Default Ruthlessness: Examining Borrower Default Behavior

LTV and DCR Are Not the Only Determining Factors for Defaults on Commercial Mortgages

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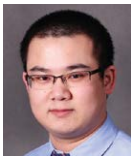

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For simplicity, some models used by CMBS investors assume that the non-recourse borrower will default immediately if the DCR falls below 1.0 or LTV goes above 100 (percent). This is sometimes referred to as "ruthless default" behavior. In reality, however, borrowers do not choose to default just because DCR is below 1.0 or LTV is higher than 100. This article examines some historical data and attempts to look at various factors that have an impact on the borrower's decision to default, and presents historical default rates for each category.

Using different default rates for the different categories may be a better approach for scenario analysis for CMBS investors than trying to use fixed cutoff numbers for DCR and LTV to examine each loan to determine if it will default or not. An important underlying factor that motivates borrower behavior is the option value embedded in owning the real property.

Also, borrower selection impacts ruthlessness. Market expertise helps borrowers measure the benefits of supporting an underperforming property based on potential future upside. Further, key to the decision to support the property is the borrower's access to capital and overall liquidity – without which there is no ability to subsidize the property until the market improves.

Introduction

As part of their investment analysis, CMBS Investors run various scenarios of changes in economic conditions, cap rates, vacancies, NOIs, etc. The resulting DCR and LTV are used to decide if the loan will default in that scenario and what the loss severity will be in case of default. If DCR falls below 1.0, that clearly increases the likelihood of default during the loan term as borrowers are required to pay out-of-pocket to cover property expenses. When the property value is below the loan amount default is more likely and losses will be higher in case of default. Also, if the LTV is above 100 at maturity, the loan is not likely to not qualify for a new loan without putting more equity into the property, and hence there may be a maturity default.

In practice borrowers do not choose to default just because DCR is below 1.0 or LTV is higher than 100. There is an option value to owning real property that impacts borrower behavior. The option value captures the possibility of upside in the future.

Investors are aware of the option value. However, if 1.0 DCR and 100 LTV are not the cut off points, what are the levels that drive borrower behavior? Even more complex models must address this question as well. In this research we focus on the multifamily loans and look at the borrower default behavior in loans in both CMBS and Freddie Mac collateral.

Default Ruthlessness of CMBS Multifamily Borrowers

To examine the default behavior in CMBS, we analyze performance records of about 25,000 fixed-rate multifamily loans in CMBS deals from 1998 to 2013. We focus on two key factors: (1) debt service coverage ratio (DCR), and (2) mark-to-market loan-to-value (LTV). We calculate the DCR using the latest reported net operating income (NOI) of the underlying property and the annual debt service. To calculate LTV, we use three methods to estimate property value: (1) property appraisals updated by mortgage servicers, (2) direct capitalization valuation, and (3) market index based valuation. When the updated appraisal was not available, we generally select the lower of the direct capitalization value and the index based value. The cap rates used were from Real Capital Analytics and the multifamily value index series used were those from National Council of Real Estate Investment Fiduciaries (NCREIF). In the direct cap valuation, we use the trailing 12-month NOI to better measure operating profitability of underlying properties. Although it may be a conservative approach, especially for any property that is temporarily distressed, this approach reduces the impact of any pro-forma underwriting used at origination.

With derived LTV and DCR for each period, we then identify CMBS multifamily mortgages that ever went underwater, defined as either DCR<1 or LTV>100. We also identify all defaulted loans – defined as 60-day delinquency (or worse) in this analysis – and calculate the default rates that reflect how ruthless borrowers were on loans on properties that were distressed.

Table 1
Default Ruthlessness in CMBS

CMBS (1998--2013)	Total	Default	Percentage of default
Fully underwater (DCR<1 and LTV>100)	3356	1305	38.9%
Value underwater (DCR>=1 and LTV>100)	2378	352	14.8%
Cash Flow underwater (DCR<1 and LTV<=100)	2682	553	20.6%
No underwater performance observed	15054	1241	8.2%

Source: Trepp and Freddie Mac

In our analysis some loans defaulted even though the available data did not indicate that the property was underwater. This may be due to possible reporting issues in (1) incomes, (2) reported valuations, or (3) cash flows not reflecting the actual property

performance. Except for some idiosyncratic events that we would expect to be rare, the number of defaults on performing properties should be very low. We understand that there is noise in the data we are using, nevertheless there is still a lot to be learned about borrower behavior that is less than fully-ruthless and in this article we will look at that across a number of different dimensions.

In order to further investigate the default behavior, we split up the sample using several different criteria. Splitting up the sample by original loan term, we observe that the behavior tends to be more ruthless in shorter term loans. This is consistent with option theory because the longer the term (to loan maturity in this case) the greater the option value. Loans fully underwater with more than 7 years to maturity defaulted 36% of the time, but loans less than 7 years to maturity defaulted 60% of the time. Consistent with the theory, borrowers with more time to maturity were more likely to keep the loan current despite weak property conditions.

Table 2
Long Term Mortgage Default Ruthlessness

Long Term Investment (>=7 years)	Total	Default	Percentage of default
Fully underwater (DCR<1 and LTV>100)	2985	1082	36.2%
Value underwater (DCR>=1 and LTV>100)	2051	221	10.8%
Cash Flow underwater (DCR<1 and LTV<=100)	2440	488	20.0%
No underwater performance observed	12501	980	7.8%

Source: Trepp and Freddie Mac

Table 3
Short Term Mortgage Default Ruthlessness

Short Term Investment (<7 years)	Total	Default	Percentage of default
Fully underwater (DCR<1 and LTV>100)	370	223	60.3%
Value underwater (DCR>=1 and LTV>100)	327	131	40.1%
Cash Flow underwater (DCR<1 and LTV<=100)	240	65	27.1%
No underwater performance observed	2545	260	10.2%

Source: Trepp and Freddie Mac

This finding makes sense as the longer term loans generally indicate borrower's expectation or intention to hold the property for a longer period. Also, the longer term means the property owner has a longer time period to improve the property's operations and performance. Credit models can incorporate option valuation techniques to consider this time value effect.

Another factor we look at is borrower behavior near balloon maturity. Since the default decision is basically a put option in a non-recourse loan, the embedded time value of the option depends on the time until the maturity of the option. Given that and based on option theory, the default option has a higher value if the mortgage has more remaining time before balloon maturity, and the borrower can be expected to be less ruthless. To test this, we compare the multifamily loans by whether mortgage's under-performance occurred near maturities. The results confirm that the default option is more likely exercised when the underlying mortgage is near maturity.

Table 4
Default Ruthlessness by Remaining Time to Maturity

Fully Underwater (DCR<1 and LTV>100) occurred at:	Total	Default	Percentage of default
At least 2 years prior to balloon maturity	2917	1075	36.9%
Within 2 years of balloon maturity	439	230	52.4%

Source: Trepp and Freddie Mac

We also test whether property investor's ruthlessness changes across various economic environments, as both access to liquidity and expectations for economic growth vary based on economic conditions. In recessions, it is very difficult to improve underperforming properties and obtain financial assistances from lenders. We would speculate that there would be a higher ruthlessness of default when market conditions are weak, as only a subset of borrowers will have the capacity to support their properties in these periods. Loan performance in the recent major recession provides us a good chance to examine this hypothesis. The following table does show that if underwater performance occurred during the period between 2008 and 2012, the underlying mortgage default rate was slightly higher. For the near-maturity loans, the ruthlessness rises even higher (to 66%).

Table 5
Default Ruthlessness in the Recession

Fully Underwater Between 2008 and 2010	Total	Default	Percentage of default
All observations	1578	674	42.7%
Within 2 years of balloon maturity	249	167	67.1%

Source: Trepp and Freddie Mac

In the CMBS loans, we have often observed high volatilities in some states, such as Florida. These states were also the ones that experienced the biggest downturn during the recent recession. The nature of boom and bust in those states can have dramatic impact on CRE borrowers' default behavior. We further investigate the ruthlessness of four of the states (Arizona, Florida, Georgia and Nevada) which suffered severely during the recession. Clearly, the evidence indicates that multifamily borrowers tend to default more ruthlessly when facing a more volatile market environment or a more stressed market. A number of issues may contribute to this. The properties may be even more distressed than is evident from the data available. Otherwise, option theory suggests that there is significant upside as the markets and properties return to periods of stability. Also, borrower liquidity could play a role here as borrowers recognized the potential upside but did not have the capacity to support the properties.

Table 6
Geographic Comparison of Default Ruthlessness

Default Ruthlessness in Different States	AZ, FL, GA and NV	Other States
Fully underwater (DCR<1 and LTV>100)	47.6%	36.7%
Value underwater (DCR>=1 and LTV>100)	27.6%	13.2%
Cash Flow underwater (DCR<1 and LTV<=100)	25.8%	19.4%
No underwater performance observed	9.8%	8.0%

Source: Trepp and Freddie Mac

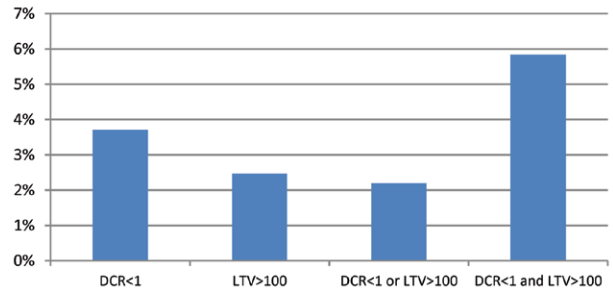
Default Ruthlessness of Freddie Mac Multifamily Loans

Freddie Mac's current multifamily business model began in the late-1990s, similar to the CMBS data reviewed above. The extremely low delinquency rate (<1%) for Freddie Mac-financed properties contrasts sharply with the delinquency rate for multifamily loans in CMBS, which peaked near 15%. Brickman, Guggenmos and Li (2011)[1] research provided some solid evidence and explanation for these results. In that research, Mysteries Revealed, it is clear that income and value underwriting were quite different for loans originated by CMBS conduits relative to those funded by Freddie Mac. On average, incomes and values were 5% to 15% more aggressive for conduits before the market crash. This CMBS underwriting practice often led to the approval of some loans unqualified for the Freddie Mac programs.

Here we look at another factor, borrower decisions to default once a property goes underwater. We examine if the ruthless behavior is different among Freddie Mac borrowers from those of CMBS, and what are the factors that drive the differences.

To analyze the default behavior in Freddie Mac loans, we look at the Freddie Mac multifamily fixed rate loan historic performance data from 2002 to 2012. We use a similar methodology to the one described above for the private label CMBS to obtain DCR and derived LTV for each year. Any loans that were foreclosed or liquidated with losses were counted as defaulted.

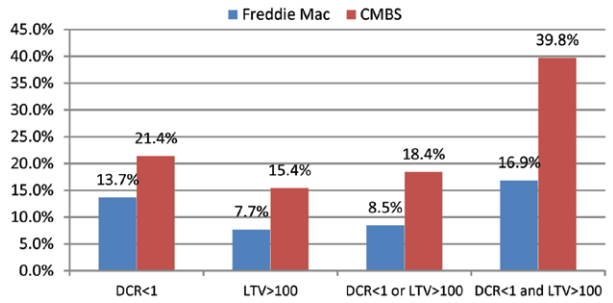
Figure 1
Freddie Mac Multifamily Mortgage Default Ruthlessness



Source: Freddie Mac

Because the differences in asset management practices between Freddie Mac and CMBS, we further identify the distressed mortgages which were modified and became current. The most common types of modification include term modification, negotiated payoff and reinstatement. We believe that these loans, if securitized in the market, would otherwise default (comparable to a 60-day delinquent loan in CMBS). Hence, we add these loans to our default list in order to have a more precise comparison with the discussed CMBS loans. Figure 2 presents the revised Freddie Mac default ruthlessness in comparison with the CMBS default ruthlessness from 2002 to 2012.

Figure 2
Comparison of Default Ruthless between Freddie Mac and CMBS



Source: Trepp and Freddie Mac

Clearly, Freddie Mac multifamily borrowers are less ruthless in their default decisions. This difference in ruthlessness is one of the reasons for the lower delinquencies for Freddie Mac loans relative to CMBS, and shows that the borrower behavior plays a role in the extremely low credit losses in Freddie Mac history.

Why do Freddie Mac borrowers behave differently and why are borrowers of GSE portfolio more cautious in exercising their mortgage default options when property distress occurs? We believe several factors are responsible for that result.

Before a Freddie Mac loan is sourced, it has to go through several filters starting with a carefully selected network of originators. Weaker properties and inexperienced borrowers are filtered out at initial stages. Borrowers and sellers in the Program Plus network understand Freddie Mac's credit policies and standards. Thus the properties go through a rigorous and well-defined selection process that results in a selection of relatively uniform investment relative to the broader market. The resulting conservative selection of strong properties and strong borrowers (who have the ability to withstand adverse market situations) results in greater ability to support a property and more commitment to the property — in model terms it means higher option cost which results in lower ruthlessness. Given the attractive financing from GSEs, the stronger borrowers are motivated to remain in good standing with the enterprises is an additional factor that results in lower ruthless behavior in marginal situations.

Summary

In this article, we investigate the historical evidence from CMBS and Freddie Mac multifamily loans and confirm that the pure theory of ruthless default behavior is not supported. Rather, today's commercial real estate borrowers often exercise the default option in a gradually optimal manner based on the market conditions, collateral characteristics and relationship with lenders. They tend to be more ruthless in defaulting when (1) economic conditions are weak, (2) loans have shorter term, (3) there is less time remaining to maturity, and (4) the property is in a more volatile market.

Finally, the borrower selection process impacts ruthlessness and the CMBS borrowers are more likely to behave ruthlessly than the GSE borrowers. Borrowers with market expertise can assess with more confidence the benefits of supporting an underperforming property based on potential future upside. Further, borrowers who have access to capital and overall liquidity have greater ability to support a property until the market or the property performance improves.

Consequently, for CMBS investors performing scenario analysis, using different default rates for the different categories of loans based on LTV/DCR buckets and characteristics such as the ones discussed above may be better than trying to use fixed cutoff numbers for DCR and LTV to examine each loan to determine if it will default or not.

1 Brickman, D., Guggenmos, S., and Li, J. 2011 "Mysteries Revealed — Why CMBS Multifamily Performance is So Much Worse than Agency and Life Company Experience" *CRE Finance World* Summer