionals may have relatively volatile income streams and therefore may prefer to avoid rigid amortization schemes.

[8]The survey was national in scope, with responses from 2,385 people in 100 cities. See American Savings and Loan Institute (1934).

Interest rate risk is a topic of much discussion today. Indeed, much of the modern literature on mortgage financing choices focuses on the use of fixed or floating rate contracts. Short-term contracts implicitly carry interest rate risk, as interest rates could potentially be higher when borrowers seek to refinance. However, interest rate risk was largely a non-factor in the 1920s, as mortgage rates were quite steady. I have never seen any discussion of the risks posed by interest rate variability in this time period. The absence of much concern about interest rate risk allows the analysis to focus on refinancing and income risk instead.

Table 5: Risks posed by mortgage contracts

	More refinancing risk	*Less refinancing risk*
More income risk	Short term, frequent amortization	Long term, frequent amortization
Less income risk	Short term, infrequent amortization	Long term, infrequent amortization

To understand how these risks applied to different contracts, Table 3 presents a segmentation of contracts into four groups, depending on whether they pose refinancing risk, pose risks for those with uncertain incomes, both, or neither. Contracts in the lower left, with short terms and infrequent amortization, might appeal to borrowers with very good creditworthiness but volatile income. Such borrowers would have relatively more tolerance for refinancing risk given their creditworthiness, and place relatively high value on the optionality of making amortization payments at a schedule of their own choosing. In contrast, contracts in the upper right might appeal to borrowers with relatively low creditworthiness and low income volatility. Such borrowers may have valued the ability to lock in the longest terms available, and would have placed little weight on income risk. Contracts in the upper left, with short terms and frequent amortization, would be relatively unattractive, given their combination of refinancing risk and income risk.

Contracts in the lower right of the table, with long durations and infrequent amortization were rare. This is because lenders are typically unwilling to allow large debts to remain outstanding by contract for long periods with no reduction in the principal. That said, the Baltimore market

actually offered one financing vehicle of this type, the leasehold estate, as described at the end of the previous section. Leasehold estates were quite popular, likely because they allowed for higher leverage while avoiding both income and refinancing risk. Typically, though, ground rents effectively financed only a small portion of the property value. Overall, since leasehold ownership imposes neither refinancing risk nor income risk on borrowers, it should not factor into contract choice.

The household finance literature touches on similar issues in the study of modern household finance choice. Campbell and Cocco (2003) consider the role of income risk in the modern choice of a fixed or floating rate contract. They develop a lifecycle consumption model in which borrowers face uncertain income and borrowing constraints. They find that most borrowers should prefer the floating rate, but those with sufficiently volatile labor income should prefer fixed rates in order to avoid fluctuations in the size of the payments. In addition, Piskorski and Tchistyi (2010) also study households with uncertain labor income. They conclude the optimal contract is a combination of an interest-only mortgage and a home equity line of credit.

Scholars have also studied the role of financial sophistication in shaping contract choices. Primary sources from the 1930s contain complaints, for example, that borrowers were unaware of how the risk on short-term contracts could manifest in practice; borrowers "learned to their dismay that a short-term mortgage is 'callable' at any time after its due date, whether it was 'convenient' for the borrower or not."[9] While lenders had not exercised this option aggressively in the 1920s, they likely did so increasingly after 1930 in order to raise funds, and may have caught unsophisticated borrowers by surprise.

Often, studies on financial sophistication also consider the use of alternative mortgage products. One relevant finding from this literature is that financially literate borrowers can have a higher likelihood of using non-standard products, including interest-only mortgages, and taking on the risks accompanying them. Amromin, Huang, Sialm, and Zhong (2011) find this result in the US, and Cox, Brounen, and Neuteboom (2015) in the Netherlands, though Gatherwood and Weber (2017) find more mixed evidence in the UK. Otherwise, much of the literature on modern mortgage contract choice focuses on the choice of fixed or floating rates, such as Coulibaly and Li (2009) and Barlevy and Fisher (2011). Lender characteristics and other financing factors also affect the

[9] *Literary Digest*, 16 September 1933, p. 37.

mix of contracts, including as discussed in Fuster and Vickery (2014).

Contract choice is also a subject of much research in the corporate finance literature. Of particular relevance, Flannery (1986) considers how asymmetric information affects debt maturity choices for firms. He concludes that, under certain circumstances, firms may choose to use short-term debt in order to signal to lenders their creditworthiness, insofar as they exhibit willingness to take on refinancing risk.

Figure 2: Advertisement for mortgage loans suitable for the "business man" and the "wage earner"

Source: *Baltimore Sun*, 9 June 1930 p. 6.

Finally, lender preferences of course also affect what contracts borrowers select, as fundamentally the contract is a joint choice between borrower and lender. Some historical sources suggest that lenders saw frequent amortization payments as a useful way to monitor and maintain contact with borrowers whose creditworthiness was otherwise relatively opaque. For example, a discussion of Baltimore building and loan associations noted that their "close contact with the borrower" led

them to accept higher borrower leverage than most other lenders.[10] This points to a larger pattern in which the amortization requirements, duration, and leverage of a loan are jointly set. Lenders who offered long maturities or high leverage tended to require amortization as well, in order to avoid large debts sitting untouched for long periods. In addition, relationships between borrowers and lenders could certainly affect borrower contract choice, as a borrower might be willing to alter their contract choice in order to take advantage of a relationship with a lender they desire to borrow from.

Figure 2 shows an example of a Baltimore lender marketing different contracts. It is particularly telling that the ad suggests "the business man" and "the wage earner" might have different preferences. Indeed, other ads by this savings bank (too large to reproduce on this page) specifically marketed short-term unamortized contracts to business men, and 10-year fully amortized contracts to wage earners.

4 Analysis of contract choice in 1930

4.1 Empirical setup

To analyze contract choice, I classify contracts into three types:

1. Short-term contracts of 7.5 years or less, with no amortization or infrequent (annual or semi-annual) amortization
2. Medium-term contracts of more than 7.5 years, with frequent amortization
3. Short-term contracts of 7.5 years or less, with frequent amortization

This classification groups together short-term contracts that have infrequent amortization with those that have no amortization. The rationale is that both types are likely to pose smaller income risk to borrowers compared to more frequent amortization. Thus the first contract in the list poses refinancing risk but less income risk; the second poses more income risk but less refinancing risk; and the third poses both types of risk. The data contain virtually no loans that feature medium-term durations and no or infrequent amortization.

[10] HOLC papers, Box 89, "Building and Loan Associations."

I use two different types of models to estimate contract choice empirically. The first is a set of three probit models, with the outcome dummy variables representing the choice of each of the three contract types. This equation is estimated separately for each contract choice.

The second model is a multinominal logit model with three possible outcomes, one for each contract type. The multinominal model has the advantage of modeling the choice across the three contract types as one decision, instead of treating it as three separate decisions as in the set of probit models. I use a multinomial model rather than an ordered model because the different contracts have no natural ordering. The multinomial model presents empirical challenges, though, because of the small number of observations in which borrowers chose the third contract type. As a result, some of the explanatory variables perfectly predict the third outcome. In particular, every borrower with a short-term frequent amortization contract is married and has a job. Thus these variables cannot be included in the multinomial logit specifications, but can be included in the probit analyses of the other two contract types. In addition, note that a key assumption of the multinomial logit model is independence of irrelevant alternatives. In this context, this assumption would imply that, for example, the availability of a medium-term fully amortized contract does not affect the relative probability of the other two contract types.

4.2 Summary statistics

Table 6 displays summary statistics for the explanatory variables used in the analysis. Each variable derives either from the 1930 census or from the land records. Variables describing characteristics of an individual, such as race or gender, relate to the household head as identified in the census.

The discussion of risks in the previous section suggests that measures of creditworthiness would be useful in an empirical analysis of contract choice. Credit reports for individuals did exist at the time, but I am not aware of an extant collection that would contain information on Baltimore mortgage borrowers. Instead, I construct two pieces of information related to credit history from the land records data: the number of previous mortgages on the same property, and whether the household used a chattel loan in 1930 or before. Chattel loans, in which borrowers used household posessions like furniture as collateral, are an indicator of a household reaching the end of its ability to raise credit. The major limitation of using the land records to construct credit history information is the infeasability of collecting information on people before they acquired the house

Table 6: Summary statistics in 1930

variable	N	mean	median	sd	min	p25	p75	max
Baseline variables								
log property frontage	539	3.08	2.75	0.69	2.4	2.6	3.4	5.7
number working adults	539	1.81	1	1.14	0	1	2	6
1(never married)	538	0.033	0	0.18	0	0	0	1
age at first marriage	500	25.2	24	6.0	17	21	28	76
1(has boarders or renters)	539	0.29	0	0.46	0	0	1	1
1(race=black)	539	0.17	0	0.38	0	0	0	1
1(veteran)	539	0.11	0	0.31	0	0	0	1
1(immigrant)	539	0.21	0	0.41	0	0	0	1
age	539	45.9	44	11.8	23	37	54	86
year of purchase	539	1922.5	1924	6.3	1893	1920	1927	1930
1(had chattel mort.)	539	0.037	0	0.189	0	0	0	1
Cumulative # mtges	539	2.425	2	2.007	1	1	3	18
1(has occupation)	539	0.89	1	0.31	0	1	1	1
Additional variables								
1(has servants)	539	0.028	0	0.165	0	0	0	1
log property value	516	8.71	8.70	0.65	6.2	8.3	9.0	10.6
occupational score	375	31.0	28	12.4	4	23	42	80
1(employer)	477	0.059	0	0.235	0	0	0	1
1(self employed)	477	0.191	0	0.393	0	0	0	1
occupation income sd	470	0.575	0.592	0.118	0.3	0.5	0.61	1.18

Notes: Property frontage is measured in feet. The standard deviation of income is estimated using income information for the same occupations in the 1940 census, as described in the text.

which they owned as of the 1930 census. As a result, those who acquired their properties closer to 1930 will naturally have had fewer mortgages on that property, as it would be quite difficult to record what loans they had on previous properties. Including the year of purchase both adjusts for the relationship between tenure and the number of mortgages, and provides another measure of creditworthiness.

In addition, I use several pieces of information from the 1930 census that relate to socioeconomic status. These factors may correlate with creditworthiness, or a more general ability to obtain loans easily. Relevant measures available in the census include whether a household employs live-in servants, the number of working adults living in the house, and the presence of boarders or renters. In addition, the age of marriage, or never having married, can indicate that the household head was economically capable of delaying marriage, yielding insight into economic status. In terms of income and occupation information, the 1930 census does not report income, but it does

report occupation. As a measure of income, Ruggles, Genadek, Goeken, Grover, and Sobek (2017) estimate a median earnings by occupation, known as an occupational earnings score.

House values, as reported by households in the census, could also be an indicator of economic status, but would likely pose challenging interpretation issues. For example, house values could capitalize access to desirable forms of mortgage credit. Therefore, house values could endogenously reflect the availability of certain contract types. (Of course, this effect depends in part on the flexibility of the housing supply in areas with access to desirable mortgage credit; greater flexibility of supply would tend to diminish this price effect.) Therefore, instead of house prices, I use property frontage width as a proxy for the attractiveness of the property, a measure that should not capitalize on local economic opportunities.

The previous section also suggests that a measure of income volatility would be useful. Some information from the 1930 census may be correlated with such volatility, including whether a borrower is self-employed, and whether the borrower is an employer. In addition, I use occupational information to look at the within-occupation dispersion of incomes. Since income information is not available in the 1930 census, though, I calculate this measure using the occupation and income information in the 1940 census.[11]

Table 7 breaks down the summary statistics across the three types of contracts. The table also shows p-values for simple difference in means tests, comparing households that chose the first contract with households that chose each of the latter two contracts. Figure 3 shows some of these simple relationships graphically. Together, Table 7 and Figure 3 show some strong patterns in which borrowers with markers of relatively high creditworthiness and socioeconomic status are more likely to use short-term contracts with no or infrequent amortization. These markers include no history with chattel mortgages, not having had a large number of mortgages, larger properties, higher incomes, fewer working adults in the house, not having been married young, higher property values, and employing live-in servants.

Finally, note that in Table 7 zero borrowers with medium-term contracts had live-in servants, and every borrower with short-term frequently amortized contracts had an occupation. As a result, I omit these variables from the analysis below when including them would perfectly predict contract

[11] Specifically, I match occupation-state-gender-age bins in 1930 with the same bins in 1940, and take the median income for each bin. I thank Dan Aaronson and Karl Schulze for generously sharing with me their algorithm to perform this matching with the 1940 census.

Table 7: Summary statistics in 1930: Differences in Means Across Contract Types

	Full sample		Short term, infreq. amort.	Medium term, frequent amort.		Short term, frequent amort.	
Variable	N	mean	mean	mean	p value	mean	p value
Baseline variables							
log property frontage	539	3.08	3.54	2.88	0.00	2.95	0.00
number working adults	539	1.81	1.59	1.94	0.00	1.69	0.58
1(never married)	538	0.03	0.03	0.04	0.78	0.03	0.98
age at first marriage	500	25.2	26.5	24.7	0.00	25.8	0.57
1(has boarders or renters)	539	0.29	0.26	0.31	0.24	0.25	0.89
1(race=black)	539	0.17	0.13	0.18	0.23	0.38	0.00
1(veteran)	539	0.11	0.13	0.10	0.40	0.09	0.59
1(immigrant)	539	0.21	0.18	0.24	0.17	0.09	0.22
age	539	45.87	45.41	45.93	0.64	48.06	0.25
year of purchase	539	1922.5	1923.1	1922.4	0.23	1920.8	0.06
1(had chattel mort.)	539	0.04	0.01	0.03	0.31	0.28	0.00
Cumulative # mtges	539	2.42	2.23	2.37	0.37	4.13	0.00
1(has occupation)	539	0.89	0.87	0.89	0.59	1.00	0.03
Additional variables							
1(has servants)	539	0.03	0.08	0.00	0.00	0.06	0.75
log property value	516	8.71	9.26	8.47	0.00	8.53	0.00
occupational score	375	31.0	35.6	29.2	0.00	27.5	0.01
1(employer)	477	0.06	0.07	0.05	0.38	0.06	0.87
1(self employed)	477	0.19	0.25	0.16	0.01	0.25	0.97
occupation income sd	470	0.58	0.59	0.57	0.05	0.61	0.37

Notes: The p values are the result of simple difference in mean tests between each of the two subsamples on the right with the short-term infrequent amortization subsample.

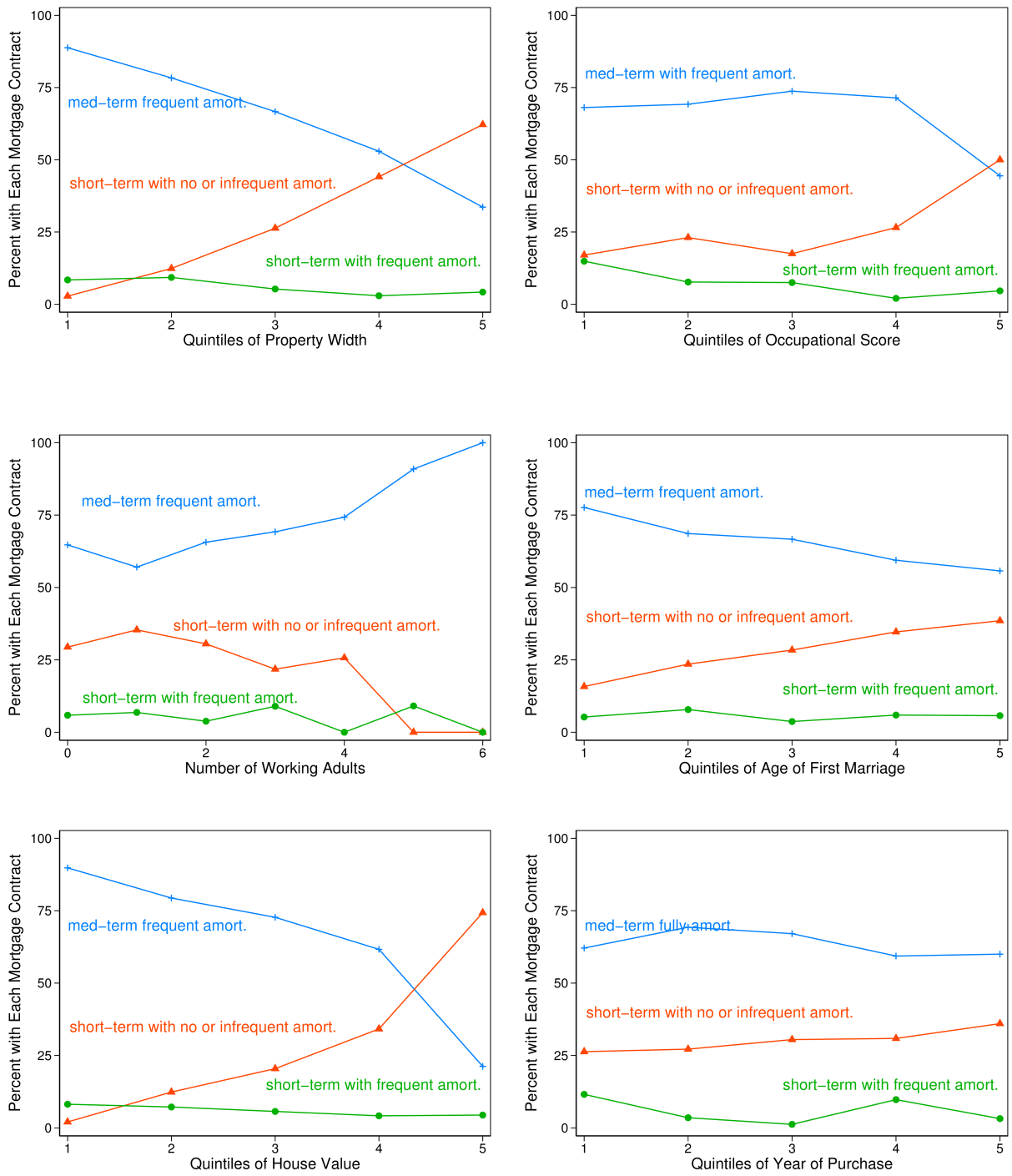
choice.

4.3 Baseline results

The results of the probit models are reported in Table 8. I report two different specifications, including and not including the marriage age variables, which reduce the sample size a bit since this information is missing for some borrowers in the census. This baseline specification also excludes the occupational variables, since those significantly reduce the sample. The occupational variables are analyzed in a subsequent section.

The results confirm the basic patterns that emerged in the summary statistics. Measures of relatively high socioeconomic status predict less use of long-term contracts or more use of the

Figure 3: Associations Between Contract Choice and Selected Independent Variables, 1930



short-term contracts with no or infrequent amortization. High status borrowers likely had the ability to arrange for the contract of their choice, and therefore the results suggest that the medium-

Table 8: 1930 Probit Estimates, Marginal effects

	Probit Short term, infreq. amort.		Probit Medium term, frequent amort.		Probit Short term, frequent amort.	
	(1)	(2)	(3)	(4)	(5)	(6)
log property frontage	0.306***	0.291***	-0.307***	-0.295***	-0.00998	-0.0109
	(0.0711)	(0.0713)	(0.0690)	(0.0699)	(0.0199)	(0.0189)
Number working adults	-0.0360	-0.0217	0.0611***	0.0489**	-0.0110*	-0.0125*
	(0.0232)	(0.0234)	(0.0224)	(0.0245)	(0.00638)	(0.00683)
1(never married)		0.265		-0.293*		0.0514
		(0.166)		(0.166)		(0.0631)
age at first marriage		0.00802*		-0.00966**		0.00178
		(0.00436)		(0.00433)		(0.00126)
1(has boarders/renters)	0.0166	0.0275	0.0412	0.0287	-0.0396***	-0.0353**
	(0.0622)	(0.0720)	(0.0661)	(0.0740)	(0.0153)	(0.0168)
1(race = black)	0.134*	0.0584	-0.168**	-0.0829	0.0322	0.0161
	(0.0766)	(0.0866)	(0.0666)	(0.0671)	(0.0407)	(0.0299)
1(veteran)	0.0793	0.0701	-0.0510	-0.0433	-0.0123	-0.0114
	(0.0662)	(0.0671)	(0.0665)	(0.0653)	(0.0176)	(0.0155)
1(immigrant)	0.0617	0.0541	-0.0250	-0.0216	-0.0306*	-0.0274*
	(0.0795)	(0.0771)	(0.0625)	(0.0585)	(0.0161)	(0.0161)
age	-0.000439	-0.00224	-0.00174	0.000655	0.000800	0.000502
	(0.00204)	(0.00232)	(0.00224)	(0.00262)	(0.000694)	(0.000645)
year of purchase	-0.00382	-0.00469	0.00335	0.00495	0.000571	0.000330
	(0.00638)	(0.00615)	(0.00631)	(0.00613)	(0.00182)	(0.00161)
1(had chattel mort.)	-0.182	-0.146	-0.214	-0.212	0.120***	0.104***
	(0.131)	(0.132)	(0.136)	(0.144)	(0.0316)	(0.0304)
Cumulative # mtges	-0.0110	-0.00367	0.000932	-0.0106	0.00548	0.00871*
	(0.0153)	(0.0149)	(0.0164)	(0.0168)	(0.00445)	(0.00462)
1(has occupation)	-0.0908	-0.0534	-0.0190	-0.0535		
	(0.0701)	(0.0769)	(0.0794)	(0.0916)		
Observations	539	500	539	500	539	500
Pseudo-R2	0.172	0.179	0.145	0.155	0.159	0.165

Notes: Each column is a separate probit estimation. The table reports the marginal effects on the probability of each column's contract, evaluated at the means of the independent variables. For dummy variables, the table displays the effect of a change from zero to one. This standard errors are clustered at the block level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels.

term fully amortized contract was not necessarily the most sought after contract for all borrowers.

In particular, the predictive power of the property size is statistically quite strong, with borrowers less likely to use a medium-term contract if they have wider properties. In terms of magnitude, a 0.5 log point increase in property width (say from 2.5 to 3.0, or roughly from 12 to 20 feet, the difference between a very narrow house and a larger than average rowhouse) is associated with

about a 15 percent decrease in the probability of a medium-term contract.

Otherwise, households with chattel mortgage history were more likely to use frequently amortized short-term contracts, by about 10 percentage points. Households whose heads married relatively late (or never married) tended to use short-term infrequently amortized contracts. The results also show that households with more working adults are more likely to use medium-term frequently amortized contracts, consistent with theory. Each additional adult is associated with a 6 percentage point increase in the likelihood of choosing this contract. The number of working adults is a socioeconomic indicator, but could also relate to income risk. Income diversification from multiple working adults might lower expected income volatility and therefore increase a household's willingness to take on frequent amortization. The results concerning borrower race will be discussed in a subsequent section.

The results for the multinomial logit estimation are are displayed in Table 9. Table 9 displays relative risk ratios, i.e. the ratio of the probability of each column's contract relative to the base contract, which is short-term loans with no or infrequent amortization. If a variable's relative risk ratio is greater than one, it indicates that an increase in that variable increases the relative probability of that contract compared to the base contract. If the ratio is less than one, it indicates a lower relative probability. The results are broadly similar to the probit estimations, though the variables included in the model are limited to those that do not perfectly predict contract 3, therefore excluding the age of marriage variables and the occupational dummy variable.

4.4 Occupational variables

Table 10 displays the results from including the occupational and income variables, using a set of three probit models. These variables were excluded from the prior analysis because missing information for many observations reduces the sample size. Each specification in the table includes all of the baseline controls, including the marriage variables and occupation dummy variable (except for the third contract type).

The results in specifications A and B show strong predictive power for the occupational score. Specification A includes the occupational score as a linear term, while specification B includes it more flexibly as quintiles. The latter specification suggests the effects are largely due to the highest occupational scores, as borrowers with occupations in the upper quintile are 28 percentage points

Table 9: 1930 Multinomial Logit Estimation, Baseline results - Relative Risk Ratios

	Contract choice	
	Medium term, frequent amort.	Short term with frequent amort.
log property frontage	0.211***	0.305
	(0.0738)	(0.230)
Number working adults	1.183	0.823
	(0.155)	(0.160)
1(never married)	0.217*	0.851
	(0.191)	(1.586)
age at first marriage	0.952**	1.004
	(0.0194)	(0.0359)
1(has boarders/renters)	0.885	0.333*
	(0.349)	(0.204)
1(race = black)	0.696	1.127
	(0.293)	(0.840)
1(veteran)	0.742	0.607
	(0.253)	(0.367)
1(immigrant)	0.766	0.349
	(0.277)	(0.306)
age	1.010	1.017
	(0.0116)	(0.0181)
year of purchase	1.030	1.022
	(0.0351)	(0.0532)
1(had chattel mort.)	1.246	10.38***
	(1.068)	(9.204)
Cumulative # mtges	1.010	1.199*
	(0.0946)	(0.125)
Observations	498	
Pseudo R-squared	0.156	

Notes: Each column reports the relative risk ratio of that column's contract compared to the probability of a short-term contract with no amortization or infrequent (semiannual or annual) amortization. This table displays standard errors which are clustered at the block level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels.

more likely to have short-term infrequent amortization contracts.

Specification C indicates that self employed borrowers were more likely to use short-term infrequently amortized contracts. This result could be consistent with higher creditworthiness of such borrowers, for example if they have built up a successful business. The results could also reflect potential income volatility for the self employed, leading them to dislike frequent amortization. In a specification including both the self employed variable and the oocupational score quintiles (not shown), the self employed variable loses predictive power while the topmost occupational

Table 10: 1930 Probit Estimates Including Occupational and Income Variables

	Short term, infreq. amort. (1)	Medium term, frequent amort. (2)	Short term, frequent amort. (3)
Specification A			
occupational score	0.00640**	-0.00531*	-0.000824
	(0.00249)	(0.00304)	(0.000595)
Observations	357	357	357
Specification B			
1(occ score quintile 2)	0.125	-0.109	0.00610
	(0.0876)	(0.100)	(0.0278)
1(occ score quintile 3)	0.0750	-0.0543	-0.00379
	(0.101)	(0.0995)	(0.0260)
1(occ score quintile 4)	0.143*	-0.0468	-0.0365**
	(0.0840)	(0.0846)	(0.0178)
1(occ score quintile 5)	0.283***	-0.241**	-0.0261
	(0.102)	(0.107)	(0.0270)
Observations	357	357	357
Specification C			
1(employer)	0.0754	-0.125	-0.00110
	(0.0902)	(0.0862)	(0.0239)
1(self employed)	0.121**	-0.130**	0.00937
	(0.0499)	(0.0514)	(0.0200)
Observations	455	455	455
Specification D			
occupational income dispersion	0.191	-0.314	0.0755
	(0.264)	(0.285)	(0.0617)
Observations	447	447	447

Notes: Each column reports the marginal effect on the probability of that contract. The standard errors are clustered at the block level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels.

score quintile retains strong predictive power. This suggests that the mechanism underlying the predictive power of the self employed variable is largely through economic status. Of course, the inclusion of the occupational score variable shrinks the sample, but an estimation of specification C on that limited sample (not shown) yields basically the same results as specification C.

Finally, specification D includes the occupational income dispersion variable, estimated from

1940 census data. The results indicate the variable has little predictive power over contract choices, though admittedly this is a poor measure of expected income volatility.

Table 11: Contract Use by Borrowers' Industry of Employment

		Percent with		
Industry	Number	Short term, infreq. amort.	Medium term, frequent amort.	Short term, frequent amort.
Transportation, communication, utilities	38	5.3	84.2	10.5
Government	32	12.5	71.9	15.6
Manufacturing - nondurable goods	64	25.0	70.3	4.7
Manufacturing - durable goods	62	29.0	67.7	3.2
Construction and mining	28	32.1	57.1	10.7
Other services	90	33.3	58.9	7.8
Wholesale and retail trade	93	36.6	58.1	5.4
Finance, Insurance and Real Estate	36	50.0	44.4	5.6
Unclassifiable, unavailable, or none	94	35.1	63.8	1.1

Notes: The industries are sorted by use of short-term contracts with infrequent amortization, in increasing order.

Turning to industry information, Table 11 displays a simple cross-tabulation of contract choice by broad industry of employment for borrowers that report such information in the census. Generally, borrowers appear more likely to use frequently amortized medium term contracts if they are employed in sectors with relatively little seasonal volatility, such as the government. In contrast, borrowers in more seasonally volatile sectors, such as wholesale and retail trade, are more likely to use contracts with infrequent amortization.

4.5 Race

Black borrowers are a population historically of interest in the study of access to credit, as they have long been discriminated against in the housing and mortgage markets. The literature on racial discrimination in mortgage markets tends to focus on the post-1930 period, and especially on the redlining practices of federal government programs. Jackson (1980) and Hillier (2003) are defining papers in this literature. Recently, new research by Aaronson, Hartley, and Mazumder (2017) examines the long-term effects of federal policies from this era. The data used in this paper from Baltimore cannot address the matter of redlining given the limited geographic variation.

Nevertheless, the data do provide an opportunity to study differences in mortgage contracts along racial lines. In addition, the setting in 1930 means that the differences are not due to federal policy that promoted racial discrimination or the use of long-term contracts.

Raw summary statistics in Table 12 show that the share of black borrowers using medium-term contracts was about the same as the share of white borrowers.[12] However, the results from the baseline estimation in Table 8 suggested that black borrowers were about 17 percentage points less likely to use a medium term contract. These results are consistent with a line of thought in which black borrowers would have used medium term contracts even more than white borrowers, but discrimination prevented some black borrowers from obtaining these contracts while similar nonblack borrowers were able to obtain them. Of course, more information on creditworthiness and other borrower characteristics would strengthen this finding. The modern literature on racial discrimination in lending typically uses a host of creditworthiness controls, and lenders in 1930 certainly had access to more creditworthiness information than is available for the estimation.

Table 12: Lender and Contract Breakdowns by Race of Borrower, 1930

	White borrowers		Black borrowers	
Type of lender	Number	Percent	Number	Percent
Individuals	42	9.4	8	8.5
Building and Loans	283	63.6	71	75.5
Savings Banks	69	15.5	2	2.1
Mortgage Companies	11	2.5	10	10.6
Insurance Companies	14	3.1	0	0.0
Commercial Banks	19	4.3	2	2.1
Builders	7	1.6	1	1.1
Total	445	100.0	94	100.0
Type of contract	Number	Percent	Number	Percent
Short term, no amort.	119	26.7	20	21.3
Short term, infrequent amort.	23	5.2	2	2.1
Short term, frequent amort.	20	4.5	12	12.8
Medium term, frequent amort.	281	63.1	60	63.8
Other	2	0.4	0	0.0
Total	445	100.0	94	100.0

Another element in the racial dynamics of mortgage lending was the exclusion of blacks by

[12]Note that the sample contains only white and black homeowners. A small number of other nonblack minorities owned homes in Baltimore at the time, but they did not end up in the sample.

certain types of lenders. Table 12 shows stark differences in the interactions between black borrowers and savings banks, insurance companies, and commercial banks. These institutions were known as well-regulated and conservative institutions, but in the process of cherry picking the best credit risks, they appear to have avoided the city's black population. For example, Thon (1935) describes savings banks in Baltimore as generally making loans "on high class residential, church, or business property. The poorer residential sections of the city are avoided" (p. 69). Black borrowers instead were more likely to borrow from mortgage companies and building and loans, both of which were unregulated in Maryland. For borrowers exposed to refinancing risk on short-term contracts, the stability of their lenders was quite important. Lenders running risky business models may have been more likely to refuse refinancing at maturity because of poor financial condition.[13]

Other data on racial aspects of mortgage lending in this era are scarce. The 1934 Financial Survey of Urban Housing (Wickens 1937) reports race-lender information for five cities. In these limited data, the most consistent difference along racial lines is that life insurance companies made relatively few loans to blacks, providing 12 percent of white borrowers' loans versus 4 percent for black borrowers. This is consistent with the pattern in Baltimore. Otherwise, the racial gaps across lenders exhibit different patterns across the five cities. National statistics from the 1940 census are more comprehensive, but they reflect developments during the 1930s including the Depression and federal policies. These data show a similar pattern to Baltimore in which commercial banks, savings banks, and life insurance companies provided 28 percent of mortgages for white borrowers, but only 13 percent for black borrowers.

4.6 Interest rates and leverage

The analysis thus far has focused on how income and refinancing risk affected contract choice. Of course, other contract characteristics also affected contract choice. This section focuses in particular on interest rates and leverage.

Table 13 shows the distribution of interest rates in the sample. Interest rate variation was

[13]The mortgage companies in particular operated fragile business models, dependent on wholesale funding. Many mortgage companies in this period were dependent in particular on a wave of securitization that took place in the 1920s, in which the companies issued bonds direct to investors. All came under catastrophic funding pressure in the late 1920s, even before the onset of the Depression, when investors refused to buy any more of their bonds and demanded redemption at maturity of the bonds they held. The latter caused these mortgage companies to insist on payment at maturity from their borrowers, realizing the refinancing risk inherent in those short-term contracts.

Table 13: 1930 Interest Rates by Contract and by Lender

		By Contract Type			By Lender Type		
Interest Rate	Total Obs.	Short term, infreq. amort.	Medium term, frequent amort.	Short term, frequent amort.	Savings banks, commercial banks, insurance companies	Building and loans	Individuals, mortgage companies, builders
5	6	5	1	0	4	0	2
5.5	57	55	0	2	55	0	2
6	271	98	160	9	47	150	74
6.24	196	0	176	17	0	197	0
6.66	1	0	1	0	0	1	0
6.93	2	0	2	0	0	2	0
7.8	1	0	1	0	0	1	0
NA	4	1	2	0	0	3	1
Total	538	159	343	28	106	354	79

Notes: Interest rate information is missing for one observation.

relatively limited, with almost all contracts bearing interest rates between $5\frac{1}{2}$ and $6\frac{1}{4}$ percent. Nevertheless, the limited variation in interest rates is clearly linked to other factors. Rates below 6 percent were generally only found in short-term infrequently amortized contracts, issued by the more conservative lenders that generally loaned only to white borrowers. The lower interest rates could therefore perhaps be interpreted as a lower risk premium, although they could also incorporate a lower term premium given the shorter durations of the contracts.

Table 14 displays a robustness check, repeating the baseline probit analysis but for the subsample of loans with interest rates of only 6 or $6\frac{1}{4}$ percent. With very limited interest rate variation in this sample, the choice among contracts is presumably driven by other factors. The results are broadly similar to the baseline results.

Turning to leverage, short-term loans tended to have stricter loan-to-value (LTV) ratio requirements than medium-term contracts. In Baltimore, LTVs on short-term contracts usually could not exceed 60 percent, whereas LTVs on medium term contracts could reach 70 percent. In part, lenders of medium-term contracts may have been more comfortable with the higher LTVs because of the amortization required by their contracts, which ensured the gradual reduction of debts over time. The stricter LTV requirements on short-term loans may also reflect the institutional conservativism on the part of savings banks, commercial banks, and insurance companies, that offered

Table 14: Robustness: Restricting Sample by Interest Rate

	Sample: interest rate at least 6 percent		
	Probit Short term, infreq. amort.	Probit Medium term, frequent amort.	Probit Short term, frequent amort.
log property frontage	0.177***	-0.188***	-0.00157
	(0.0384)	(0.0513)	(0.0197)
Number working adults	-0.0166	0.0426**	-0.0139**
	(0.0154)	(0.0205)	(0.00692)
1(never married)	0.208	-0.251	0.0629
	(0.146)	(0.156)	(0.0716)
age at first marriage	0.00509	-0.00693	0.00234
	(0.00429)	(0.00452)	(0.00167)
1(has boarders/renters)	0.0741	-0.0229	-0.0431**
	(0.0631)	(0.0685)	(0.0183)
1(race = black)	0.0968	-0.119**	0.0118
	(0.0726)	(0.0569)	(0.0295)
1(veteran)	0.141*	-0.117*	-0.0185
	(0.0725)	(0.0712)	(0.0148)
1(immigrant)	0.0746	-0.0405	-0.0338**
	(0.0710)	(0.0560)	(0.0169)
age	-0.000245	-0.00153	0.000316
	(0.00203)	(0.00252)	(0.000774)
year of purchase	-0.00659	0.00699	0.000616
	(0.00457)	(0.00504)	(0.00184)
1(had chattel mort.)	-0.0984	-0.204	0.112***
	(0.112)	(0.125)	(0.0327)
Cumulative # mtges	-0.00509	-0.00775	0.00988*
	(0.0126)	(0.0144)	(0.00512)
1(has occupation)	-0.0447	-0.0532	
	(0.0611)	(0.0818)	
Observations	444	444	444
Pseudo R-squared	0.114	0.106	0.167

such loans.[14] Nevertheless, it is not clear whether the leverage available on a first mortgage contract really imposed much of a constraint on a borrower, since the borrower could always take out one or more junior mortgages. A borrower seeking high leverage but also desiring to avoid frequent amortization as much as possible, for example, could be better off with an unamortized first mortgage and an amortized second mortgage compared to a single larger amortized first mortgage.

Measuring leverage in the data is difficult, unfortunately, since the data only record loan amounts at origination. Leverage as of 1930 would be more useful, since the data on household

[14]HOLC papers, Baltimore Survey pp. 16-20

Table 15: Robustness: Restricting Sample by Leverage

	Sample: lower loan-to-value loans		
	Probit Short term, infreq. amort.	Probit Medium term, frequent amort.	Probit Short term, frequent amort.
log property frontage	0.267***	-0.339***	0.0231
	(0.0968)	(0.108)	(0.0278)
Number working adults	-0.0452	0.0720*	-0.00906
	(0.0433)	(0.0410)	(0.0141)
1(never married)	0.382*	-0.480**	0.0621
	(0.206)	(0.221)	(0.121)
age at first marriage	0.00357	-0.00707	0.00193
	(0.00641)	(0.00579)	(0.00264)
1(has boarders/renters)	-0.0160	0.0886	-0.0465
	(0.0835)	(0.0862)	(0.0335)
1(race = black)	-0.0731	-0.00599	0.0851
	(0.0900)	(0.0991)	(0.0782)
1(veteran)	0.220**	-0.150	-0.0546***
	(0.108)	(0.105)	(0.0204)
1(immigrant)	-0.0470	0.0110	0.0166
	(0.116)	(0.102)	(0.0535)
age	-0.00437	-0.000512	0.00201
	(0.00337)	(0.00441)	(0.00168)
year of purchase	-0.00367	0.00635	-0.000993
	(0.00928)	(0.00878)	(0.00313)
1(had chattel mort.)	-0.123	-0.714***	0.234**
	(0.127)	(0.265)	(0.0991)
Cumulative # mtges	0.00212	0.00624	-0.00150
	(0.0293)	(0.0338)	(0.0120)
1(has occupation)	0.0102	-0.248	
	(0.153)	(0.194)	
Observations	195	195	195
Pseudo R-squared	0.201	0.216	0.211

characteristics date to 1930, not origination. Nevertheless, I calculate a crude measure of leverage using the original loan amount and the self-assessed property value as of the 1930 census. Table 15 displays the results from restricting the sample to loans with leverage of 60 percent or less. I also constrain the sample to loans made in 1925 or after, a period of relative house price stability (since property prices peaked around 1925 and did not significantly decline until 1931-1933). Again, the results are broadly similar to the baseline results.

4.7 Junior mortgages

Thus far, the analysis has largely considered only borrowers' first mortgage choices. Of course, the first mortgage contract is just one part of a decision over how to finance the ownership of a property, which also includes whether to have a second or third mortgage contract, and the form of those contracts. For borrowers concerned about income or refinancing risk, second mortgage contracts can clearly pose the same risks, though typically the risks would be more moderate given the smaller sizes of second mortgages. As a robustness check, it is useful to analyze whether borrowers' choices over their first and second mortgage contracts together conform with the patterns suggested by the preceding analysis.

With this in mind, column (1) of Table 16 displays the result of a probit estimation in which the outcome variable is a dummy for whether a borrower has any mortgage that contains frequent amortization. Column (2) shows the results of a similar estimation in which the outcome variable is a dummy for whether the borrower has any mortgage with a short term. In these estimations, I cannot include the chattel variable, as every borrower who had a chattel mortgage also had frequent amortization on at least one of their mortgage contracts. The results are similar to the previous analysis.

5 Depression experience

This section briefly discusses the large economic shocks that affected the mortgage market during the Great Depression, and the associated institutional changes that took place in the market. These events are key background for understanding contract choice in 1940, which is analyzed in the next section.

The combination of lower house prices and reduced incomes during the Depression years led to a wave of foreclosures across the country. Fishback, Rose, and Snowden (2013) estimate that the rate of foreclosure was likely 2.5-3.0 percent of outstanding loans a year at peak in the early 1930s, and that the cumulative total from 1926 to 1936 was 10-20 percent of all residential mortgages. In line with these estimates, the Baltimore data show that 14 percent of the mortgages outstanding in 1930 ended either in foreclosure or in the borrower deeding the property to the lender in lieu of repaying the debt. Another 11 percent were refinanced by the Home Owners' Loan Corporation

Table 16: 1930 Results - Choices across all mortgages

	Probit Frequent amort. on any mortgage (1)	Probit Short term on any mortgage (2)
log property frontage	-0.180***	0.283***
	(0.0399)	(0.0569)
Number working adults	0.0370*	-0.00954
	(0.0192)	(0.0269)
1(never married)	-0.136	0.299*
	(0.129)	(0.180)
age at first marriage	-0.00529	0.00963**
	(0.00347)	(0.00482)
1(has boarders/renters)	-0.0266	-0.0835
	(0.0505)	(0.0579)
1(race = black)	0.143***	0.218***
	(0.0434)	(0.0611)
1(veteran)	-0.0184	0.0341
	(0.0582)	(0.0755)
1(immigrant)	0.00680	0.0186
	(0.0522)	(0.0694)
age	0.000265	0.00233
	(0.00180)	(0.00334)
year of purchase	0.00739	0.0111
	(0.00460)	(0.00698)
1(had chattel mort.)		0.185
		(0.118)
Cumulative # mtges	0.0501***	0.0730***
	(0.0156)	(0.0192)
1(has occupation)	0.0497	0.0220
	(0.0606)	(0.0993)
Observations	500	500
Pseudo R-squared	0.230	0.155

Notes: Column one shows results from a probit predicting a dummy variable that equals one if a borrower has any mortgage that requires frequent (greater than semiannual) amortization. Column two shows results from a probit predicting a dummy variable that equals one if a borrower has any mortgage with a short term. This table displays marginal effects and standard errors which are clustered at the block level.

(HOLC), which was a federal relief program that refinanced distressed mortgages from 1933 to 1936.

Across contract types, Table 17 shows that foreclosure rates were highest on short-term contracts with frequent amortization. These results should not be interpreted causally, especially since this paper shows strong selection of borrowers into different contracts. For example, the higher

Table 17: Rates of foreclosure and HOLC take-up among loans outstanding as of 1930

		Foreclosures or deeds-in-lieu		Refinanced with HOLC	
Type of contract	Total	Number	Percent	Number	Percent
Short term, no or infrequent amort.	164	16	9.8%	19	11.6%
Short term, frequent amort.	31	6	19.4%	5	16.1%
Medium term, frequent amort.	342	54	15.8%	35	10.2%
Other	2	0	0.0%	0	0.0%
Total	539	76	14.1%	59	10.9%

rate of foreclosure on short-term contracts with frequent amortization likely reflects a combination of factors, including the risky nature of those contracts, the fragile business models of lenders who wrote those contracts, and the relatively poor creditworthiness of the borrowers who took out those contracts.

In response to this foreclosure crisis, the federal government responded by setting up a number of new institutions in quick succession to shore up the home mortgage market. In 1931, the Federal Home Loan Banks (FHLBs) were created to provide liquidity facilities for mortgage lenders, particularly building and loan associations. In 1932, a charter for federal savings and loan associations (FSLAs, using the new nomenclature for building and loans) became available for the first time. In 1933, the HOLC was created. In 1934 the Federal Housing Administration (FHA) began operations, offering insurance to lenders on their mortgage loans. In 1938, the Federal National Mortgage Association (quickly dubbed Fannie Mae) launched as a secondary market actor in the FHA loan market. Altogether, these institutions represented a major intervention by the federal government in residential mortgage finance.

Federal policymakers took many lessons from the poor experience of the mortgage market in the Depression, and had grand visions for remaking it. This vision was explicitly laid out, for example in a 1934 article by John Fahey, the head of the newly founded Federal Home Loan Bank Board, which oversaw the HOLC, the FHLBs, and the FSLAs.[15] The manifesto listed many goals, not all of which were successfully put in place. For example, policymakers had envisioned a nationwide system of National Mortgage Associations (NMAs) to provide secondary market liq-

[15] *Federal Home Loan Bank Review*, vol. 1 no. 1, October 1934, pp. 1-14.

uidity and securitization vehicles for mortgage lenders, improve integration of regional mortgage markets, and replace and improve upon the defunct securitization vehicles of the 1920s. Yet, Fannie Mae was ultimately the only NMA ever chartered. For the purposes of this paper, one major goal espoused by Fahey was the widespread adoption of long-term loans with frequent amortization, and the phasing out of short-term contracts. Fahey wrote:

> To the home owner the short-term first mortgage has caused almost as much distress as the second mortgage. When a short-term mortgage comes due in hard times, the lending institution usually refuses to renew or else demands a substantial reduction of principal. As this demand is made at the very time when the home owner is least able to make that reduction, foreclosure is frequently the only alternative. This situation works a hardship also on the entire real estate market, for foreclosures and inability to borrow on real estate depress the prices of all properties.

Fahey's plans resembled earlier calls for reform, reflecting a long-standing concern by policymakers about short-term contracts. For example, President Hoover convened a conference in 1931, amidst rising foreclosures, to diagnose defects in the American home financing system. The final report similarly criticized short-term unamortized mortgages for the refinancing risk they exposed borrowers to and recommended that all borrowers consider longer-term fully amortized contracts. Yet, consistent with the findings of this paper, the report stopped short of calling for an elimination of short-term loans, as it still admitted that "there are times when short term straight mortgages are necessary" and suggested that borrowers consult with their local mortgage agencies to find the loan that best fits their financial situation (Gries and Ford 1932, pp. 6-7).

The FHLB and S&L programs encouraged a modest lengthening of loan terms up to about 15 years, and the HOLC directly provided 15-year contracts to all of its borrowers. The FHA promoted longer terms of 20 years from its inception, and 25 years for some borrowers beginning in 1938. The reach of these programs, however, was uneven. The HOLC reached nearly one-fifth of all residential mortgage borrowers, but was a temporary program that ceased refinancing in 1936. Likewise, the FHA reached only a subset of borrowers that it targeted, and by policy directed lenders to avoid black neighborhoods. Among lenders, only some B&Ls and S&Ls joined the FHLB system, and only some converted to federal charters.

6 Contract choice in 1940

6.1 Changes in the market from 1930 to 1940

Over the ten year period from 1930 to 1940, the use of short-term contracts fell about 10 percentage points, from 35 percent in 1930 to 25 percent in 1940, as can be seen in Table 18. This table also shows a small number of long-term loans, defined somewhat arbitrarily as exceeding 15 years. The data therefore capture a snapshot of a time when long terms were just beginning to become more widespread. Together, the use of medium and long term contracts reached about 75 percent of loans. The table also shows a significant reduction in the overall number of mortgages compared to 1930, from 539 to 409, reflecting a decline after the Depression in the number of homeowners and in the use of mortgages among homeowners.

Table 18: Contracts in 1940

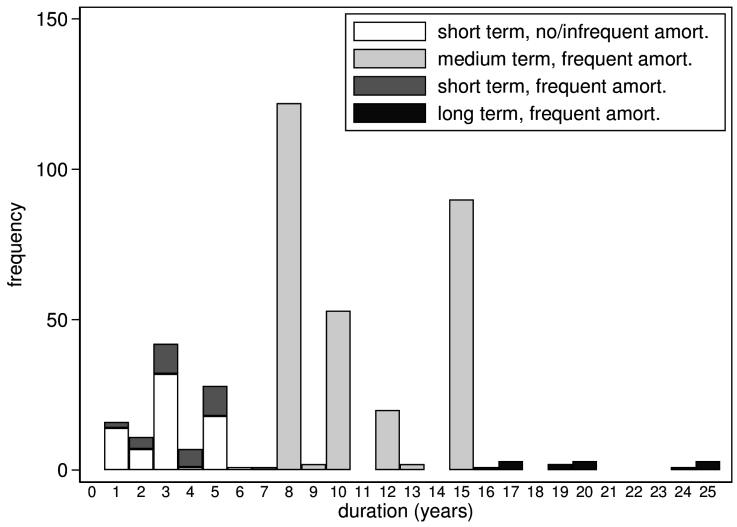
	First Mortgage		Second Mortgage	
Type of contract	Number	Percent	Number	Percent
Short term, no amort.	61	14.9	38	43.7
Short term, infrequent amort.	12	2.9	0	0.0
Short term, frequent amort.	35	8.6	44	50.6
Medium term, frequent amort.	287	70.2	5	5.7
Long term, frequent amort.	14	3.4	0	0.0
Total	409	100.0	87	100.0

Notes: A term is considered short if it is 7.5 years or less, medium if it is 7.5-15 years, and long if more than 15 years. Amortization is considered infrequent if it is semiannual or annual, and frequent if weekly, monthly, or quarterly.

The composition of lenders, shown in Table 19, also evolved over this period. One of the biggest changes is the credit outstanding from the HOLC. The HOLC's reach was quite large, having refinanced about 20 percent of all nonfarm mortgages nationwide. As of 1940 in this sample from Baltimore, it accounted for 17 percent of outstanding loans.[16]

[16]This 17 percent figures is larger than an earlier figure presented in Table 17, which showed that 11 percent of the mortgage outstanding in 1930 were refinanced by the HOLC. The discrepancy is likely the result of the fact that Table 17 tracks only what happened to mortgages outstanding as of April 1930. In the sample, an additional 20 borrowers refinance those mortgages between the April 1930 observation and the establishment of the HOLC, and then refinanced again with the HOLC, bringing the total takeup rate of the HOLC for borrowers existing as of 1930 to 15 percent. In addition, others with outstanding loans as of April 1930 sold their houses before the establishment of the HOLC, and some of the new owners likely sought HOLC financing.

Figure 4: Distribution of Durations on Mortgages in 1940



Notes: Amortization is defined as infrequent if it is semiannual or annual.

Table 19: Lenders in 1940

	First Mortgage		Second Mortgage	
Type of lender	Number	Percent	Number	Percent
Individuals	42	10.3	36	40.9
Building/Savings and Loans	211	51.6	25	28.4
Savings Banks	31	7.6	0	0.0
Mortgage Companies	11	2.7	13	14.8
Insurance Companies	17	4.2	0	0.0
Commercial Banks	23	5.6	6	6.8
Builders	4	1.0	8	9.1
Home Owners' Loan Corp.	70	17.1	0	0.0
Total	409	100.0	88	100.0

Notes:

The FHA's reach was still limited in 1940. Nationally, only 13 percent of loans were FHA insured in 1940. The Baltimore sample captures 18 FHA-insured loans as of 1940, representing about 4 percent of the sample, suggesting takeup was lower in Baltimore than nationally. The durations on these loans ranged from 10 to 25 years, with half exceeding 15 years. Indeed, of the long-term loans in the sample, FHA-insured loans accounted for about half. The remaining

long-term loans were written by insurance companies, making them the only lenders in the sample to write long-term loans without FHA insurance. In the data, federal S&L loan durations exceeded 15 years only if the loans were FHA insured. Finally, all HOLC loans carried 15 year durations, which in this table are classified as a medium-length term.[17] Classifying them as long-term loans would naturally move 17 percent of the sample into the long-term category.

Overall, the presence of the HOLC and FHA raises issues of interpretation. In 1930, contract choices reflected decisions by borrowers and lenders, not government policy. In 1940, access to federal programs also affects contract choice. HOLC borrowers were a specific group whose loans were in danger of foreclosure between 1933 to 1936 and were able to qualify for HOLC refinancing. Such borrowers may not have had the same access to 15-year contracts from non-HOLC sources as other borrowers, and therefore the presence of the HOLC would have changed the relationship between borrower characteristics and contract choice. Likewise, the FHA selected certain borrowers. Its underwriting criteria were notoriously racist, favored suburban style detached houses over urban rowhouses, and targeted newly constructed homes in particular.

6.2 1940 Analysis

The 1940 analysis follows the same framework for modeling mortgage contract choice as in the 1930 analyis, including probit and multionmial logit estimations. As a baseline, I group together medium and long term contracts, given the small number of the latter and for comparability with the 1930 analysis.

Table 20 shows summary statistics for variables that are available from the 1940 census and the land records. Compared to the 1930 census, the 1940 census did not ask about the age of marriage, but did ask about educational attainment and earned income.

Simple comparisons of borrower characteristics across contracts in Table 21 and Figure 5 show a fairly broad shift toward longer-term contracts across the various socioeconomic characteristics. However, the direction of the cross-sectional relationships generally remain the same as in 1930, with short-term infrequent amortization contracts still used more by borrowers with large properties, white borrowers, high salaries and occupational scores, and high-valued properties. Unlike in

[17] Beginning in late 1939, the Mead-Barry Act granted the HOLC authority to extend loans to as long as 25 years. The sample, a snapshot of early 1940, did not end up capturing any such loans.

Table 20: Summary Statistics in 1940

variable	N	mean	median	sd	min	p25	p75	max
Baseline variables								
log property frontage	409	3.06	2.75	0.65	2.44	2.63	3.20	5.44
highest educational grade	397	8.95	8.00	3.95	0.00	6.00	12.00	17.00
number working adults	409	1.94	2.00	1.34	0.00	1.00	3.00	12.00
1(never married)	409	0.05	0.00	0.22	0.00	0.00	0.00	1.00
1(has boarders or renters)	409	0.15	0.00	0.35	0.00	0.00	0.00	1.00
1(has servants)	409	0.03	0.00	0.17	0.00	0.00	0.00	1.00
1(race=black)	409	0.16	0.00	0.37	0.00	0.00	0.00	1.00
1(foreign born)	409	0.16	0.00	0.37	0.00	0.00	0.00	1.00
age	409	48.51	48.00	11.77	18.00	40.00	57.00	88.00
1(has job)	409	0.78	1.00	0.41	0.00	1.00	1.00	1.00
Additional variables								
log property value	405	8.14	8.01	0.73	3.22	7.63	8.52	10.13
log(wage and salary income)	246	7.19	7.24	0.74	3.00	6.84	7.65	8.76
occupational score	328	30.60	26.00	13.04	4.00	23.00	38.00	80.00
occupation income sd	256	0.64	0.60	0.29	0.18	0.55	0.69	2.64

1930, though, the number of working adults has little predictive power. Lastly, the new 1940 data on education show a strong relationship in which better educated borrowers are more likely to use short-term contracts with infrequent amortization.

The results from the probit models in Table 22 likewise continue to show that borrowers with markers of higher socioeconomic status had a higher probability of a short-term contract with no or infrequent amortization. However, the coefficient magnitudes are generally smaller than in 1930, reflecting a broad shift toward medium and long-term contracts. In the probit model with short term contracts that have no or infrequent amortization as the outcome variable, the coefficient on log property frontage falls from 0.30 in 1930 to 0.11 in 1940. In the model with medium or long term contracts as the outcome variable, the coefficient on the number of working adults falls to about zero and loses predictive power. Finally, the education variable has strong predictive power, with each additional grade of education associated with a 2 or 3 percentage point change in the probability of short or medium or long term contracts. The results of the multinomial logit, shown in Table 23, have the same patterns.

Table 24 shows the results of including occupational variables: log income (available in 1940, unlike 1930), occupational scores, and dispersion in occupational income. Here, the income vari-

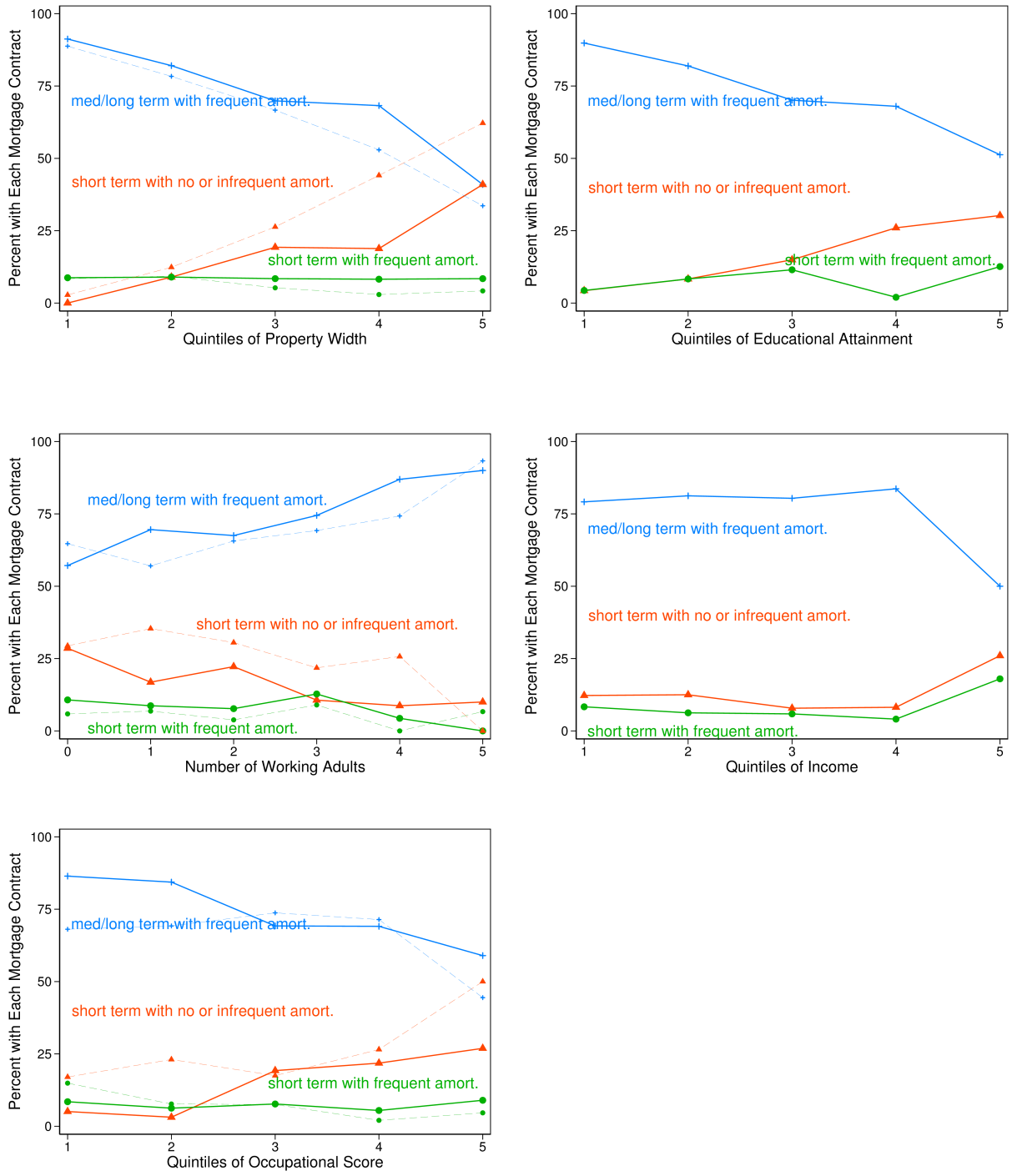
Table 21: Summary Statistics by Contract in 1940

	Full sample		Short-term, infreq. amort.	Medium-term, frequent amort.		Short-term, frequent amort.	
Variable	N	mean	mean	mean	p value	mean	p value
Baseline variables							
log property frontage	409	3.06	3.52	2.95	0.00	3.05	0.00
highest educational grade	397	8.95	11.27	8.23	0.00	10.26	0.21
number working adults	409	1.73	1.52	1.79	0.07	1.60	0.69
1(never married)	409	0.05	0.03	0.06	0.31	0.03	0.97
1(has boarders or renters)	409	0.15	0.10	0.16	0.17	0.14	0.47
1(has servants)	409	0.03	0.01	0.03	0.38	0.03	0.60
1(race=black)	409	0.16	0.05	0.17	0.01	0.26	0.00
1(foreign born)	409	0.16	0.14	0.17	0.50	0.17	0.64
age	409	48.51	49.30	48.23	0.49	49.23	0.98
1(has job)	409	0.78	0.74	0.80	0.28	0.71	0.78
year of purchase	409	1927.9	1926.5	1928.3	0.09	1927.3	0.62
cumulative # mtges.	409	2.66	2.41	2.70	0.32	2.86	0.38
1(had chattel)	409	0.03	0.00	0.03	0.16	0.11	0.00
Additional variables							
log property value	405	8.14	8.60	8.02	0.00	8.31	0.13
log(wage and salary income)	246	7.19	7.39	7.13	0.06	7.39	1.00
occupational score	328	30.60	36.79	28.97	0.00	32.60	0.26
occupation income sd	256	0.64	0.61	0.65	0.48	0.70	0.25

ables have little predictive power, and more flexible specifications (such as quintiles for the occupational score as used in the 1930 analysis) do not improve their predictive power, even though the raw relationship in Figure 5 seems to suggest a change in contract use among the highest income group. Overall, these results are another sign of the weakening relationship between socioeconomic status and contract choice.

Finally, in terms of race, the 1940 data show similar patterns as the 1930 data. In the raw data, black borrowers continued to make much more use of short-term contracts with frequent amortization compared to other borrowers, and are much less likely to use short-term contracts with infrequent amortization. The regression results again suggest that, even after controlling for other socioeconomic characteristics, black borrowers were about 10 percentage points less likely to use short term contracts with infrequent amortization.

Figure 5: Simple Associations between Contract Choice in 1940 and House Width, Educational Attainment, Number of Working Adults, Income, and Occupational Score



Dashed lines indicate the relationships in 1930, if the variable is available in 1930.

Table 22: Probit Estimates, Marginal Effects, 1940

	Short term, infreq. amort. (1)	Medium/Long term freq. amort. (2)	Short term, freq. amort (3)
log property frontage	0.120***	-0.130***	-0.0143
	(0.0351)	(0.0474)	(0.0214)
Highest edu grade	0.0200***	-0.0320***	0.00916***
	(0.00700)	(0.00859)	(0.00326)
Number working adults	-0.0112	0.0190	-0.00652
	(0.0170)	(0.0179)	(0.0122)
1(has boarders/renters)	-0.0409	0.0670	-0.0147
	(0.0610)	(0.0806)	(0.0385)
1(has servants)	-0.294**	0.283	0.00756
	(0.139)	(0.203)	(0.0949)
1(race = black)	-0.0656*	0.000480	0.0425
	(0.0369)	(0.0586)	(0.0296)
1(foreign born)	0.0752	-0.124**	0.0471
	(0.0584)	(0.0632)	(0.0410)
age	0.000504	-0.000725	6.12e-05
	(0.00196)	(0.00216)	(0.00135)
1(has occupation)	-0.0394	0.0761	-0.0317
	(0.0532)	(0.0771)	(0.0363)
year of purchase	-0.00728***	0.00913**	-0.000725
	(0.00268)	(0.00385)	(0.00215)
cumulative # mtges	-0.0181*	0.0243*	-0.00757
	(0.00934)	(0.0131)	(0.00629)
1(had chattel)		-0.178	0.163**
		(0.124)	(0.0736)
Observations	397	397	397
Pseudo-R2	0.198	0.157	0.067

Notes: Each column is a separate probit estimation. The table reports the marginal effects on the probability of each column's contract, evaluated at the means of the independent variables. For dummy variables, the table displays the effect of a change from zero to one. This standard errors are clustered at the block level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels.

7 Conclusion

The sample of mortgage loans used in this paper represents a major advancement in economic historians' ability to analyze mortgage contracts historically. Its main limitation, though, is the inclusion of loans from only one city, Baltimore. The external validity of the results, therefore, depends on the extent to which other cities resembled Baltimore's mortgage market.

Compared to the country as a whole, Baltimore in the interwar period had a particularly good supply of medium-term fully amortized loans, a key source of which were building and loan as-

Table 23: Multinomial Logit Estimates, Relative Risk Ratios, 1940

	Medium/Long term freq. amort.	Short term, freq. amort
log property frontage	0.396***	0.438**
	(0.109)	(0.159)
Highest edu grade	0.817***	0.955
	(0.0516)	(0.0657)
Number working adults	1.125	1.008
	(0.159)	(0.231)
1(has boarders/renters)	1.590	0.988
	(0.858)	(0.633)
1(has servants)	12.55*	7.221
	(17.20)	(13.63)
1(race = black)	1.935*	3.359***
	(0.667)	(1.522)
1(foreign born)	0.473	0.993
	(0.244)	(0.753)
age	0.991	0.994
	(0.0156)	(0.0227)
1(has occupation)	1.360	0.755
	(0.645)	(0.392)
Year of purchase	1.067***	1.040
	(0.0244)	(0.0340)
Cumulative # mtges	1.178**	1.120
	(0.0968)	(0.129)
Observations: 397; Pseudo R-squared: 0.14		

Notes: Each column reports the relative risk ratio of that column's contract compared to the probability of a short-term contract with no amortization or infrequent (semiannual or annual) amortization. This table displays standard errors which are clustered at the block level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels.

sociations. Snowden (2013) notes that by 1930 B&Ls had spread to every state in the union, but coverage was uneven. Generally, the strong presence of B&Ls was characteristic of other mid-Atlantic cities, including Philadelphia, Newark, and Camden, as well as several other parts of the country. The best data available on the mix of contracts and lenders, from Wickens (1937) and displayed in Figure 6, are a 1934 survey of borrowers in twenty-two cities. These data can only be loosely compared to the 1930 data on Baltimore, since major changes took place in the mortgage market from 1930 to 1934, including widespread foreclosures and the intervention of the HOLC. In addition, selection issues in the Wickens survey of borrowers could affect the 1934 data. Nevertheless, these data suggest that several of the sampled cities closely resembled Baltimore, insofar

Table 24: Probit estimates Including Occupational Variables, 1940

	Short term, infreq. amort. (1)	Medium/Long term freq. amort. (2)	Short term, freq. amort (3)
Specification A			
log(income)	-0.00265	-0.0269	0.0249
	(0.0229)	(0.0384)	(0.0187)
Observations	244	244	244
Pseudo R-squared	0.254	0.212	0.115
Specification B			
occ score	-0.000161	-0.000202	0.000366
	(0.00197)	(0.00242)	(0.00147)
Observations	325	325	325
Pseudo R-squared	0.237	0.175	0.0463
Specification C			
occupational income dispersion	-0.0834	-0.0399	0.0293
	(0.109)	(0.118)	(0.0529)
Observations	254	254	254
Pseudo R-squared	0.309	0.273	0.0988

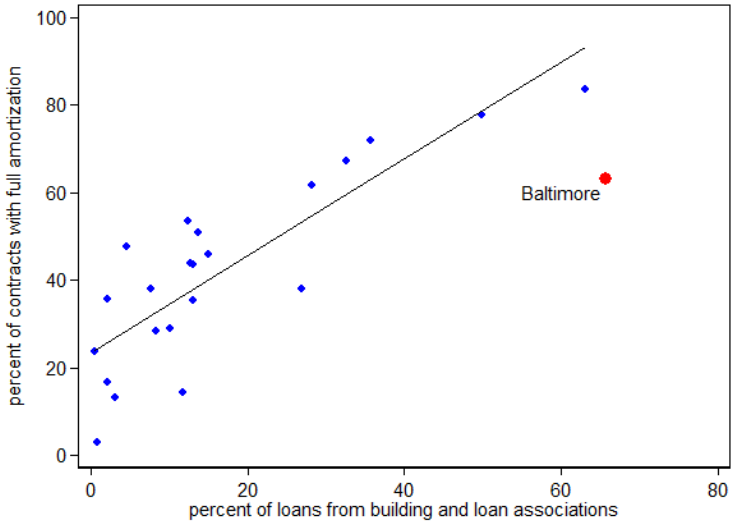
Notes: Each column reports the marginal effect on the probability of that contract. The standard errors are clustered at the block level. The symbols ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels.

as large shares of outstanding contracts were fully amortized (and therefore likely medium in term as well). In contrast, in some cities fully amortized contracts were significantly more uncommon. The data also show a very strong correlation across cities between the presence of building and loan associations and the use of fully amortized contracts.[18]

These data suggest that Baltimore should be considered representative of cities that featured wide availability of medium-term fully amortized mortgages. (Even then, Baltimore featured some subtle differences. Other cities with significant amounts of medium-term loans tended to feature

[18]Wickens also reports data on contract terms. However, in my view, the term data seriously under-report the number of contracts with short terms. I speculate that the survey results did not report terms for loans which were past their stated maturity dates, in a mistaken belief that the maturity dates were incorrect. Indeed, there are an inexplicably high number of observations with missing information on terms, and the extent to which these data are missing is highly correlated with the percent of loans that were unamortized (and therefore that very likely had short terms as well). For example, in Worcester Massachusetts, I would expect the data to show a large number of short-term loans, since the state was dominated by savings banks well known for making 1-year loans. Indeed, savings banks accounted for 819 of 1,096 loans in the data, and 770 of those were unamortized, compared to 45 requiring some amortization. Yet, the data report terms for only 37 savings banks loans, with almost all of these terms greater than 5 years. The report gives no explanation for the missing data.

Figure 6: External validity - Comparison of Baltimore to other cities in a 1934 survey



Source: Wickens (1937) data on 22 cities in 1934, combined with this paper's Baltimore data set in 1930. The trend line is the result of a simple OLS regression that omits the Baltimore data point.

slightly longer 10-15 year contracts compared to the 8-10 year contracts in Baltimore.) In other cities, short term contracts were used much more widely, and therefore likely by a wider set of borrowers compared to Baltimore, perhaps not as confined to the socioeconomic elite. The realization of refinancing risk may have been a more widespread phenomenon in these cities, perhaps providing particularly strong impetus to the national move away from short-term contracts after the Depression.

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A Appendix: Sample construction

The sample consists of owner-occupied households located in a stratified one percent sample of 38 blocks out of the 3,839 blocks in Baltimore as of 1930.

The sampling is done by block rather than by household because of the the structure of the land records. The Baltimore land records are organized by block, i.e. each block has an index that lists all land records that apply to that block in chronological order for the entire history of the block's existence in Baltimore. Sampling by blocks yields enormous economies of scale compared to sampling by individual properties. To follow a property over time, it is necessary to check the index for the entire block to find references to the property. Digitizing an entire block over time allows for the properties within that block to easily be followed over time, and also greatly lowers the probability of missing a record for a property.

The Census has, in the past, also employed block-level sampling, likely because of the economies of scale of contacting each household on a block. For example, the 1934 real property inventory (see Wickens 1937) was conducted with a sample of every seventh block in small cities and every tenth block in large cities.

I use a stratified sample in order to ensure the sample captures geographic areas with different access to mortgages. In particular, I focus on the varying willingness of lenders to make loans to different areas of the city. I divide the 3,839 blocks in the city into four segments, by cross-referencing the municipal block map of Baltimore with a "residential security map" produced in 1935. The residential security map, created by the Home Owners' Loan Corporation (HOLC) in conjuction with the advice of local realtors, lenders, and other real estate professionals, divides the city into four security "grades," based on the desirability of the neighborhood for lending. The least desirable neigborhoods are colored red, thus the term "red lining." Red lining was directly related to disciminatory practices in the real estate industry, and by using the map I must acknowledge that history. I use the map for sampling purposes because I believe it provides a guide to how lenders at the time viewed the city's different neighborhoods, highly relevant for understanding the allocation of real estate contracts to different borrowers. I do not intend my use of the map to constitute an endorsement of the discriminatory practice of that area.

The HOLC map shows the universe of developed residential blocks that existed in Baltimore as 1937, likely quite close to the universe of such blocks that existed in 1930 given the very small amount of new construction that occurred during the intervening years. I limit the sample to Baltimore City and exclude the surrounding Baltimore County, since the latter's land records are organized differently, making them difficult to sample. In addition, Baltimore County at the time had a population of only 125,000 in 1930, compared to 800,000 in Baltimore City.