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**Working Paper**

## Defaults and losses on commercial real estate bonds

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Federal Reserve Bank of New York  
Staff Reports

Defaults and Losses on Commercial Real Estate Bonds  
during the Great Depression Era

Tyler Wiggers  
Adam B. Ashcraft

Staff Report no. 544  
February 2012

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## **Defaults and Losses on Commercial Real Estate Bonds during the Great Depression Era**

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### **Abstract**

We employ a unique data set of public commercial real estate (CRE) bonds issued during the Great Depression era (1920-32) to determine their frequency of default and total loss given default. Default rates on these bonds far exceeded those originated in subsequent periods, driven in part by the greater economic stress of the Depression as well as the lower level of financial sophistication of investors and structures that prevailed in 1920-32. Our results confirm that making loans with higher loan-to-value ratios results in higher rates of default and loss. They also support the business cycle's significance to the performance of CRE assets. Despite the large number of defaults in the early 1930s, the losses, which typically occurred after 1940, are comparable to those for contemporary loans, largely due to the rapid recovery of the economy from the Depression. This finding has relevance today, as numerous entities have a large amount of sub-performing CRE assets to work out. While the data point to better loss performance the quicker a problem loan is worked out, this may not hold true when there is a rapid recovery around the corner.

Key words: Great Depression, CMBS market, default and loss study, commercial real estate

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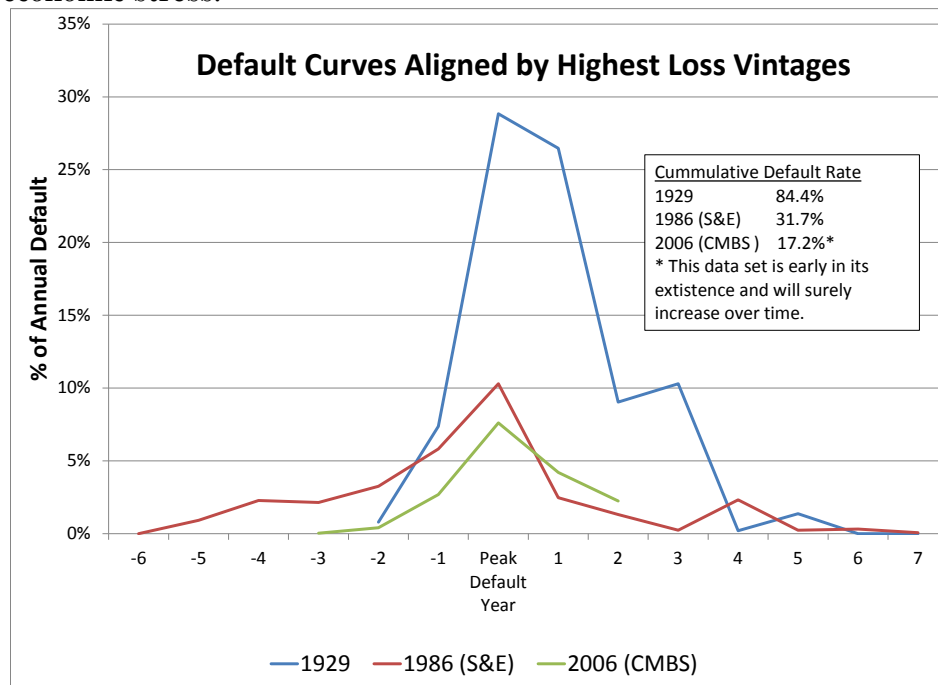
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## I. Overview

*“Looking forward makes you more optimistic, [but] looking backward makes you more realistic” - Prof. Magne Jorgensen, 2010*

For the market to allocate capital efficiently it must have accurate measurements of risk and return. This is particularly the case for real estate, in comparison to other assets, as it is the least forgiving in regards to errors in design, manufacture, or location – for example, all the residential lots currently sitting vacant on the outskirts of many cities.

“Alternatives available ex ante quickly become more expensive ex post. Structures are difficult to move once built . . . [and] take years to wear out. And it is generally much more expensive to reassemble than to subdivide land.” (Field Dec. 1992, 788) The challenge for commercial real estate (“CRE”) investors is that there is limited historical data on the default and loss performance of representative loans from a period with significant economic stress.



Currently, market participants have only two datasets with which to gauge the risk of commercial real estate debt as measured by either the frequency of default (PD) or the severity of loss given default (LGD). In particular, Snyderman and Esaki (“S&E”) have documented

defaults from loans originated by eight insurance companies between 1972 and 1984 (Esaki and Goldman, Commercial Mortgage Defaults: 30 Years of History Winter 2005). And secondly, defaults and losses from loans originated by commercial mortgage backed securities (“CMBS”) participants from the early 1990s to the current day. Each of these datasets, while extremely useful, is considered, for different reasons, to understate CRE defaults and losses. Specifically, while the S&E dataset contains the economic downturns in the 1970s and early 1980’s and 1990’s, it does not contain a time period of extended and severe economic stress similar to the current downturn or the Great Depression. Moreover, insurance companies have traditionally operated at safe end of the risk spectrum. Finally, insurance companies have incentives (both regulatory and economical) that encourage

underreporting of defaults<sup>1</sup>, meaning this data lack the default discipline<sup>2</sup> that exists in the modern-day CMBS market. While the CMBS dataset certainly incorporates a market default discipline, it lacks a, truly, stressed economic time period, as defaults and losses on recent vintages will not be known for some time into the future, and most loans have not seasoned to maturity.

One of the most significant risk management challenges by market participants and regulators is to make plausible projections about the performance of CRE loans in an extended economic downturn, like the current one, that is significantly outside of experience of the data highlighted above (e.g. regulatory stress testing). The primary contribution of this paper, along with the accompanying dataset, is to provide the industry with PDs and LGDs on CRE loans originated from an economic period (i.e. 1920 to 1932) that exhibits extreme tail risk – both oversupply of space from the construction in the mid and late 1920s and the demand shock of the Great Depression in the 1930s. In addition to encompassing one of the most economically stressed times in the United States history, the default data is market determined (i.e. it is the result of the default discipline of the market), eliminating underreporting which occurs in the S&E data.

There are several important similarities between the CRE bond market of the 1920s and the retail CRE loan market (i.e. non-institutional CMBS and bank loans) of 2004-2007. During both periods, CRE loans were made on less-coveted properties in an intensely competitive market<sup>3</sup>. This led to underwriting with overly optimistic assumption being baked into cash flow and risk expectations. However, the main difference between the market today and the market then is that standardized processes and structures are now in place to deal with delinquent borrowers. In particular, in every CMBS transaction there is an assigned special servicer guided by a Pooling and Servicing Agreement and a standardized reporting package for investors. Additionally, regulatory oversight by the SEC now provides protections to investors against outright fraud by issuers.

Over the last year, we have hand-collected information on approximately 3,800 CRE bonds from historical sources, including information about the characteristics of the bonds at issue, the date of default, type of resolution, and the amount and timing of monthly cash flows associated with each resolution. The data illustrate that issuance increased from about \$60 million (79 transactions) in 1920 and peaked at \$544 million (415 transactions)

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1 “In applying the results of this study to current CMBS collateral, analysts should be careful to note the potential differences between insurance company and [other] mortgage . . . originations. Loan size, property concentrations, LTV, debt service coverage, and geographic distribution . . . may vary significantly from the life insurance company average. In addition, the procedures taken by a life insurance company on problem loans may differ . . . . For example, life insurance companies generally operate under regulatory constraints that, in terms of capital charges, give preference to restructured loans rather than foreclosed loans.” (Esaki, L’Heureux and Synderman, *Commercial Mortgage Defaults: An Update* Spring 1999)

<sup>2</sup> The market’s focus is on receiving the contractual amount of cash on the contractual date due, and is not, collectively, influenced by need to reserve more funds on loans that are classified as “defaulted” nor does the market have a direct relationship or a desire to make a future loan to this borrower.

<sup>3</sup> It is important to note that the modern CMBS market typically makes loans to both smaller less-coveted properties but also to much larger Class A properties that exceed a single lender’s exposure limit.

in 1928 before collapsing to \$2 million (6 transactions) in 1932. Over 50 percent of the bonds issued in each year from 1923 to 1931 eventually defaulted, and approximately 84 percent of the amount issued in the worst-performing 1929 vintages eventually defaulted. While the annual default rate increased throughout the 1920s, it increased significantly in 1931-1932, shortly after the onset of the Great Depression. Traditional loss severities increased from about 21 percent on the 1921 vintage up to nearly 48 percent on the 1928 vintages before peaking at 51 percent in the 1930 vintage.

In summary, the PD and LGD results from this period are truly extreme and illustrate how severe the performance of CRE debt can deteriorate in a period of significant economic stress.

## II. Historical Background

*“If opportunities for employment of . . . savings do not exist, they tend to be created” – Homer Hoyt, 1933*

In this section, we provide a brief overview of the 1920s CRE market, the CRE bond market, a discussion of CRE bond market excesses, and a comparison of the CRE bond market to the current day CRE debt market.

### A. CRE Market in the 1920s

Like the 2000’s, the US economy in the 1920s was characterized by a significant boom in activity in both residential and commercial real estate markets. The effects and results of World War I (1914 to 1918) laid the groundwork for the commercial real estate bubble and the use of the commercial real estate bond to fuel the speculation.

While the US was actively engaged in the conflict, national efforts and materials were diverted to creating munitions and foodstuffs to support the war effort and away from real estate construction choking off new supply, particularly housing. After the war, there was a general population migration into urban areas, mostly to the larger cities (migration of 9 million individuals to urban areas with populations over 30,000). Returning soldiers felt they had better employment opportunities in urban areas and an agricultural depression caused by falling commodity prices spurred “millions of people from farms . . . [to] large cities” (Simpson 1933, 163). As a result of the limited housing supply and the tremendous increase in demand for urban dwellings, apartment rents doubled from 1919 to 1924, net income of existing owners greatly increased, and apartment values soared. It was a great time to be a landlord, but a difficult time to be a renter. The boom in commercial real estate was not limited to multifamily housing, US nonfarm dwellings increased more than 400 percent 1918-1926 (Gottlieb 1965). In particular, more buildings taller than 70 meters were built in NY between 1922 and 1931 than any other 10-year period previously or since (Emporis n.d.). Coupling the highly profitably ownership environment and the natural

human reaction to conclude that a profitable situation will endure for years to come, there was an increased desire to build more. This mindset was further supported by memories from the recent “gilded age” and the desire / hope that the current time would be similar. “There was that same striving for sudden wealth on the part of the masses of the people, and that same financial manipulation on a grand scale by men” (Hoyt 1933, 232).

These conditions were propagated by a common human tendency to immediately conclude that a profitable situation will endure for many years. Land values are capitalized not merely on this new basis, but even on the assumption that the profit margin will continue to increase. Taxes are levied, bank loans are made, and long-term commitments are entered into on this new basis, until the whole financial structure of society is involved in the support of the newly created land values. This situation is brought about not merely because of the increase of profitability, which makes land at least temporarily a lucrative investment, but also because of the pressure of funds seeking investment. When banks are able to expand their loans with ease and wage-earners are accumulating surplus funds in large volume, if opportunities for employment of such saving do not exist, they tend to be created (Hoyt 1933, 233). By the mid-1920s most of the pieces of a bubble were in place – strong economic fundamentals to drive growth and a desire for quick wealth – but the ability to speculate and inflate the bubble was severely limited without access to abundant leverage.

## **B. CRE bond market in the 1920s**

The CRE bond market developed given the unwillingness of traditional lenders, including commercial banks, wealthy families, and life insurance companies, to advance funds for risky atypical CRE projects – including construction, non-traditional property types, and high leverage loans. Up until this time the typical CRE debt instrument was a loan from a local savings bank, insurance company, or wealthy trust estate, with the majority of financing being provided by savings banks (North, Van Buren and Smith, Real Estate Finance 1928, 33). Later in the post-war building boom as the larger building projects got under way and more capital was required for a single project, it was necessary to find additional sources of capital (Koester, A Survey of a Selected Group of Real Estate Mortgage Bonds in the Chicago Area, 1919 - 1937 June 1938, 3). Those borrowers who were unable to obtain funds from the traditional sources turned to the public market for debt.

Earlier during the First World War, the general public was introduced to a new investing product – the bond, specifically the Liberty Bonds (1917 – 1919) – through the nation’s war funding efforts. The increased wages and profits that grew from World War I provided a fertile demand base for CRE bonds as an enormous supply of money was clamoring for investments (Shultz and Simmons 1959, 144-145). And because yields on CRE bonds were attractive in comparison to savings accounts<sup>4</sup>, high-grade bonds, and other securities, there

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<sup>4</sup> A typical bond yielded six percent, which was twice the rate paid on a commercial bank savings deposit and more than two percentage points higher than the rate offered by savings banks. (Willis 1995, 163)



was a rush of capital into this investment option (Gray and Terborgh May 1, 1929, 17). While the typical investor may not have realized it at the time, they were being compensated with a higher return because they were investing in a riskier asset. Helping fuel the demand was the fact that CRE bonds were specifically made accessible to small investors through denominations of \$100, \$500, and \$1,000 (Willis 1995, 162). The result was wide distribution of real estate debt ownership in this country<sup>5</sup>. And this diversification of ownership led to a wide distribution of losses which resulted in a violent contraction of established purchasing habits with disastrous results in retail and wholesale commercial channels when the market collapsed. (Simpson 1933, 166) Thus by the time that the economy collapsed and demand evaporated for commercial space, there was also a tremendous amount of supply that had been built on expectations of great economic growth. These dual shocks helped to keep the CRE space market in most US cities in a state of dormancy for the next two decades.

Market size information for this era is even more difficult to come by than for today's

<p><b>61 Broadway Building, New York, NY</b>  Borrower: Broadway Exchange Corp.  Purpose: Acquisition / Refinance (building was built in 1913)</p> <p><u>First Bond</u>  Collateral: closed first mortgage  Origination Date: October 1, 1925  Amount: \$9,500,000 sold at 99.75% of par with denominations of \$500 and \$1,000  Rate: 5.5% (semi-annual payments)  Maturity: October 1, 1950  Structure: gold, callable at 103% to 101%, sinking fund (retires \$3,000,000 by maturity date)  Appraised Value at Origination: \$16,079,736  LTV: 58.9%</p> <p><u>Second Bond</u>  Collateral: general mortgage (2<sup>nd</sup> mortgage)  Origination Date: October 1, 1925  Amount: \$3,000,000 offered at par with denominations of \$500 and \$1,000  Rate: 7.0% (semi-annual payments)  Maturity: October 1, 1945  Structure: gold, callable at 105% to 101%, sinking fund (100% retired at maturity date)  LTV: 77.7%</p>	<p>market but in 1929 the Brookings Institute estimated the total CRE debt market to be approximately \$25 billion in 1927 and that CRE bonds represented 12% of that total – a percentage that is not too dissimilar to today with non-agency CMBS estimated to provide roughly 20% of the total CRE debt funds as of the third quarter 2011. Also similar was the lender pecking order, in relation to risk appetite, with the insurance companies funding what was considered the choicer mortgages; conservative banks loaning freely on real estate mortgages; and less conservative banks and financial houses funding almost everything else that represented real estate in any form. (Simpson 1933, 164). The authors' focus on \$3.1 billion of issuance across approximately 3,300 bonds over 1920 to 1932 (“relevant period”), with the level of issuance increasing from \$60 million in 1920 to \$544million in 1928.</p>
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A review of 125 prospectuses by Goetzmann and Newman (January 2010) indicates the typical bond had the following characteristics:

<sup>5</sup> This is similar to the syndication trend in the 1980s which made small pieces of larger CRE deals available and attractive to smaller and, typically, less sophisticated investors.

- denominations vary between \$500 and \$1000
- coupons between 4 and 7 percent paid semi-annually, typically in gold coin
- balloon maturities
- used to both finance construction as well as term funding for stabilized building

Approximately 76% of the public CRE bonds were secured by a single first mortgage – **the typical arrangement was one bond backed by one mortgage collateralized by one property**,<sup>6</sup> thus these early bonds had much less diversification than modern-era CMBS. Earlier in the 1920s, it was more common for real estate bonds to have a construction element to them rather than being purely refinancing loans, as compared to CRE bonds issued later in this period after the stock of supply had essentially been built (1936 5). Examples of typical bonds from the relevant period can be found in the box above.

The issuing bond house played a larger role in the investment after the initial issuance than it does today. The underwriting houses were the center for all information and services connected with the real estate bond issues. For example, they served as the fiscal agent and received monthly deposits of interest and principal from the mortgagor, in anticipation of semi-annual interest payments and of serial maturities of principal. (1936 4). The fact that conflicting interests were served by the originating organization in its role of underwriter, paying agent, and trustee for a security aroused serious criticism, but the lack of CRE bond investor sophistication was, in part, responsible for allowing this conflict to exist. (Koester, A Survey of a Selected Group of Real Estate Mortgage Bonds in the Chicago Area, 1919 - 1937 June 1938, 101)

### C. CRE bond market excesses in the 1920s

The losses experienced by investors in the CRE bond market were driven in part by the unprecedented decline in economic activity associated with the Great Depression, but also by other factors which must be taken into account. In particular, there is evidence of some abuse by bond houses in underwriting practices at origination, through disclosures to investors at issue, and in servicing practices following default. These practices were highlighted through investigations by both Congress and the SEC, and fall into three broad categories as highlighted by Halliburton (1939):

**Origination practices** - there was a significant difference in underwriting standards that existed in the CRE bond market relative to other lenders: inflation of appraisals due to both fraud and inflated expectations, overreliance on leverage metrics, as opposed to cash flow as the primary indication of riskiness, use of pro-forma underwriting, use of new loans to refinance delinquent loans, and the use of reduced amortization.

**Distribution practices** - sophisticated investors shunned the CRE bond market, which preyed on the general public who had gotten accustomed to buying Liberty Bonds during the First World War. Bond Houses solicited unsophisticated investors through the use of small denominations and high coupons, and were compensated through large up-front fees paid by the borrower.

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<sup>6</sup> Because of this, the authors will use the terms “loan” and “bond” interchangeable unless otherwise noted.

**Servicing practices** - trustees and asset managers were generally part of, or were affiliated with, the bond house that sponsored the deal. There was often commingling of funds with the funds of the bond house. Additionally, only the bond house knew the names of other investors, which gave it an important advantage protecting its interests in the event of default.

Some of these practices were common then and, thus, prevalent throughout the sector – e.g. dependency on LTV as the main risk determiner and an affiliate of the issuer acting as the trustee. But the majority of the abuses seemed to be idiosyncratic in nature – e.g. misappropriation of funds through co-mingling. While idiosyncratic abuses can probably be found in the performance results in loans from other eras, the systematic presence of practices that led to the level of abuses during this time period most certainly resulted in higher losses. However, because the majority, approximately 66%, of the loans by dollar amount were resolved in a high growth period for the economy (1940 to 1960) the loss results are within the range of the loss results using more contemporary data. While it is difficult to illustrate given the data's limitations, it is the authors' belief that the macro economic factors played a larger role in the default and loss performance than the origination, distribution and servicing excesses of the period.

#### **D. Comparison of 1920s CRE bond market to current-day CRE market**

The typical Great Depression CRE bond has characteristics and qualities that match all of today's major CRE debt investments, however it is most similar to today's loans made to retail borrowers most often found on banks' balance sheets as well as in CMBS pools.

Below is a table that compares the average Great Depression bond to today's average bank, CMBS, and insurance company:

	Great Depression Bond	Typical Bank Loan (Current)	Typical CMBS Loan (Current)	Typical Insurance Loan (Current)
<b>Intended Use</b>	Construction & refinance & acquisition	Construction & refinance & acquisition	Refinance & acquisition	Refinance & acquisition
<b>Funds Source</b>	Retail public via bonds	Bank balance sheet	Institutional public via bonds	Insurance company balance sheet
<b>Loan Size</b>	Both small and large. Range in 2010 \$'s is \$102,000 to \$165.9 million with a median of \$5.6 million.	Both small and large. Range is \$100,000s (Retail) and over one billion (Institutional). Large loans are typically syndicated.	Most loans between \$2 and \$20 million with a subset of much larger loans.	Typically large. Average for past four quarters is \$20 to \$47 million.
<b>Collateral</b>	1 <sup>st</sup> Mortgage	1 <sup>st</sup> Mortgage	1 <sup>st</sup> Mortgage	1 <sup>st</sup> Mortgage
<b>Term</b>	Median and average of 12 years	Majority are 3 to 7 years	5 to 10 years	Average 6 to 8 years
<b>Rate Structure</b>	Fixed	Primarily floating	Primarily fixed with some floating	Mostly fixed with some floating
<b>Personal Borrower Recourse</b>	Both recourse and non-recourse	Both recourse (typically Retail) and non-recourse (typically Institutional)	Non-recourse	Non-recourse
<b>Type of Borrower / Sponsor</b>	Typical retail	Both retail and institutional	Both retail and institutional	Typically institutional
<b>Amortization</b>	Amortizing with balloon	Amortizing with balloon	Amortizing with balloon (80% amort / 20% partial IO). Larger loans have a higher % of IO	Amortizing with balloon

While the Great Depression bonds compare and contrast in different elements to both of today's bank and CMBS loans, common differences are funding sources and loan terms. Thus the average Great Depression bond structure was a long term loan from a, typically, unsophisticated group of retail investors acting as lenders. Had the bond houses wanted a more enduring structure for long term loans from unsophisticated lenders, they should have put in a more reliable mechanism to work out problems at the trust and asset level as they arose. As it was, self-interested affiliates as trustees collecting a monthly fee with no clear documented guidelines for working out problems ended up, at best, delaying the loan resolution and, at worst, allowing the trustees to cheat the bondholders out of their investments.

### III. Description of Data Set

The dataset is comprised of approximately 3,800 bonds with origination dates from 1891 to 1935, and contains property and asset level detail as well as performance measurements for each individual asset<sup>7</sup>. The majority of the information was found in old ratings manuals, primarily Moody's Manuals, and other period documents. If the items in the Data Methodology Appendix were available in the source documents, it was recorded in the database.

Unless otherwise noted, the following tables include only US bonds originated between the years of 1920 and 1932, and, when compared to current CMBS data<sup>8</sup>, the peak issuance year by dollars for both periods (i.e. 2007 and 1928) were aligned together to make the annual comparison<sup>9</sup>.

#### A. Issuance

The steady increase of CRE bonds issued peaked in 1925 with 528 new bonds. However due to an increasing average loan balance, the total dollar amount of new issuance didn't peak until three years later in 1928 with approximately \$544 million (approximately \$5.7 billion in 2010 \$s) of new issuance.

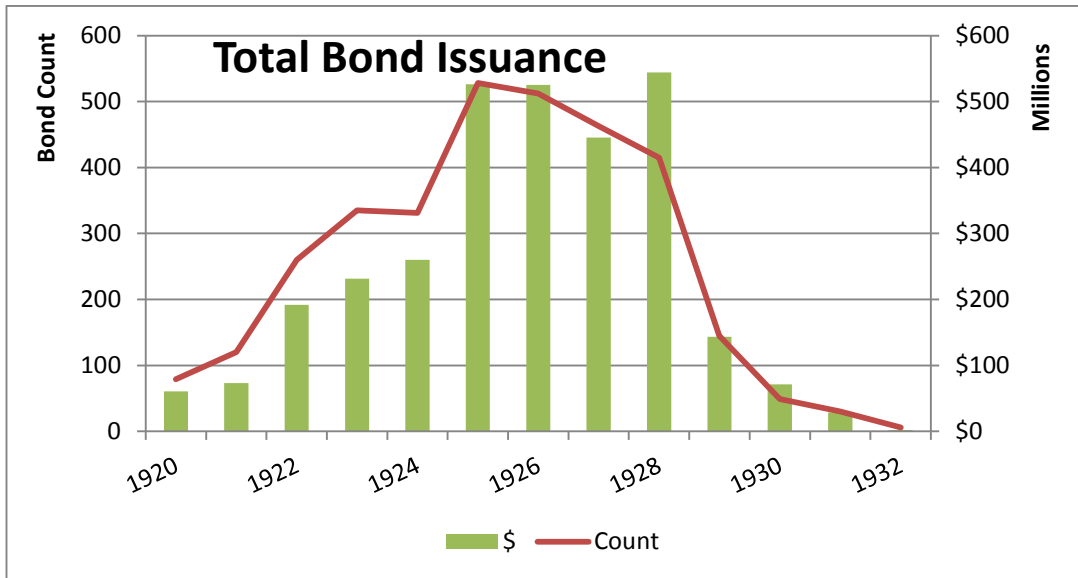
It is interesting to note the drop-off of issuance occurs roughly a year before the stock market crash in October 1929. "By this time the speculative public was forsaking real estate for the stock market, as land purchases no longer yielded quick cash profits, and real estate ceased to lure the crowds of new buyers who were being attracted by the fortunes that were being made in securities. Consequently, many real estate operators viewed the stock-market crash of October 24, 1929, with ill-concealed satisfaction; . . . they thought [the investing public] would return to [real estate] as the safest form of investment." (Hoyt 1933, 265-276). However, this was not to be, in 1929 new loans and total issuance fell by 65% and 74% respectively, and by 1930 only 49 new bonds were issued for a total amount of \$71 million (approximately \$794 million in 2010 \$s) of new issuance.

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<sup>7</sup> See Data Methodology Appendix for specifics.

<sup>8</sup> This data was collected by Trepp for the origination years of 1993 to end of 3<sup>rd</sup> quarter 2011; however, except for issuance data only the data starting from 1996 was used by the authors. Trepp is widely regarded as the leading data provider and analytics firm in the CMBS space.

<sup>9</sup> S&E data is generally not compared due to the lack of details in that dataset.

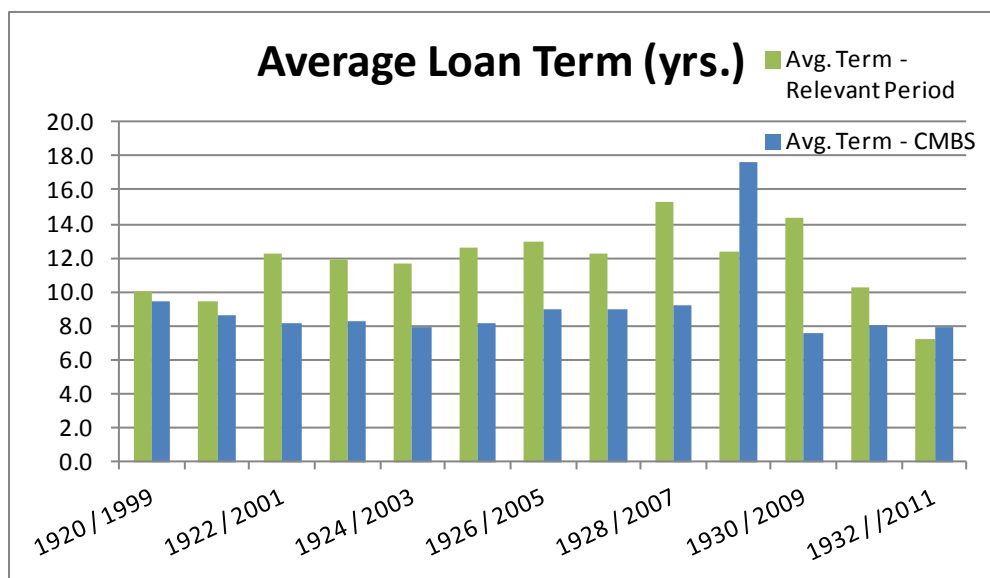


## B. Loan Size

During this time period bond amounts ranged from \$10,000 to \$16,000,000 (approximately \$102,000 to \$162.5 million in 2010 \$s). The median loan size was \$540,000 (approximately \$5.5 million in 2010), while the average was \$941,000 (approximately \$9.6 million in 2010). Average vintage loan sizes are variable from year to year but generally increase with a peak in 1930 of \$1.4 million (approximately \$15.4 million in 2010).

## C. Term

Average loan terms were fairly consistent in a tight band around the average of 12 years, thus much longer on average than recent CMBS loans with five to ten year terms. Typically, for loans involving construction there was an approximate one to two year period where only interest was due on the loan as the building was being erected and then began to amortize for the remaining term; this is akin to banks' mini-perm loans today but with a longer permanent term.



#### D. Geography

Not surprisingly given the shift and changes in the country’s economy over the past 90 years, the geographic concentration of CRE loans is slightly different now than it was back during the relevant period. The states of New York, Illinois, and California are still in the top five states with CRE exposure, but the Mid-western states of Michigan, Ohio, and Missouri have been replaced with the Southern states of Virginia, Georgia, and Florida.

Additionally, there is much less state concentration now; this is mainly a factor of geographic-centric lending prevalent during the relevant period. However, geographic dispersion of collateral during the relevant period was fairly diverse across the country with 41 (out of the then 48 US) states being represented. The top ten states with CRE bond concentration are:

State	% to Total Loans by \$	CMBS - State	CMBS - % of Total Loans
NY	28.5%	CA	13.9%
IL	25.4%	NY	12.8%
MI	8.0%	TX	6.6%
CA	7.2%	FL	5.8%
PA	4.9%	IL	3.2%
OH	4.6%	VA	3.0%
MO	2.5%	NJ	2.6%
TX	2.3%	PA	2.4%
MA	2.0%	GA	2.3%
NJ	1.9%	MA	2.3%
Other	12.8%	Other	45.0%

Concentration of lending is also observed on a city basis. Specifically, Mid-western cities (Chicago, Detroit, Cleveland, and St. Louis) played a much larger role in CRE than currently in CMBS with nearly 36.9% of the total CRE funding during the relevant period.

City / MSA	% to Total Loans by \$	CMBS – MSA	CMBS - % of Total Loans
New York	26.6%	New York	12.3%
Chicago	25.1%	Los Angeles	6.1%
Detroit	7.2%	Washington DC	4.1%
Los Angeles	4.1%	Chicago	2.8%
Philadelphia	3.2%	Dallas	2.3%
St. Louis	2.7%	Miami	2.2%
San Francisco	2.2%	Houston	2.0%
Cleveland	1.8%	Philadelphia	1.8%
Washington DC	1.6%	San Francisco	1.8%
Boston	1.5%	Atlanta	1.8%
Other	24.0%	Other	62.7%

## E. Collateral Type

Similar to today's loans, the majority of the loans issued during the relevant period were secured by 1st mortgages. Specifically, as illustrated in the table below, there were 2,726 bonds in the data set that were secured by a first mortgage which represented 76.2% of the total dollar amount of all relevant bonds; this percentage is comparable to 99.2% all CMBS bonds issued with a first mortgage as collateral. However, the collateral securing bonds during the Great Depression were much more varied (see the Glossary for definitions of the specific collateral types). And it should come as no surprise to learn that in the later years of the relevant period the percentage of issuance of bonds backed by higher risk collateral (e.g. debentures, general mortgages, etc.) increases; this was most likely to bridge the gap between higher values and a finite amount of owners' equity (Bayless 1927, 3).



<b>Collateral Type</b>	<b>Count*</b>	<b>% of Total \$</b>	<b>CMBS - % of Total \$</b>
1st Mortgage	2,726	76.2%	99.2%
1st Leasehold	270	14.2%	
General Mortgage	42	1.7%	
Land Trust Certs.	34	1.7%	
Various	27	1.3%	
Debenture	23	1.3%	
2nd Mortgage	34	1.2%	0.6%
Participation Certs.	13	0.8%	
Pref. Stock	31	0.7%	
Collateral Trust	10	0.7%	
Beneficial Interest	3	0.1%	
2nd Leasehold	2	0.1%	
Mezzanine Debt			0.1%
<b>Total</b>	<b>3,273</b>	<b>100.0%</b>	<b>100.0%</b>

\*Note: 58 Great Depression bonds lacked enough information to be included in this analysis.

## F. Property type

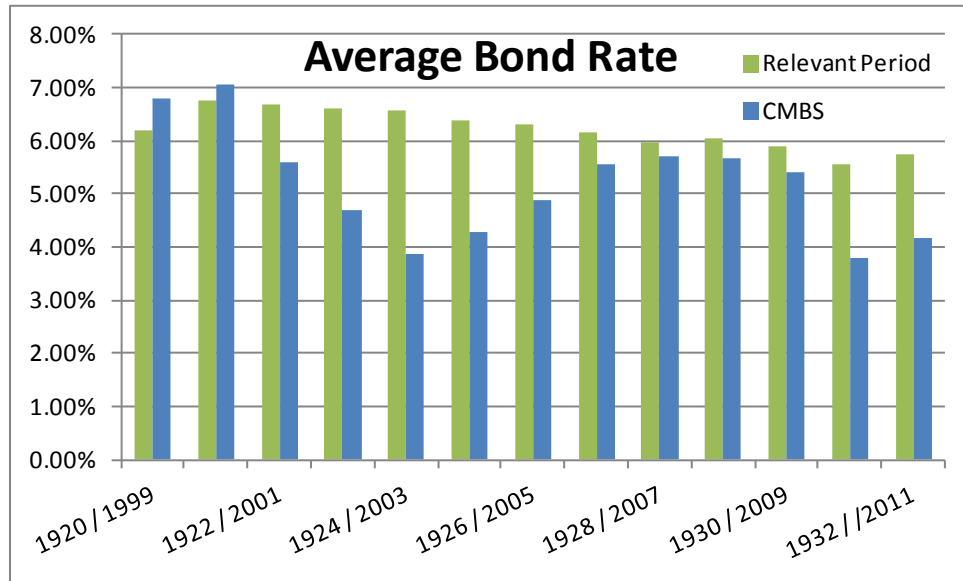
All of today's major property types (i.e. multi-family, office, retail, industrial, and hotel) were present during the relevant period. However, there was a greater presence of non-traditional property types issued during this time period which reflects the growth of the country (e.g. educational, religious structures, hospitals, etc.) and establishment of new emerging sectors (e.g. theaters, garages, etc.). However, it is interesting to note that the presence of retail-specific collateral was much less than it is in CMBS today.

<b>Property Type</b>	<b>Count*</b>	<b>% of Total \$</b>	<b>CMBS - % of Total Loans</b>
Office	533	31.8%	27.5%
Apartment	977	19.7%	15.4%
Hotel	370	17.3%	11.7%
Other	381	13.1%	12.9%
Apartment Hotel	114	5.3%	
Retail	116	5.2%	27.9%
Theater	91	3.8%	
Industrial	73	2.0%	4.6%
Various / Mixed Use	32	1.8%	
<b>Total</b>	<b>3,273</b>	<b>100.0%</b>	<b>100.0%</b>

\*Note: 586 Great Depression bonds lacked enough information to be included in this analysis.

## G. Coupon Rate

There was a tight band on the average loan rate during the relevant period between 5.5% and 6.5% with a steady decreasing trend. Increased competition for borrowers business throughout the relevant time period helped to encourage the bond houses to decrease their rates and subsequently the bond coupon rate

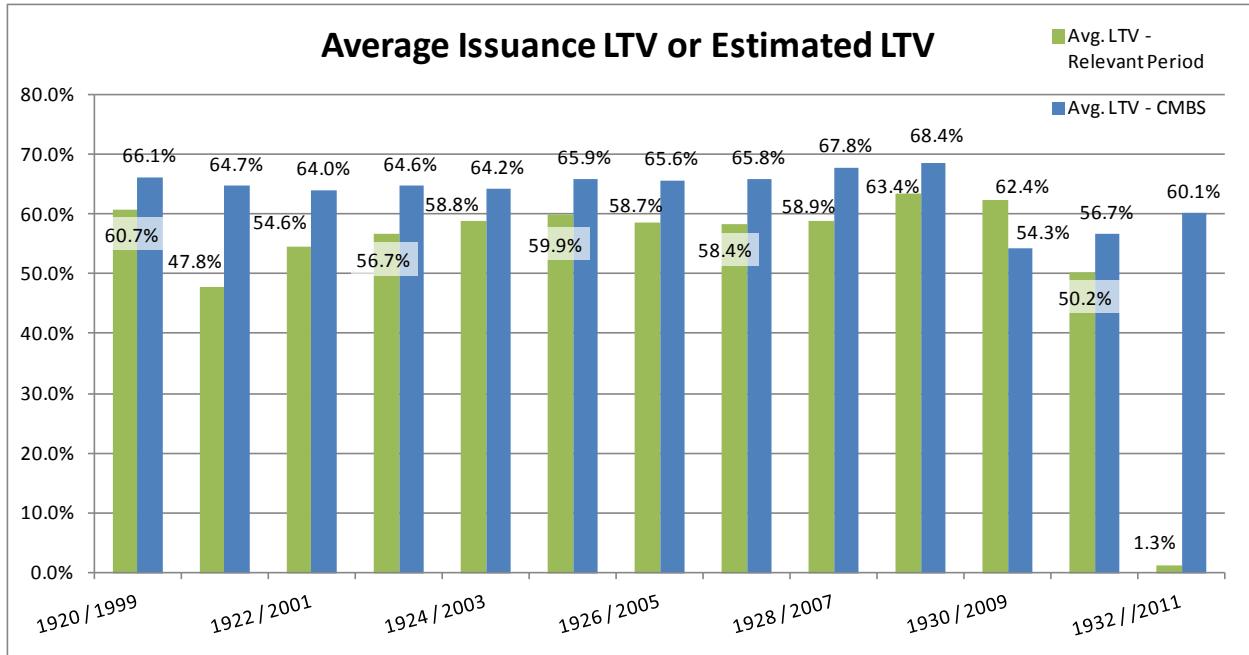


## H. LTV & DSCR

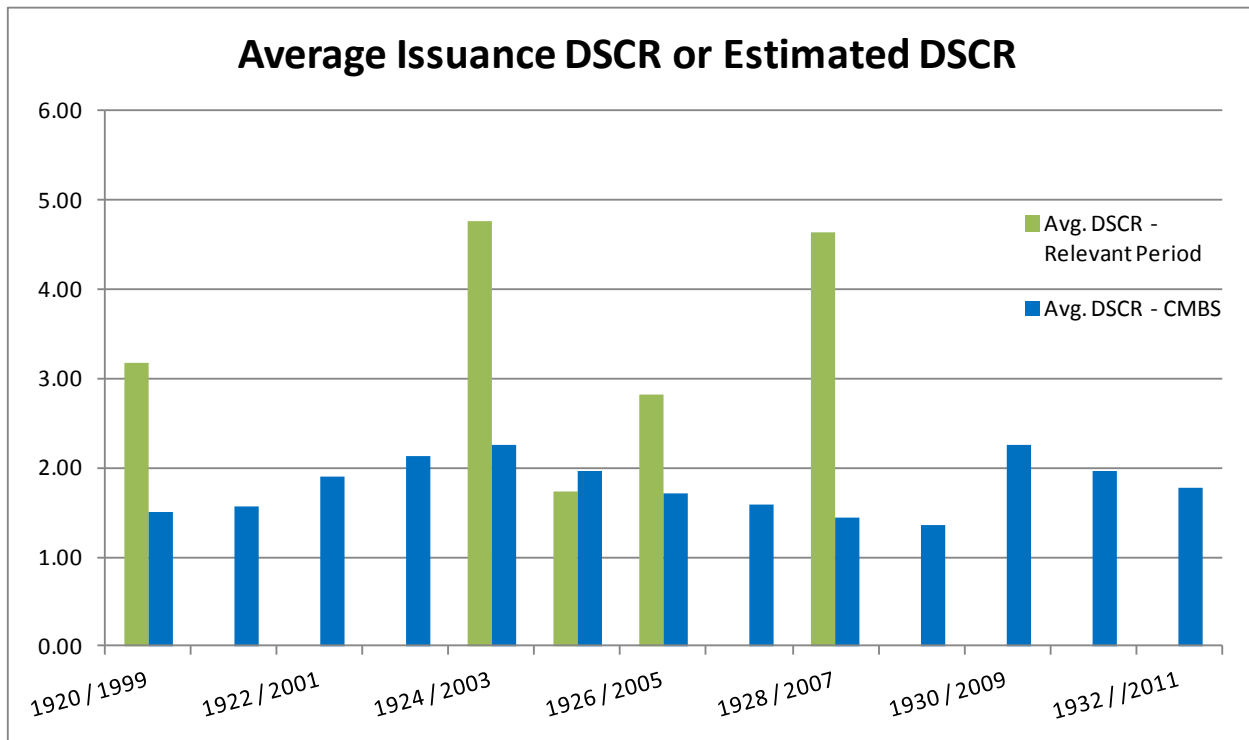
Generally speaking, CRE bonds during the relevant period appear to be underwritten fairly conservatively from an LTV perspective (if the appraisal values were accurate) with average LTV's ranging from 48% to 63% (exclusive of 1932<sup>10</sup>). The general trend is for higher LTVs later in the relevant period when competitive pressures made it necessary to fund more of the value of a property to win the borrower's business.

The graph below illustrates that the average issuance LTV's were not too dissimilar to CMBS issuance LTV's. It is interesting to note that after peak issuance, LTV's for CMBS deals adjusted more quickly down than bonds issued after the peak during the relevant period.

<sup>10</sup> The one loan in 1932 with LTV information was secured by a direct obligation to a Roman Catholic bishop who held the title to all church and school properties in Indianapolis which resulted in an abnormally low LTV of approximately 1.3%.



DSCR information is much more difficult to obtain and was not readily available for the majority of the years<sup>11</sup>. However, if the information that is available is representative of the market at that time, the properties as collateral had, or were expected to have, strong cash flows.



<sup>11</sup> There are only 16 DSCR data points during the relevant period.

## IV. Defaults

The table below tracks the percentage of dollar defaults for a particular vintage on a yearly basis. For example, of the 512 bonds issued in 1926 that have all the pertinent information, 1.7% defaulted in the third year from issuance (between the months of 25 and 36). For the purposes of this table a default is defined as non-payment of interest for at least 90+ days. Thus non-payment of serial payments, sinking fund reserves, or taxes would not be registered as a default in most cases. But for all practical purposes, bonds that did not make these types of non-interest payments eventually defaulted on interest payments in this circumstance; the focus on non-payment of interest doesn't affect the number of defaults, just the timing of the default. Only when there is no interest default and the property has trouble would a different type of default be used (e.g. maturity, structural, etc.). Additionally, due to the lack of information, the authors did not treat advances by bond issuers as a default<sup>12</sup>. One factor that affects defaults of bonds with Chicago collateral is the decision by the city of Chicago in 1927 to reassess its taxes<sup>13</sup>. The authors investigated this and found that only the timing of defaults was affected and not the average frequency of bond default.

### A. Annual and Cumulative Default Rates by Vintage

Year	Count	Paid in Full	1	2	3	4	5	6	7	8	9	10	10-yr Cum	Lifetime Total
1920	79	77.3%	0.0%	0.0%	1.2%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	3.5%	4.9%	22.7%
1921	120	72.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	2.5%	0.0%	4.5%	7.4%	28.0%
1922	260	65.3%	0.0%	0.0%	0.0%	0.3%	1.4%	0.1%	0.3%	0.4%	3.3%	14.6%	20.3%	34.7%
1923	335	48.9%	0.0%	0.0%	0.0%	0.0%	0.5%	1.4%	3.3%	8.6%	16.7%	9.6%	40.2%	51.1%
1924	331	32.1%	0.0%	0.5%	1.5%	1.1%	2.6%	5.5%	3.2%	22.5%	16.2%	8.8%	62.0%	67.9%
1925	528	25.9%	0.0%	0.8%	3.6%	2.1%	4.5%	10.4%	22.3%	18.0%	5.4%	3.0%	70.0%	74.1%
1926	512	16.1%	0.0%	1.3%	1.7%	7.4%	8.4%	22.9%	22.4%	10.4%	1.9%	4.6%	81.1%	83.9%
1927	463	20.1%	0.0%	0.3%	3.5%	12.3%	26.5%	16.3%	15.4%	1.9%	1.0%	1.6%	78.9%	79.9%
1928	415	23.0%	0.0%	2.1%	5.8%	21.5%	29.4%	7.9%	6.7%	1.2%	0.4%	0.6%	75.5%	77.0%
1929	145	15.6%	0.8%	7.4%	28.8%	26.5%	9.0%	10.3%	0.2%	1.4%	0.0%	0.0%	84.4%	84.4%
1930	49	20.2%	2.4%	19.3%	5.4%	29.9%	0.7%	5.6%	14.8%	0.0%	0.0%	0.6%	78.8%	79.8%
1931	30	28.8%	0.0%	7.0%	46.6%	3.9%	9.2%	0.0%	1.1%	0.0%	0.0%	3.5%	71.2%	71.2%
1932	6	62.5%	37.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.5%	37.5%
Total	3273													
Annual Avg. for Relevant Period Vintages														
			3.1%	3.0%	7.5%	8.1%	7.1%	6.2%	6.9%	5.2%	3.4%	4.2%		

<sup>12</sup> There was a brief time period when the bond houses paid the interest payments for properties that were unable to cover their debt service. "Some of the underwriters did this because they still had bonds to sell to the public, and they felt they could not sell those bonds if some of their outstanding issues went into default. Other underwriters sought to protect their uses by advancing money so that their record of years of service to their customers without any loss would not be marred. In the summer of 1929, several of the underwriters had reached the end of their ability to protect their own issues." (Pettibone, Status of Mortgage Bonds 1930, 7).

<sup>13</sup> In 1927 the city of Chicago decided to reassess their taxes; a job that was expected to take one year that lasted three. Thus in 1930 property owners in Chicago were faced with a tax bill that incorporated three years worth of taxes. "Taxes on real estate in Chicago are recognized as a heavy burden at any time. The particular circumstance of having taxes for several years accumulated was, in many instances, the precipitating incident of the default of an issue. Pending the completion of the reassessment reserves for these tax changes should have been set up each year, but the financial plans of most properties failed to make adequate provision for meeting these accruing charges. (Koester, A Survey of a Selected Group of Real Estate Mortgage Bonds in the Chicago Area, 1919 - 1937 June 1938, 48-49).

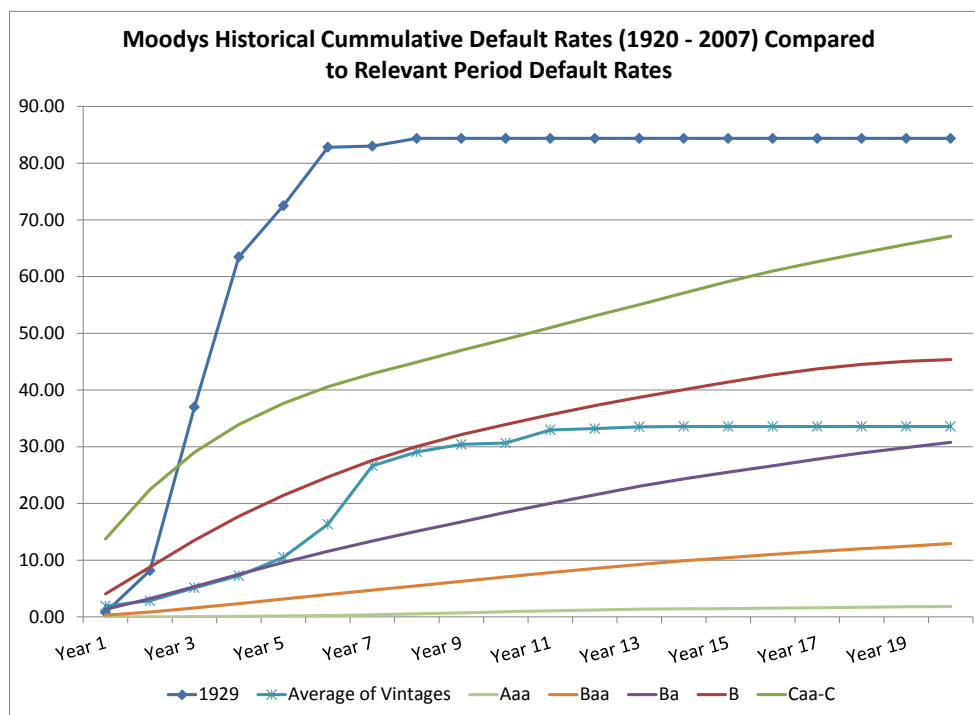
Highlighted on the table above is the year 1931, which shows an obvious spike in defaults and is related to the depressed economic conditions facing the country at that time.

**Defaults: 61 Broadway Building, New York, NY**

**First mortgage:** the borrower stopped interest payments on the October 1935 payment date. A principal payment was made 9 months later and interest resumed under the court-confirmed resolution and continued in various amounts until the final pay-off date of January 1949.

**General mortgage<sup>1</sup>:** the borrower stopped interest payments on the October 1935 payment date and never resumed to the final date of September 1944.

Below is a graph that illustrates the differences between historic cumulative default rates on corporate bonds as reported by Moodys<sup>14</sup>, and cumulative default rates of CRE bond that were originated during the relevant period. The most notable aspect of the table is that the vintage with the highest cumulative loss (i.e. 1929) is well in excess of the riskiest tranche (Caa – C) and reaches its peak rate much faster than the benchmark Caa – C tranche. Secondly, the average of the relevant period vintages exhibit a default profile closed to Ba risk.



<sup>14</sup> Moody's statistics are derived from their proprietary database for corporate bond issuers. The ratings do not refer to the ratings of any specific debt obligations, but rather are notional, issuer-level ratings derived from each issuer's outstanding rated bonds.

## B. Property Type

Hotels had one of the highest default rates in both eras, and only apartments have a higher default rate currently. Additionally, the office property type had one of the lowest default rates in both data sets for the all of the major five property types<sup>15</sup>.

Throughout this default section, it is important to note that while the final performance of the relevant period CRE bonds is known, that the performance of the CMBS bonds has not concluded and will most likely change from what is known today.

<b>Defaults: Based on Property Type</b>			
Property Type	Count*	% Total Default	% Total Default – CMBS**
Apartment Hotel	114	88.0%	N/A
Hotel	370	83.5%	17.4%
Theater	32	79.3%	N/A
Various	91	79.4%	9.4%
Retail	116	76.3%	10.3%
Other	381	75.2%	6.4%
Office	533	72.1%	10.4%
Apartment	977	68.7%	18.4%
Industrial	73	55.5%	12.7%
Total	3,273		

\*Note: 586 Great Depression bonds lacked enough information to be included in this analysis.  
 \*\* This data encompasses the issuance years from 1996 to end of 3<sup>rd</sup> quarter 2011 and amounts to approximately \$1.1 trillion of originated CMBS. 4.7% of all CMBS loans lack enough information to be included in this analysis.

## C. LTV

Both data series exhibit an increasing default trend with higher LTVs, however it is interesting to note that the trend doesn't appear to be that strong particularly for the highest LTVs. This could be result of (1) inaccurate appraisals, (2) lack of nuance of LTV as a risk indicator – e.g. differing loan structures are not addressed, or (3) the fact that “weak” properties will fail no matter what the LTV.

<sup>15</sup> Multi-family, Office, Industrial, Lodging, and Retail.

<b>Defaults: Based on Origination LTV</b>			
LTV	Count*	% Total Default	% Total Default – CMBS**
100% +	4	95.9%	20.0%
90% - 99%	4	56.0%	10.4%
80% - 89%	15	87.8%	17.3%
70% - 79%	48	90.7%	16.4%
60% - 69%	190	89.5%	10.2%
50% - 59%	185	78.7%	7.9%
40% - 49%	60	70.3%	5.5%
30% - 39%	20	89.9%	4.4%
20% - 29%	4	71.6%	5.6%
10% - 19%	4	66.3%	0.9%
0% - 9%	1	62.5%	0.3%
<b>Total</b>	<b>3,273</b>		

\*Note: 2,738 Great Depression bonds lacked enough information to be included in this analysis.  
\*\* This data encompasses the issuance years from 1996 to end of 3<sup>rd</sup> quarter 2011 and amounts to approximately \$1.1 trillion of originated CMBS. 4.7% of all CMBS loans lack enough information to be included in this analysis.

*“The newly created wealth in the form of higher land values, which seemed so solid and substantial when it was buttressed by bank loans and when it was readily convertible into cash, was seen first to lose its liquidity and then much of its value” –Homer Hoyt, 1933*

## V. Resolution Process

After a relevant period bond defaulted, it was the legal obligation of the trustee to manage the property on behalf of the bondholder until a financial resolution could be agreed upon by 100% of the bondholders. As the table below illustrates, often times resolution periods could be quite long – e.g. resolutions of defaulted loans originated in 1928 averaged just over ten years. Perhaps predictably, loans originated during the peak issuance period (1925 to 1929) generally took longer to resolve than non-peak years:

Year	Count	Average Duration from Default to Final Date (years)
1920	14	4.90
1921	16	7.85
1922	61	8.50
1923	103	8.72
1924	149	8.00
1925	307	9.37
1926	329	9.62
1927	292	8.43
1928	298	10.20
1929	109	8.50
1930	34	9.38
1931	18	5.98
1932	1	0.75
Total	1,858	
*Note: 127 Great Depression bonds lacked enough information to be included in this analysis.		

During this time, the trustee, who typically was an appointee of the bond issuing house but had limited commercial real estate ownership experience, hired a receiver to manage the property. The legal loan resolution process was lengthy and costly for the bondholders mainly due to the gridlock created through the difficulty in locating all the bondholders (made more difficult by the fact that the bond house had the only list of all the bondholders and often times refused to release the information to competing bondholder committees) and even if they all could be located, it was difficult to get such a large diverse group to agree upon one course of action<sup>16</sup>. Because of this it was often the case that the majority of cash flow that the property generated was consumed by trustee and receivership fees.

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<sup>16</sup> This can also be the case with syndicated bank loans, but rarely is an issue with CMBS.



### Resolution Process: 61 Broadway Building, New York, NY

**First mortgage:** Borrower defaulted on interest payment on October 1, 1935 and within two days had filed petition in court to reorganization. Borrowers proposed that the 1<sup>st</sup> mortgage bondholders receive for their \$1,000 bond (1) a new \$500 bond with a lower interest rate, (2) \$500 new preferred equity, and (3) 2 shares of common equity in the new corporation for approximately 32% of the new entity. However within three months of the default, no less than four different bondholder committees had formed in opposition to the borrower's plan and were soliciting bonds to support their competing plans. One committee dissolved in January due to lack of bondholder support and the remaining three committees jointly developed an amended plan which was submitted to the court in January 1937. The plan, which was confirmed by the court in April 1937, stated that \$1,000 1<sup>st</sup> mortgage bondholders would receive (a) a new interest rate regime with a lower rate, 3.5%, (2) two shares of equity, and (3) a partial payment of back interest. This capital structure was still too taxing for the property and on April 9, 1942, the company filed another petition to reorganize. Only two competing bondholder committees were formed, and on June 12, 1944 the court approved a new reorganization plan which stated the old \$1,000 1<sup>st</sup> mortgage bondholders were to receive (a) a new \$500 1<sup>st</sup> income bond and (2) 10 common equity voting trust certificates for, essentially, 100% of the new entity. Old common equity holders did not participate in this reorganization plan. In January 1949, the company was able to secure a new 1<sup>st</sup> mortgage loan from Metropolitan Life Insurance Company which effectively allowed the company to call all the 1<sup>st</sup> mortgage bonds at a price of par plus 5%.

**General mortgage:** Borrower defaulted on interest payment on April 1, 1935 and within two days had filed petition in court to reorganization. Borrowers proposed that the general mortgage bondholders receive for their \$1,000 bond (1) new \$1,000 in second preferred equity and (2) 4 shares of common equity in the new corporation for approximately 25% of the new entity. However within three months of the default a bondholder committee had formed in opposition to the borrower's plan and was soliciting bonds to support a different plan. In conjunction with the three senior bondholders' committees, an amended plan was submitted to the court by the company in January 1937. The plan, which was confirmed by the court in April 1937, stated that general mortgage bondholders would receive for their \$1,000 bonds (a) a 10-year maturity extension and (2) six shares of common equity. This capital structure was still too taxing for the property and on April 9, 1942, the company filed another petition to reorganize. And on June 12, 1944 the court approved a new reorganization plan which stated the old \$1,000 general mortgage bondholders were to receive either (a) one share of common equity or (2) \$12.50 in cash. Old common equity holders did not participate in this reorganization plan.

Holders of defaulted bonds did receive some relief on June 7, 1934 when section 77B was added to the National Bankruptcy law. Section 77B greatly accelerated the rehabilitation of real estate corporations and provided that: (1) consent of only 2/3 of the creditors affected by the proposed plan was required before it could be put into operation; (2) underwriting houses could be compelled to make public the complete lists of bondholders; (3) all actions of the committee in control were presented to public scrutiny through court hearings and records; and (4) the legality of the various steps required for an equitable reorganization were determined by court order. The mere availability of the provisions listed dissolved many deadlocks among committees and caused many reorganizations to be pushed to completion under foreclosure

methods. (Koester, Chicago Real Estate Bonds, 1919-1938 1939, 56)

Thus the typical process for a defaulted bond became:

1. Bondholders hold a mortgage on the building as security for their investment
2. The property defaults on payments of mortgage interest and principal
3. A trustee appointed by the bond house legally takes over management of property and typically hires a receiver. Typically, a self-appointed bondholders' committee is formed (sometimes several competing bondholders' committees were formed) for the purported purpose of protecting bondholders' interests. A bondholders' committee could be established by anyone, and they need not have been involved originally with the bond.
4. Through deposit of bonds one bondholders' committee will gain control.
5. Now being in control, the bondholders' committee forms a new corporation, which it controls to acquire the property.
6. The property is then purchased and redeemed, after foreclosure sales, by the new corporation controlled by the bondholders' committee.
7. The bondholders' committee's resolution plan is put into effect. Plans range from slight modifications to the term of the original bond to complete debt for equity swaps.
8. The trustees of the bondholders' committee now operate and control the property as completely as though they were absolute owners. And often times the bondholders had very little say (1934 855-856).

The bond resolution process was made much more efficient with section 77B but it was not without its faults. For the average retail investor, choosing between competing bondholders' committees was a very confusing situation to be in as they rarely understood all the nuances of the process and ramifications of the resolution plans. In these cases, the votes may have been based more on popularity of the committee members than on the economics of the resolution plan. For example presumably to sway votes, one committee even advertised that they received permission and implicit approval of their plan from a Federal Reserve Chairman, Eugene Meyer, and President Hoover. However, one of the most important aspects of the process to the bondholders had to do with what resolution process was chosen.

Resolution Types	Count	% of Total Loans by \$
Reorg - Cap. Structure	709	37.1%
Reorg - Loan Structure	358	17.4%
Liquidation / Sale	155	5.2%
Termination	113	3.3%
Paid in Full	1,724	27.5%
Called	214	9.5%
Total	3,273	100.0%

A plurality, or approximately 37% by dollars issued, of the resolutions were reorganizations of the capital structure. In these cases, the original bondholders would swap their bonds for a portion of the equity in the new corporation that was formed during the foreclosure process and a small mortgage, often times obtained from the bond house, was placed on the property to pay for the back taxes or interest advanced by the bond house. For poorly performing properties in the Great Depression, even the debt service on a small mortgage was, often times, too much and the new corporation defaulted on the new mortgage, and the new equity was wiped out. The result was that the original bondholder, who had agreed to swap their first priority claim (old first mortgage) for the last priority claim (new common equity) was now completely out of the deal and had lost everything and the bond house (new first mortgage) was left owning the property. While this happened in a minority of cases, it did happen enough to help warrant a Congressional investigation into the CRE bondholder's resolution methods.

## VI. Severity of Loss Given a Default<sup>17</sup>

The authors compute a traditional measure of LGD, regardless of how the default is resolved, using the sum of three components - principal loss, foregone interest, and resolution fees - divided by balance at origination. The amount and timing of principal recovery is identified from source documents, and is discounted back to the origination date. Foregone interest is identified using the difference between contractual and actual interest, discounted using a market interest rate back to the origination date. Fees are estimated to be three percent of the balance at the resolution data and to be incurred on the date the resolution plan is authorized by the courts; this is also discounted back to the origination date.

In the case where the actual cash flows extended past the original term of the asset (which was quite often the case when a reorganization was performed that included a maturity extension), it was assumed that the original principal that would have been received was reinvested in similar risk-type assets at the period rate ("reinvestment rate") until the investments eventual final date. The reinvestment rate is based upon the origination rate for small balance bonds with a mortgage as collateral (Hickman 1960). The actual reinvestment rate was known for the years 1919 to 1944; for subsequent years a rate was constructed by adding a premium to the US Treasury Yield. The premium used was 3.66% which represents the average of 26 years (1919 to 1944) of premiums at issuance over the US Treasury Yield for small issue balance bond issuance with mortgages as collateral. This average gave a fair representation of the perceived risk that the market was demanding at issuance for assets with mortgages as collateral. Once the contractual and actual cash flow

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<sup>17</sup>The authors used a loss give default as opposed to a loss given liquidation measure.

streams were determined, the difference between the two was discounted back to the origination date for a final loss number.

In addition to this traditional method described above, the authors also calculate the LGD in another way due to the extensive periods where some bondholders did not receive interest payments that were due to them and the subsequent losses of well in excess of 100%; the traditional LGD calculation seemed, to the authors, an unsatisfactory measure of loss in these instances. The only difference between the two calculations is the denominator. The traditional denominator is comprised solely of the principal balance; whereas the denominator in our additional LGD calculation incorporates the original principal amount as well as all discounted interest payments that should have been received to the final date; the authors call this the Full Loss. The concept behind the Full Loss is that it represents the amount of loss that a bondholder suffered in relation to the entire amount of money they were supposed to receive, not just principal.

In the instances where the original bondholders received equity during the resolution process, the authors searched for an actual transaction price on the final date. More often than not, an actual price could not be found for the final amount, and in these cases the equity book value of the borrower was used<sup>18</sup>.

## A. Vintage

The vintages exhibit a trend of larger losses for the later vintages with one of the worst performing vintages being the peak issuance year. This demonstrates that the expansion of credit through increased competition led to larger losses, presumably via more risky loans and structures.

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<sup>18</sup> If neither an actual final transaction price nor the book value of equity was known, the bond was excluded.

### Loss Given Default: Vintage Year

Year	Count*	Weighted Average Full Loss	Weighted Average Traditional Loss
1920	14	15.4%	19.9%
1921	16	15.2%	20.6%
1922	61	15.9%	22.7%
1923	103	20.5%	29.5%
1924	149	20.3%	29.5%
1925	307	25.5%	38.5%
1926	329	24.4%	39.0%
1927	292	26.1%	39.4%
1928	301	31.3%	47.6%
1929	109	26.4%	44.0%
1930	34	31.1%	50.7%
1931	18	34.7%	50.2%
1932	1	7.2%	8.0%
Total	3,273		

\*Note: 1,539 Great Depression bonds did not default or lacked enough information to be included in this analysis.

Of all the bonds that were issued during the relevant period, ultimately there was approximately \$1 billion of wealth that was lost then.

## **B. Property Type**

Bonds originated during the relevant period generally exhibit larger losses than the CMBS market have thus far. And there seems to be some consistency in property type riskiness in regards to the five primary types. For both time periods, retail and multi-family have the highest losses and office have below median losses. But hotels appear to have a much better performance today, relative to the other primary property types, than they did during the Great Depression.

Throughout this loss section, it is important to note that while the final performance of the relevant period CRE bonds is known, that the performance of the CMBS bonds has not concluded and will most likely change.

**Loss Given Default: Property Type**

Property Type	Count*	Weighted Average Full Loss	Weighted Average Traditional Loss	Weighted Average Traditional Loss – CMBS**
Apartment Hotel	79	32.9%	50.5%	N/A
Apartment	434	24.1%	36.1%	25.9%
Hotel	218	23.4%	35.0%	21.2%
Retail	75	22.6%	35.6%	27.2%
Industrial	29	20.8%	32.6%	25.8%
Office	358	20.3%	32.4%	24.2%
Other	240	19.9%	29.8%	31.4%
Theater	56	15.5%	22.7%	N/A
Various / Mixed Use	19	4.7%	21.9%	17.3%
<b>Total</b>	<b>3,273</b>			

\*Note: 1,765 Great Depression bonds lacked enough information to be included in this analysis.

\*\* Note: 44% of the CMBS bonds that defaulted have not determined their resolution strategy.

**C. LTV**

Loans originated during the relevant period exhibit a logical trend of higher losses for loans with higher origination LTVs, but that pattern is less clear in regards to the CMBS data set. Part of the reason may be that the final results for CMBS losses have yet to actualize, and that different loan structures were not taken into account in regards to the loss results.

**Loss Given Default: Origination LTV**

LTV	Count*	Weighted Average Full Loss	Weighted Average Traditional Loss	Weighted Average Traditional Loss – CMBS**
100% +	4	27.0%	49.1%	21.5%
90% - 99%	4	33.9%	46.8%	44.6%
80% - 89%	15	32.8%	48.2%	31.1%
70% - 79%	48	25.1%	37.6%	31.0%
60% - 69%	190	27.7%	46.1%	24.5%
50% - 59%	185	25.3%	38.4%	14.2%
40% - 49%	60	22.4%	33.5%	6.5%
30% - 39%	20	25.0%	36.7%	20.7%
20% - 29%	4	19.3%	25.3%	54.4%
10% - 19%	4	34.8%	51.7%	0.0%
0% - 9%	1	25.2%	37.8%	0.0%
<b>Total</b>	<b>3,273</b>			

\*Note: 2,738 Great Depression bonds lacked enough information to be included in this analysis.

\*\* Note: 44% of the CMBS bonds that defaulted have not determined their resolution strategy.

## D. Resolution type

Properties that were sold or leaseholds that were terminated performed worse than properties that were reorganized. It is the authors' belief that this was less a factor of the resolution type and more a factor of collateral and economic conditions at the time period that the resolutions took place.

### Loss Given Default: Resolution Type

Resolution Type	Count*	Weighted Average Full Loss	Weighted Average Traditional Loss	Weighted Average Traditional Loss – CMBS***
Termination	113	34.3%	44.5%	N/A
Liquidation / Sale	155	27.2%	35.6%	41.2%
Reorg. - Cap. Structure	709	31.0%	49.0%	N/A
Reorg. - Loan Structure	358	20.0%	49.0%	N/A
Paid in Full**	396	8.5%	11.5%	0.0%
Called**	3	-4.9%	-4.2%	N/A
Total	3,273			

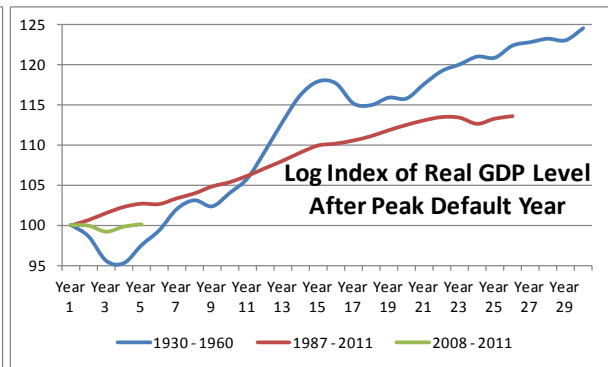
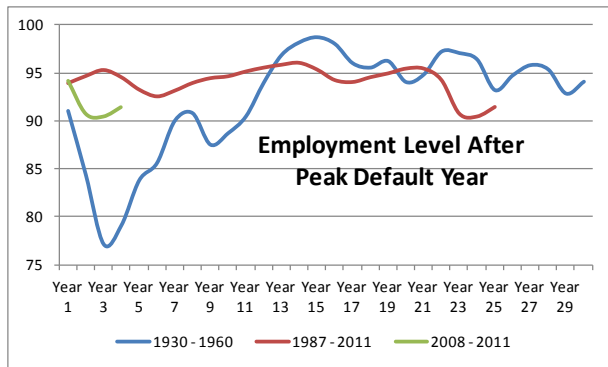
\* 1,539 loans never defaulted and were either paid in full or called.

\*\* Note: some loans that were paid full did not receive all the interest that they were contractually owed and thus suffered a loss.

\*\*\* Note: the final loss amount for 59.1% of the CMBS bonds that defaulted and have resolution plans in place are not known because the bonds are still outstanding. Resolution types that are still in –process and, subsequently, with undetermined loss amount are labeled “N/A”.

To pair the data from the relevant period with the contemporary CMBS data, the authors matched certain Trepp resolution categories with the resolution types used in the study. Specifically, a loan that was modified without a hope note was matched with Reorg. – Loan Structure; and a loan that was modified with a hope note was paired with Reorg. – Capital Structure. Any defaulted CMBS loan without a loss was considered Paid in Full, and any CMBS loan that sustained a loss was matched with Liquidation /Sale.

Following are two graphs which compare the macro-level variables of real GDP and employment over the three time periods in which CRE debt performance is publically available and illustrate the vastly different economic environments that market participants were operating in to resolve CRE loans, and subsequently impacted the loss performance.



## E. Resolution Timing

The data shows a bias towards larger losses the longer it took to finalize a loan's resolution even given the extraordinary economic growth during and after World War II.

### Loss Given Default: Timing between Default and Final

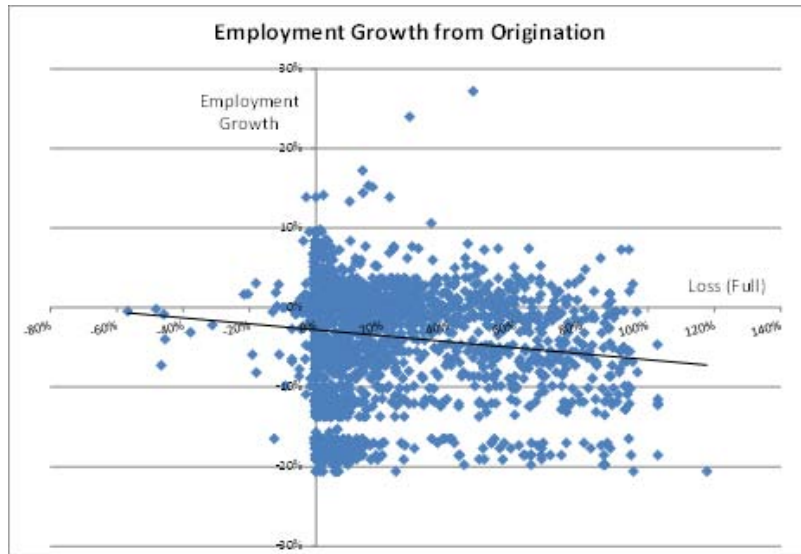
Resolution Duration	Count*	Weighted Average Full Loss	Weighted Average Traditional Loss	Weighted Average Traditional Loss – CMBS**
Less than 1 year	230	9.9%	11.6%	15.6%
1 years to 3 years	295	14.5%	17.8%	42.3%
3 years to 5 years	179	16.4%	20.2%	41.3%
5 years to 7 years	167	23.8%	32.2%	26.3%
7 years to 9 years	131	22.8%	31.6%	8.9%
9 years to 11 years	123	28.6%	40.8%	15.2%
11 years to 13 years	107	21.7%	31.9%	0.0%
13 years to 15 years	112	23.6%	37.9%	N/A
15 years to 17 years	106	30.0%	49.4%	N/A
17 years to 20 years	110	31.7%	57.6%	N/A
Greater than 20 years	171	41.6%	69.2%	N/A
Total	3,273			

\*Note: 1,539 Great Depression bonds never defaulted or lacked enough information to be included in this analysis.

\*\* Note: 0.4% of the CMBS bonds lack enough information to be included in this analysis, and 44% of the CMBS bonds that defaulted have not determined their resolution strategy.

One benefit to bondholders and mitigant to even larger losses was that the majority of bond resolutions occurred during and after World War II which was one of the strongest periods of economic growth for the US. The scatter plot below illustrates the negative relationship between employment growth (between origination and final dates) of a bond and the full loss of that bond; thus the more employment grew over the life of a bond, the smaller the loss that the bond ultimately suffered. Losses would have certainly been much larger if the economic growth during the resolution periods for these bonds was only average growth.





## VII. Conclusion

It is fair to say that the downside risk of investing in CRE debt is greater than generally perceived based on the S&E and CMBS data currently utilized by the market. Default rates from bonds issued during the relevant time period exhibited rates far in excess of loans originated in those other time periods (i.e. 1972 –

1984 and 1993 – 2011). However, this is an incomplete conclusion without acknowledging that the economic stress facing loans originated during the relevant period is something, thankfully, that have not been experienced by the US economy again, and that the process, investors, and regulatory oversight was less sophisticated then than it is today .

This data set confirms the logical presumption that making loans with higher LTV's results in higher default and loss rates, and supports the fact that certain property types were, and continue to be, inherently more or less risky than others.

The results also support the significance of the business cycle to the performance of CRE assets. Specifically, what was most surprising to the authors was the large number of defaults that occurred through the early 1930s yet the losses, which typically were realized post-1940, seemed rather “normal” when compared to studies of contemporary loans. The reason for these results become more clear when the economy's performance is considered during these time periods – specifically the unprecedented GDP loss and unemployment increased in the early 1930s and the subsequent rapid GDP growth and employment gains during World War II and the, roughly, decade and a half afterwards. This is particularly relevant for today as numerous entities (e.g. banks, CMBS trusts, some insurance companies, etc.) have a large amount of sub-performing CRE assets to workout. While the data points to better loss performance the quicker a problem loan is dispatched with, the old banking adage, “your first loss is your best loss” may not hold true when there is a rapid recovery around the corner. Rational market participants should make a realistic determination of how long they will be required to be involved with a particular asset and couple that with realistic macro-level projections for the hold period to determine whether it will be best to quickly dispose of the property or to stay involved over the long-run.

## VII. Data Methodology Appendix

Original Bond / Property Name	<ol style="list-style-type: none"> <li>1. If a property name was present at origination it was included, however, often times only the owner's name was given.</li> <li>2. Sometimes the property's name was changed if new ownership took over, however in this case the original name was still used.</li> </ol>
Original Sponsor	<ol style="list-style-type: none"> <li>1. If a name was present at origination it was included.</li> </ol>
Origination Date	<ol style="list-style-type: none"> <li>1. If only the month was given, the payment date was assumed to be the 1<sup>st</sup> of the month.</li> <li>2. In the case of a 1<sup>st</sup> &amp; refunding mortgage, the first date was used.</li> </ol>
Initial Amount	<ol style="list-style-type: none"> <li>1. Initial notional amount was adjusted for any sales discounts or premiums.</li> <li>2. In the case of a 1<sup>st</sup> &amp; refunding mortgage, the larger of the original or refunding amount was used.</li> </ol>
Rate	<ol style="list-style-type: none"> <li>1. Stated coupon rate was used.</li> </ol>
Maturity Date	<ol style="list-style-type: none"> <li>1. Stated maturity date was used.</li> </ol>
Collateral Type	<ol style="list-style-type: none"> <li>1. Occasionally, an asset was marketed as something more secure than it legally was (e.g. sold as a 1<sup>st</sup> mortgage when there already was a 1<sup>st</sup> mortgage in place) and in this case the less secure collateral type was used if known.</li> </ol>
Geographic Location (City, State and Country)	<ol style="list-style-type: none"> <li>1. If no geographic location was given but the name of the property indicated a location, then that location was used.</li> </ol>
Property Type	<ol style="list-style-type: none"> <li>1. For properties that had multiple uses, the primary use was chosen.</li> <li>2. If no property type was given but the name of the property indicated a type, then that type was used.</li> </ol>
Collateral Detail – amount and type	<ol style="list-style-type: none"> <li>1. If present, the number and types of properties were captured, as was any different pieces of collateral.</li> </ol>
Bond House	<ol style="list-style-type: none"> <li>1. If given, the names of the primary issuers were captured.</li> </ol>

Property Value at origination and estimated LTV	<ol style="list-style-type: none"> <li>1. For assets that were not 1<sup>st</sup> mortgages, an effort was made to include senior debt in the LTV calculation.</li> </ol>
Income at origination and estimated DSCR	<ol style="list-style-type: none"> <li>1. For assets that were not 1<sup>st</sup> mortgages, an effort was made to include senior debt in the DSCR calculation.</li> </ol>
Loan Structure Features	<ol style="list-style-type: none"> <li>1. All known structures were captured.</li> </ol>
Default Dates – 1 <sup>st</sup> , 2 <sup>nd</sup> , and 3 <sup>rd</sup>	<ol style="list-style-type: none"> <li>1. If multiple types of defaults, the first instance of an interest default was recorded. And if no interest default occurred then the first instance of any type of default was recorded.</li> <li>2. For bonds that had multiple defaults, the latest default was also captured.</li> <li>3. Even if not listed as such, any delay in payment from the original contractual agreement was considered a default.</li> </ol>
Default Type	<p>There are three types of default types:</p> <ol style="list-style-type: none"> <li>1. 30+, 60+, 90+ - number days a scheduled interest payment was late</li> <li>2. Principal – a scheduled payment of principal was missed, typically a missed serial payment or contribution to a sinking fund</li> <li>3. Structural – a legally required payment was missed – e.g. a tax payment</li> <li>4. Maturity – a legal principal maturity payment was missed</li> </ol>
Resolution Type and Date	<ol style="list-style-type: none"> <li>1. Called – if date and amount was given then that was used, if not then the last payment date of the year before the last occurrence of the asset was used</li> <li>2. Paid in Full – if date was given then that was used, if not then the last payment date of the year before the last occurrence of the asset was used</li> <li>3. Termination – typically used in the case of leasehold collateral. Date and amount used if given. If court dates weren't given then trust committee approval / submittal dates were used.</li> <li>4. Liquidation - date and amount used if given</li> <li>5. Reorganization: Loan Structure – if given, date used was date that court approved the final resolution plan. If court dates weren't</li> </ol>

	<p>given then trust committee approval / submittal dates were used.</p> <p>5. 6. Reorganization: Capital Structure– if given, date used was date that court approved the final resolution plan. If court dates weren't given then trust committee approval / submittal dates were used.</p>
Estimated Final Date	<ol style="list-style-type: none"> <li>1. Any payoff, sale, or refinance date that was given was used.</li> <li>2. If no date was give and when an asset was no longer found in the source documents it was assumed that the obligation was retired in full.</li> </ol>
Total Loss – Traditional	<ol style="list-style-type: none"> <li>1. Losses ( principal + interest + expense) / Original principal amount</li> </ol>
Total Loss - Full	<ol style="list-style-type: none"> <li>1. Losses ( principal + interest + expense) / Original principal amount + discounted value of all legal contractually owed interest payments. The concept behind the Full Loss is that it represents the amount of loss that a bondholder suffered in relation to the entire amount of money they were supposed to receive, not just principal.</li> </ol>

## VIII. Glossary

- 1) **1<sup>st</sup> leasehold** – a leasehold estate is an ownership of a temporary right to land or property in which a tenant holds the rights of real property by some form of title from a landlord.
  
- 2) **2<sup>nd</sup> leasehold** – junior ownership of a temporary right to land or property in which a tenant holds the rights of real property by some form of title from a landlord.
  
- 3) **1<sup>st</sup> mortgage bond** – a bond secured by a 1<sup>st</sup> mortgage which has been pledged as security with a trustee . . . the . . . house bringing them out merely acts as underwriter and not as guarantor of the bonds. (North, Van Buren and Smith, Real Estate Finance 1928, 85)
  
- 4) **Amortization Plans** - The sound real estate financing scheme should provide for a periodic reduction of the mortgage loan, either by the serial, sinking fund, or some other well regulated method. (North, Van Buren and Smith, Real Estate Finance 1928, 95)

The theory of the bond issue was based on a gradual reduction of the principal through serial repayment or amortization of the mortgage. In easy stages, from earnings of the property, annual payments amounting to about 5% of the principal were to be made after the second year. (Shultz and Simmons 1959, 144-145)

- a. **Sinking fund** – This is a method by which a borrower sets aside money in an account over time to retire its bond issuance, and was typically overseen by the bond trustee.

In order to make certain that the earnings of the property are applied each month to the payment of principal and interest before any other obligations are met, and to provide systematically for the payment of both principal and interest in cash on the days when due, monthly deposits in a sinking fund are required. Each monthly deposit is one-twelfth of the amount of principal and interest coming due during the year ... From these deposits, as they accumulate, the semiannual interest coupons are paid and a certain number of bonds are retired and cancelled on the dates [of maturities.] (Halliburton 1939, 53)

- b. **Serial bond** – a bond issue in which a portion of the outstanding bonds matures at regular intervals.

To offset excessive mortgage loans, underwriters required heavy serial payments, beginning soon after the completion of the building. (Pettibone, Real Estate Financing 1931, 5)

The type and term of real estate bonds vary with the wishes of the borrower and the requirements of the underwriter. Houses specializing in this field have usually insisted on serial maturities with retirements sufficient to reduce the outstanding issue by a quarter to a half prior to the final due date. Occasionally the serial payments are heavy enough to retire nearly the entire amount, but this is decidedly untypical. (Gray and Terborgh May 1, 1929, 25)

The loan represented a very large proportion of the cost of the property, land and buildings. . . . to offset the heavy loan it had been the common practice with this company, as well as he others, to call for serial payments of the principal, beginning right away, sometimes at the end of the first year of the first two years. (1936 74)

The houses of issue as fiscal agent received monthly deposits from the mortgagor on account of interest and principal, in anticipation of semi-annual interest payments and of serial maturities of principal. (1936 4)

- 5) **Apartment Hotel** – similar to a furnished hotel room except that hotel rooms typically didn't have kitchens.

The changing size of the family, the greater number of single people, the increasing employment of women outside the home, with the attendant difficulties of maintaining adequate house servants, and the general use of the automobile - all made the apartment building and apartment hotel popular. (Koester, A Survey of a Selected Group of Real Estate Mortgage Bonds in the Chicago Area, 1919 - 1937 June 1938, 30)

- 6) **Certificates** - Mortgage certificates are interests in a bond or mortgage securing a loan on a particular piece of real property or are secured by a group of mortgages. . . . In other words, the security holder does not have one of a series of bonds described in a certain mortgage and indenture, but has a participation certificate.

One of the advantages of the mortgage certificate over the collateral trust bond is that in New York State the certificate is a legal investment for trust funds while the collateral bond is not. (North, Van Buren and Smith, Real Estate Finance 1928, 92-93)

The collateral trust certificates differ from the mortgage certificates in that they are secured by a group of mortgages instead of by only one mortgage. (North, Van Buren and Smith, Real Estate Finance 1928, 94) The following are different types of certificates:

- i. **Beneficial interest certificates** - is an equitable interest in the income from the property but no fee interest in the property. [Certificate of beneficial interest] share in the income from the estate, but do not have a fee ownership in the trust estate. (North, Van Buren and Smith, Real Estate Finance 1928, 168-169)

- ii. **Land Trust Certificates (also called Fee ownership certificates)** - The land trust is a form of organization which operates by placing the title to real property in the hands of a trustee for the benefit of the holders of the land trust certificates. It is not in any sense a mortgage, a leasehold bond, or a note, but is an evidence of actual ownership in the property. The property of the trust is usually leased to a third party for a long term, with a rental which will give a fair return to the holders of the certificates of beneficial interest. It is employed largely as a method of raising senior money in a large building venture without issuing a mortgage. The land trust has found more extensive use around Chicago, Cleveland, and in the Midwest than in the east. (North, Van Buren and Smith, Real Estate Finance 1928, 126, 128)

Land trust certificates are commonly issued under a declaration of trust which provides that the rights of the lessee in the property shall cease upon default and immediately vest in the trustee for the benefit of the certificate holders. In this way, all of the delays, uncertainties, and costs incident to foreclosure and reorganization are obviated. (Halliburton 1939, 126)

- iii. **Participation Certificates** – many mortgages loans were too large or the risk too great for any single lender. To avoid the need for making a single large loan a scheme has been devised to split the mortgage into . . . participations. The shares are sometimes evidenced by a certificate of part ownership issued by the trustee who holds the mortgage. . . . the mortgage participation may be a participation in a bond and mortgage which is held by a trustee . . . or it may be a participation in a group of bonds and mortgages which have been pledged with a trustee . . . or the participation may be divided into a senior and junior participation. (North, Van Buren and Smith, Real Estate Finance 1928, 84-85)

- 7) **Closed mortgage** – this is a mortgage where adding any additional debt, other than what is present at origination, is prohibited.
- 8) **Collateral** – typically refers to bonds that have more than just a 1<sup>st</sup> mortgage as collateral. However, not all bonds that have additional non-1<sup>st</sup> mortgage collateral are listed as such.
- 9) **Collateral Trust Bonds** – bonds secured by a group of first mortgage bonds or other similar securities as opposed to being collateralized by only one loan. This concept is similar to today's CDO pools.
- 10) **Debenture** – This is ordinarily a lien against the general assets of the borrower and is not secured by the pledge of any particular asset or piece of property as security. (North, Van Buren and Smith, Real Estate Finance 1928, 97-98)

Under examination at the Senate Hearings on Stock Exchange Practices, an officer of the issuing house testified that debentures ordinarily indicate no lien at all on specific property. (Halliburton 1939, 86)

- 11) **Debt Service Coverage Ratio (“DSCR”)** – this is calculated by dividing the property’s annual net operating income by a loan’s annual debt service.

The loan is not made unless the net annual income will be about 15% of the amount of the loan or bond issue [resulting in a DSCR of approximately 2.5 times]. (North, Van Buren and Smith, Real Estate Finance 1928, 86)

- 12) **Depreciation fund** - Among other duties of the trustee may be those of acting as Depositary of the Depreciation Fund . . . the depreciation fund . . . may serve as a reservoir from which the lessee may borrow for the purpose of meeting rentals or other charges under the lease. (Halliburton 1939, 22)

- 13) **Direct obligation** – typically refers to a personal guarantee on a bond, as opposed to a bond that is guaranteed by a guarantee company or the issuing entity.

- 14) **First and Refunding Loan** – this structure tries to address the need of a borrower to find refinancing for a loan, by packaging an original shorter-term 1<sup>st</sup> mortgage with an automatic refinancing (i.e. “refunding”) at a later date. A new bond, typically in an increased amount and new market rate, is issued to pay off the original bond once the original bondholders surrender their bonds.

Problems arise when the original bondholders refuse to surrender their bonds and accept the refunding bond. If this happens all new refunding bonds are a junior lien on the property, no matter how there are marketed to the public. (Halliburton 1939, 87)

- 15) **General mortgage** – a junior mortgage lien on a property, typically a 2<sup>nd</sup> or 3<sup>rd</sup> mortgage. For marketing reasons, the bond underwriters felt it was advantageous to sell the public “general mortgages” in comparison to “2<sup>nd</sup>” or “3<sup>rd</sup>” mortgages.

"If you give a dog a bad name, you might as well kill him." So runs an old saying, well understood by the sponsors of junior mortgage bonds. There have been few real estate bonds, except in case of reorganization, issued under the title "Second Mortgage" The favorite title for junior issues was "General Mortgage." (Halliburton 1939, 85)

- 16) **Gold bond** - Both principal and interest are payable . . . in gold coin of the United States of America. (North, Van Buren and Smith, Real Estate Finance 1928, 365)

- 17) **Guarantee** – Typically, a surety company guarantees some combination of both principal and interest payments and assumes the responsibility of complete supervision of the mortgage. Interest on the mortgage is collected by the company and is remitted to the mortgage holder at a guaranteed rate. Under its guarantee the company sends its own check for the interest when due whether then collected or not. In case of default, the principal is due as and when collected, but in any event not later than a



fixed period after payment has been demanded in writing, the final payment being absolutely guaranteed by the company. (North, Van Buren and Smith, Real Estate Finance 1928, 83)

The title guarantee companies in New York began to guarantee not only title but also payment of interest and principal on the mortgage. (Fisher 1952, 33)

" Some prospectuses are, to say the least, carelessly worded and the impression is too often conveyed to the investor that the surety company's guaranty is a guarantee of the principal and interest on the bonds. They are often referred to as "guaranteed bonds." This is an error. 'While some bonds carry such a guarantee, the majority carry only the surety company's guaranty of the mortgages placed as collateral for the bonds. (Gray and Terborgh May 1, 1929, 52)

18) **Income bond** – a bond that is collateralized with a loan that requires the borrower to make an interest payment up to a certain rate, but is not considered in default if interest payments are not made. Interest payments can be both cumulative and non-cumulative.

19) **Loan-to-Value ("LTV") ratio** – this is calculated by dividing the debt outstanding by the value of the property.

The margin of safety, therefore, is the difference between the total amount of the loans and the true value of the property. (North, Van Buren and Smith, Real Estate Finance 1928, 100)

The usual first mortgage upon improved property will not exceed 55% to 60% of the value of the property . . . . In recent years many companies have felt that the idea of the borrowing capacity ending at 50% or 55% of value was antiquated. Many companies now place second mortgages on approved properties for the difference between the amount of the first mortgage and 75% or 80% of the value. (North, Van Buren and Smith, Real Estate Finance 1928, 29,84)

20) **Notes**- The bond and mortgage are the two instruments by which a loan on realty is secured. A note is used in some states instead of a bond. The bond or note is the evidence of indebtedness and promise to repay; the mortgage is the pledge of specific realty as security. . . . a bond is generally used to evidence the debt. (North and Benson, Real Estate Principles and Practices 1947, 129)

21) **Participating mortgages**- A mortgage that often is split into senior and junior shares, where the senior shareholder is first entitled to collect both principal and interest to the extent of his share before anything is paid to the junior shareholder. (North, Van Buren and Smith, Real Estate Finance 1928, 73)

22) **Trust Deed**- The deed of trust is substantially a mortgage, except that it has the additional advantages of possession convenience. It enables the trustee to step in and take possession of the property without court action in the event of a default. . . . a

permanent default is avoided by the trustee having the right to take charge of the property and thus rectify any financial difficulty and put the property on a paying basis again. (North, Van Buren and Smith, Real Estate Finance 1928, 86)

- 23) **Trust Mortgages**- A mortgage is made to a trustee and the trustee holds the mortgage for the investor's benefit. . . . They are used in many states where the remedy for default under an ordinary mortgage is cumbersome and lengthy. (North, Van Buren and Smith, Real Estate Finance 1928, 72-73)

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