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Multifamily Mortgage Lending: A Comparison of the U.S. and Canada

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We combine loan data from distinct sources to compare and contrast multifamily mortgage lending in Canada and the U.S. After a general comparison of the multifamily housing markets in the two countries, we focus on loan pricing and non-price contract terms in the two environments. We find longer loan terms in the U.S. compared to Canada and attribute this to the greater liquidity available from a more established secondary mortgage market. We also find that while nominal rates are higher in Canada, mortgage spreads are actually lower, a result likely due to contract features that raise the cost of default for borrowers and restrict prepayments". In terms of loan performance, we found greater prepayment risk in U.S. mortgages and greater default risk in Canadian mortgages, although findings regarding default are limited by small sample size.

Keywords

mortgage; multifamily; international

Introduction

The United States and Canada share a 5500-mile border and similar histories and cultures. But despite the many commonalities, there are interesting

differences in the financial markets and institutions in the two countries. In this paper, we combine data from a Canadian and an American lender to compare and contrast multifamily mortgage lending. We show how differences in lending practices arising from market factors are manifested in the loan terms, especially contract note rates and term length. In addition, we compare loan performance to determine whether prepayment or default risk differs across the two countries.

Previous research has focused on other segments of the two housing finance systems. Courchane and Giles (2002) study the differences in the lending practices in the single-family mortgage market between Canada and the U.S. Several of the differences that they find also apply to the multifamily market. For example, deficiency judgments are more prevalent in Canada than the U.S., which impacts default behavior, as reported by Holmes (2005b). Another interesting distinction between the two countries is the level of securitization. In Canada in the year 2000, fewer than 10% of single-family mortgages were securitized, as compared to over 50% in the U.S. In addition, the market structure in Canada is more concentrated, with just a small number of large lenders. Green and Wachter (forthcoming) compare single-family residential mortgages in the U.S. to a number of other countries. They note that Canadian single-family borrower lack access to long-term mortgages with fixed rates, penalty-free prepayment, and high loan-to-value ratios. We extend this line of comparative research with analysis of multifamily lending.

Our approach generally follows the methodologies employed in the literature on commercial mortgage literature. For example, prepayment has been studied by Fu et al. (2003) and default by Holmes (2005b), both of which contain citations to other relevant literature. The contribution of this paper is two-fold. First, we provide a cross-country empirical analysis, utilizing micro-level data on individual loan contracts to evaluate how contract design, pricing, and performance of multifamily mortgages differ between Canada and the U.S. Second, we provide a methodological framework for similar cross-country analyses that other researchers may wish to follow in comparative international research.

There are at least two major environmental differences between the Canadian and American multifamily mortgage market. First, as there are far fewer financial institutions in Canada, the level of competition in the lending is lower in the U.S. compared to Canada. One would expect reduced competition to provide greater market power for lenders and result in relatively more onerous contract terms for borrowers. Second, the secondary mortgage market in Canada is much less well developed than in the U.S., reducing liquidity for primary market participants. Since lenders

have fewer options for disposition of loans once extended, we would expect them to impose relatively more onerous terms on borrowers. Indeed, we observe that Canadian multifamily mortgages contain strong prepayment penalties as well as recourse provisions in the event of default. Our empirical analysis uses a combined U.S.-Canada database to see how these differences are manifested in the term length, contract rate, prepayment, and default behavior.

To preview our main results, we find that term lengths are significantly shorter in Canada, probably due to the limited availability of securitization. While contract rates on the Canadian multifamily mortgages are higher, the spread over government bond yields is lower for the Canadian loans. Canadian bond yields are generally higher than the corresponding American yields, which accounts for the higher level. The lower spread for Canadian loans may be related to the presence of a guarantee and/or reduced risk of prepayment. In addition, prepayment appears to occur more frequently in the U.S., a pattern consistent with stronger prepayment penalties in Canada. Results also provide some weak evidence that Canadian loans default more frequently, but this is based on a very small number of defaulting loans.

In the next section of this paper, we provide a general overview of multifamily housing in the United States and Canada. After this, we will describe our two-country database and the results of our empirical analyses. The final section offers conclusions and future research directions.

Multifamily Housing in the United States and Canada

While the United States is primarily a nation of homeowners, rental housing and multifamily properties has, and continues to be, an important element in the overall housing stock. Approximately 31% of U.S. households rent, accounting for about 35 million households (National Multi Housing Council, 2005). Within the renter group, about two thirds reside in multifamily properties, including two-four unit structures and five dwelling unit and larger apartment buildings. The balance rent single family and mobile homes. Renting is relatively more common in large cities compared to smaller cities, e.g. almost 70% of New York City households rent and more than 50% rent in Los Angeles, Chicago, Houston, San Diego, and Dallas.

The U.S. housing stock contains about 20.5 million rental units located within 2.75 million multifamily properties, including both 2-4 unit structures and the larger 5+ unit apartment buildings. Rosen (2001) estimated the total value of the multifamily housing stock at $1.3 trillion, up from $767 billion

as of 1990. As of 2003, the median monthly rent was $609 and the capitalization rate for multifamily properties was 7.35%, producing average values of $112 per square foot.

The financing of multifamily properties in the U.S. has changed very significantly over the past decade. As of the early 1990s, only about $10 billion in commercial mortgage debt was securitized; as of 2005, the total CMBS market exceeds $400 billion (www.cmbs.org). $525 billion (24%) out of the $2.2 trillion in U.S. commercial and multifamily loans outstanding are held as securities. Other players holding significant amounts of commercial mortgage debt outstanding include banks (43%), life companies (11%), thrifts (8%), and GSEs (6%). In the multifamily sectors growth has occurred as result of GSE involvement, as well. Cardwell (2001) reports that the GSEs almost doubled their percentage holding of multifamily debt from approximately 10% to 18% over the period 1990-2001. Another capital markets development has been the growth of real estate investment trusts. Approximately 30 publicly traded REITs are apartment specialists, owning and managing between 10,000 and 250,000 apartment units each ((National Multi Housing Council, 2005).

Turning to Canada, about 34% of households are renters, compared to 31% in the U.S. The Canadian population is about 30 million, approximately the same as the state of California, comprised of 11.5 million households. [2001 Census of Canada]. Of the 11.5 million occupied dwellings, 57% are single-family detached homes, 9% are apartments in buildings with 5 or more storeys and 18% are apartments in buildings with less than 5 storeys. The remaining 16% are semi-detached houses, row houses, duplexes, and movable dwellings.

There are about 4 million renter households in Canada. As in the U.S., rental rates are higher in urban areas. Montreal, Canada's second largest city with a population of 3.5 million, has a 50% rental rate, the highest in the country. Toronto, with 4.9 million people, has a rental rate of 37%, which is much closer to the national average of 34%.

Across all major metropolitan areas, the rental stock was structured as follows [Canada Mortgage and Housing Corporation, 2004, Table 26].

Number of units in the building	Percent of structures (%)
<6	46
6-19	40
20-49	9
50-199	5
>199	1

The rental stock breakdown varies by metropolitan area. For example, Montreal has proportionally more <6 unit buildings, and Toronto has proportionally more larger buildings (50-199 units and >199 units).

Colliers International provides average apartment rents (one-bedroom) for major metropolitan areas in 2004. Rents are highest in Toronto, at about $900 per month. Montreal has much lower rent levels, averaging about $575. The major cities of Ottawa and Vancouver are in the $775 range, with Calgary at about $650. (All values in Canadian dollars).

Vacancy rates in 2004 averaged about 2.7% nationwide; Montreal's rate was below average at 1.5% and Toronto's rate was above average at 4.4%. This compares to a rate of about 6.7% in the U.S. [NAREIT 2005]. The average capitalization rates for Canadian class A apartment buildings was approximately 7.5% in 2004, although rates were as low as 7% in Montreal and Vancouver.

The largest landlord in Canada is Boardwalk REIT, a multi-family residential specialty REIT with 33,000 units. Of the 26 REITs in Canada in mid-2005, four, including Boardwalk, specialized in multi-family, and several others are diversified. CAPREIT (named with an abbreviation of Canada APartment) is the other major apartment REIT, holding 23,000 units.

As is widely known, the Canadian banking system differs from the American one in that there are a small number of large institutions. Another difference between the Canadian and American residential mortgage market is the extent of securitization. About 11% of residential mortgage loans are securitized through the Canada Mortgage and Housing Corporation (known as CMHC or Cannie Mae). CMHC is a Crown corporation, meaning that it is wholly owned by the Canadian federal government. Banks also participate in lending on multifamily structures. Of the $27 billion in multifamily mortgages outstanding in 2003, $20 billion was held by the chartered banks, $1 billion by trust companies and $6 billion by life insurance companies and other lending institutions [CMHC 2003].

The issuance of commercial mortgage-backed securities in Canada began in 1998 and has grown to a modest $760 million in multifamily loans securitized. Multifamily loans represent only about 8% of all CMBS; the market is dominated by retail (37%) and office properties (30%). According to CMBS World (2004), most securitized multi-family loans in Canada are class B and C properties, since life insurers maintain the prime mortgages in their own portfolio. Smaller apartment properties can obtain mortgage default insurance through CMHC, which is a credit enhancement benefit. Some insurance companies offer units of Pooled Mortgage Funds for sale,

although none specialize entirely in multi-family buildings.

Multifamily apartment lending in Canada is frequently done with recourse. This means that that some entity, usually the borrower, provides a guarantee. In the event of default and foreclosure sale, the lender can pursue any deficiency by suing the guarantor. For the insurance company that provided the data used in this paper, 90% of their multi-family loans had recourse in the form of a personal or corporate guarantee. CMBS World calls the Canadian commercial mortgage market "lender-friendly" and cites a "high number of loans with recourse to the borrower/guarantor".

Data

In order to compare and contrast the term to maturity, pricing and performance of multifamily mortgages in the U.S. and Canada, we merged loan data from two sources. The loans were originated between 1991 and 1996, and the loans were tracked until 2001 to determine if a termination through prepayment or default occurred.

A major Canadian commercial mortgage lender provided the Canadian data. Given the lack of aggregate Canadian multi-family mortgage data, we are unable to assess the degree to which this dataset is representative of the larger market. The Canadian lender has a diversified portfolio that includes loans of all major property types (office, retail, multi-family, etc.), although this study examines only the multi-family apartment building loans. Each of these loans is secured by commercial property in Canada. All the loans by this lender are fixed-rate mortgages with a fixed term that usually ranges between 1 year and 30 years, with the most common terms being 5 years, 10 years, and 20 years. Most loans have a term shorter than the amortization period, so a balloon payment is due at maturity. Approximately 95% of the loans are amortizing with monthly payments of principal and interest, with the remainder making interest-only payments either monthly or annually. The U.S. data was supplied by Citicorp Mortgage, which services multi-family loans on behalf of various Citibank entities located in the U.S. (see Fu et al. (2003) for a more complete description of this data).

The combined database consists of 1,978 observations, of which 113, or 6%, are Canadian. Since we have so many more U.S. data points, our strategy is to draw samples from that group to create paired samples that are relatively similar in terms of loan size, for example, across the two countries (more on this later). Table 1 provides descriptive statistics for the entire sample. The loan-to-value ratio is measured at the time that the loan is originated, and is equal to the mortgage loan amount divided by the property value. The mean

value was 70.1% for the American loans and 71.9% for the Canadian loans. A simple *t*-test statistic reveals that there is no significant difference at the 5% level.

Table 1: Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	*t*-test vs.Canada
Loan-to-value ratio						
United States	1849	70.111	13.907	0.500	121.485	(1.529)
Canada	113	71.896	11.930	9.000	86.100	
Loan amount ($ millions in respective currency)						
United States	1865	0.6275	0.9444	0.0171	13.6500	(6.358)
Canada	113	2.2939	2.7766	0.1050	17.2500	
Contract interest rate						
United States	1865	8.729	0.852	6.500	11.625	(2.470)
Canada	113	9.047	1.353	5.750	13.000	
Term to maturity (months)						
United States	1595	85.01	33.80	6.00	298.00	7.623
Canada	113	59.35	34.63	12.00	180.00	

Note: *N* is the number of observations.

We do note a significant difference in the loan amounts across the two lenders. The mean loan amount, measured at the origination date, was $627,465 for the U.S. loans (measured in U.S. dollars) and $2,293,890 for the Canadian loans (measured in Canadian dollars), which is the equivalent of approximately $1.7 million in US dollars. This difference may be due to a difference in lender type and target market, rather than a real cross-country difference, however.

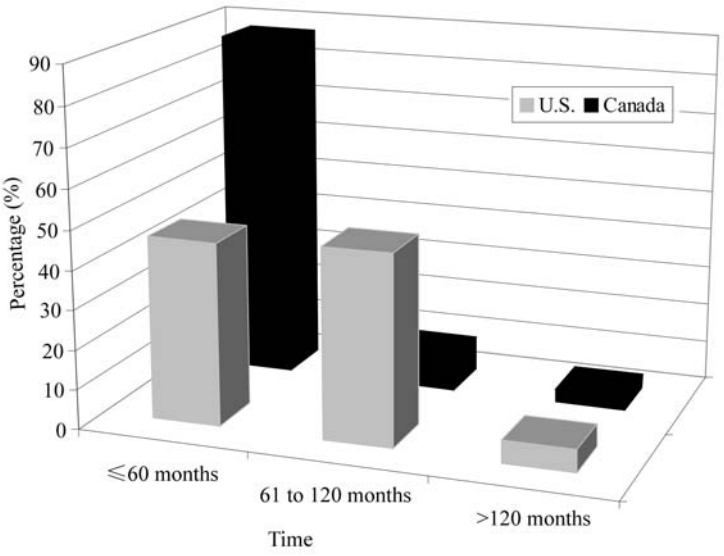
All loans are fixed rate with an average note rate of 8.27% for the U.S. loans and 9.05% for the Canadian loans. Contract rates are determined based on the risk assessment of the loan by the lender, and by the level of interest rates, as measured by government bond yields, in the respective countries.

The term to maturity is the length of the mortgage contract, with a fixed note rate over this timeframe. Most of the loans have an amortization period longer than the term, so a balloon payment is due at maturity. The average time to maturity for the American loans is 85 months, or 7.1 years. The Canadian loans are significantly shorter (based on a *t*-test at 5% significance level) at only 59 months, or 4.9 years. The longest Canadian loan term is 15 years, as compared to almost 25 for the American loans. Figure 1 provides an illustration of the breakdown of term lengths. The Canadian loan terms

are predominantly 5 years or less, while the U.S. loans have proportionally more medium length and long-term loans.

In the next section of this paper, we present statistical analyses of these pricing and term length differences. In addition, we examine loan performance and the factors affecting it to determine whether there is a cross-country difference after controlling for observable risk factors.

Figure 1: Number of loans by term lengths—United States and Canada



Empirical Results

Statistical analysis was performed using the U.S.-Canada database in order to explore differences in four categories: loan term, loan pricing, prepayments, and defaults.

In Table 1, a *t*-statistic revealed a significant difference in term lengths between the Canadian and American loans, further illustrated in Figure 1. Findings from the corporate finance literature suggest that the term length of bank loans is related to the firm size (Dennis and Sharpe, 2005). Although borrower assets are not available in our database, we will use the size of the loan as an imperfect proxy for borrower size. According to Ortiz-Molina and Penas (2004), small businesses with better financial positions tend to obtain bank loans with longer-term lengths. In our study, the financial

position of the borrowers is not available, so we will proxy with the loan-to-value ratio, since that measures the equity position by the borrower. An ordinary least squares regression is performed to determine whether the difference in term length across countries persists when appropriate control variables are included. The dependent variable is the term length, and the key variable of interest is an indicator variable set to 1 for the loan in Canadian. The results are displayed in Table 2 for four different sets of loan data. The "Entire sample" includes all Canadian and American loans. The "Large loan sample" contains those loans with an amount more than or equal to $1 million at initiation. We create loan size-based samples to account for the fact that the average loan size is larger for the Canadian mortgages. The loan amount is also included as an independent variable in the regressions. The "Small loan sample" includes all loans with an amount less than or equal to $2 million at initiation. These breakpoints of $1 million and $2 million were chosen to ensure that the loan count for Canadian loans was at least 70 in each sample. The fourth and final sample is called the "Matching loan sample", and contains all Canadian loans and a set of American loans selected to match the Canadian loans by loan amount.

Across all samples, the term length estimation results in negative coefficients on the loan-to-value ratio, suggesting that larger equity contributions by a borrower are related to longer loan terms. This finding may also be related to the idea that lenders offer short terms on loans that they want to closely monitor. The coefficient for the loan amount is consistently positive, as expected. Indicator variables for the year of origination are included, with 1991 being the excluded outcome. The main variable of interest, the Canadian indicator, is negative and significant at the 1% level across all samples. Therefore, when available control variables are included, we still conclude that Canadian loans have a significantly shorter term than American ones.

Term lengths are also determined by the availability of funds for the lender, which we are not able to measure. A lender who retains mortgages in portfolio will attempt to match maturities, so the term of the inflow of funds may be relevant in determining the term of the mortgages in the portfolio. If a lender has access to securitization, then originated loans are liquid assets and liability structure will be less relevant. The less developed secondary market in Canada, as measured by the lower rate of securitization, may therefore be an explanation for the term length difference identified.

Table 2: Regression results - Term length

	Entire sample		Large loan sample		Small loan sample		Matching loan sample	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Loan-to-value	–0.3032***	0.0609	–0.2426	0.1669	-0.2965***	0.0614	-0.0757	0.1903
Amount	3.1503***	0.7218	0.8926	1.0172	8.1501***	2.1390	2.0763**	0.9353
Canada	–35.5108***	3.4299	–34.1804***	5.1502	–37.8131***	4.0332	–39.4179***	5.0949
1992	–6.9547**	2.7304	–15.8685***	6.0767	–5.7024**	2.8518	–7.7699	6.5768
1993	–5.6637**	2.7583	–21.7694***	6.1450	–4.2088	2.8703	–13.4891*	7.1984
1994	–12.4452***	2.9540	–28.9667***	7.3705	–10.8489***	3.0664	–21.4303**	8.8249
1995	–21.7295***	2.8605	–38.7058***	6.8851	–20.6271***	2.9350	–27.9908***	9.3279
1996	–21.3638***	2.7553	–45.8735***	7.5748	–19.2557***	2.8420	–28.7746***	8.5259
Constant	116.5247***	4.8021	132.2829***	11.9981	112.4453***	5.0431	109.6401***	14.5087
N	1700		292		1586		201	
Adjust R^2	11.5%		25.8%		10.8%		26.4%	

The dependent variable is the term to maturity of the loan. The estimation methodology is ordinary least squares regression. Coefficients and standard errors are shown. The significance levels of 1%, 5%, 10% are denoted by ***, **, *.
The "entire sample" includes all Canadian and American loans. The "large loan sample" contains those loans with an amount more than or equal to $1 million at initiation. The "small loan sample" includes all loans with an amount less than or equal to $2 million at initiation. The "matching loan sample" contains all Canadian loans and a set of American loans selected to match the Canadian loans by loan amount.

An additional unmeasured variable that may be related to term length is the preferences of the borrower, which may, in turn, be related to the shape of the yield curve. The path of interest rates and the yield curves are shown in Figures 2 and 3. Figure 2 shows the path of the yield of 5-year government bonds during the study period in Canada and the U.S. During this timeframe, the correlation was 0.849. Through much of the study period, Government of Canada bonds had a higher yield than the American bonds, although the magnitude of the difference varied. In mid-1996, the difference became negative as Canadian rates dropped below American levels. Figure 3 shows yield curves with points at the 1-year, 5-year, 10-year, and long-term bond yield levels for Canada and the U.S. Six dates are shown, for the month of January in each of the study years. Variation is seen in the level of the rates, the slope of the curves, the difference between the Canadian and American rate levels, and the difference in the Canadian and American slopes.

Figure 2: Five-year government bond yields—United States and Canada

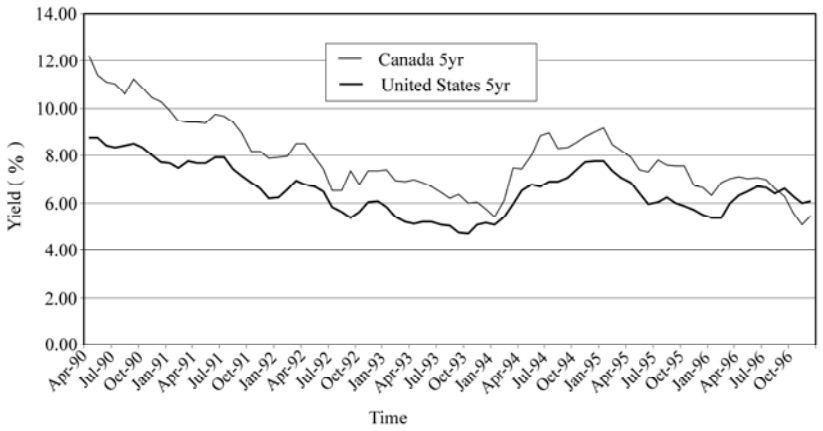
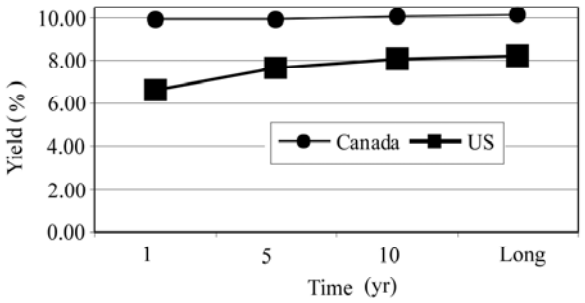
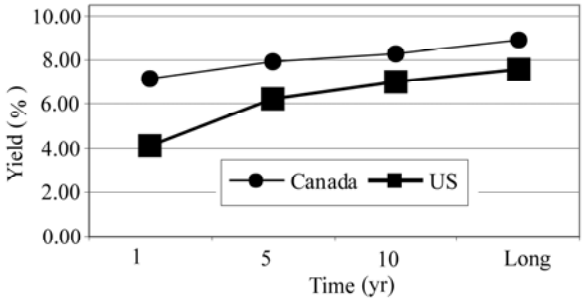


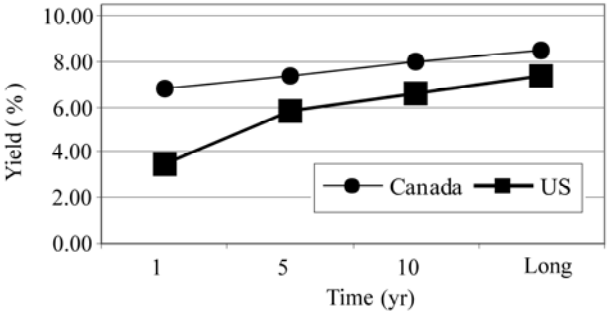
Figure 3: Yield curves of Canada and United States



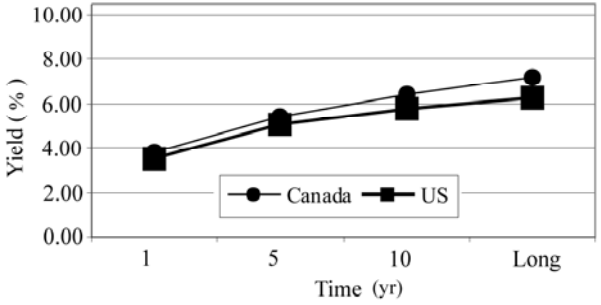
(a) January 1991



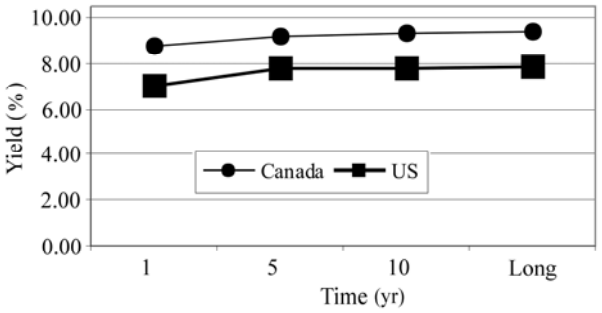
(b) January 1992



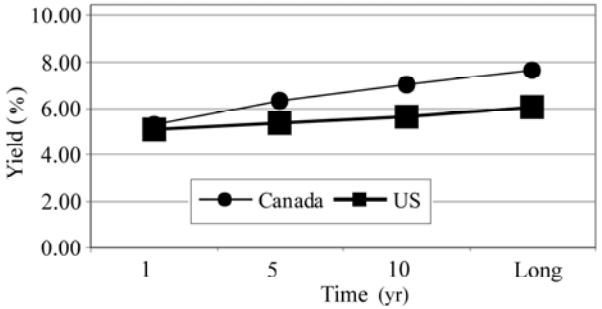
(c) January 1993



(d) January 1994



(e) January 1995



(f) January 1997

In order to take into account the different government bond yields, our contract interest rate analysis will include both the rate level and the spread of the contract rate over the matching bond yield (a quantity often referred to as the credit spread). The matching bond yield is the respective country's bond yield at the date of loan origination for the matching term length. We matched Canadian loans to Canadian bond yields and American loans to U.S. bond yields. Interpolation was used for non-standard term lengths, so for example, the matching bond yield for a loan with a 3-year term was the arithmetic average of the 1-year and 5-year bond yields.

Table 3 shows that although the level of interest rates was higher in Canada, this actually represents a smaller spread over comparable maturity government bonds. Since term lengths are shorter in Canada on average, the rate level and spread for 5-year mortgages is also shown in Table 3. There were 626 American and 66 Canadian loans with a term length equal to exactly 60 months, and the same pattern of higher levels but lower spreads for Canadian loans persists.

Table 3: Statistics - Interest rates

	N	Mean	Std. Dev.	Min	Max	*t*-test
Contract interest rate (includes all loans)						
United States	1,865	8.729	0.852	6.500	11.625	(2.470)
Canada	113	9.047	1.353	5.750	13.000	
Spread over matching government bond (includes all loans)						
United States	1,865	2.230	0.689	–0.528	5.275	4.423
Canada	113	1.535	1.662	–3.610	4.620	
Contract interest rate (includes only loans with a 5-year term)						
United States	625	8.524	0.669	7.250	11.000	(3.419)
Canada	66	9.066	1.270	5.750	13.000	
Spread over matching government bond (includes only loans with a 5-year term)						
United States	625	2.301	0.650	0.520	3.910	4.310
Canada	66	1.362	1.759	–3.610	4.510	

In Table 4, we present regression results to determine whether this relationship also exists after appropriate control variables are added. As in Holmes (2005a) and Ambrose et al. (2004), the contract rate is modeled as a function of risk variables and the term length. In our U.S.-Canada database, the loan-to-value ratio is the primary risk factor. The term length is also included since rates vary by maturity, and the loan amount is included as a control. We use the same four sample sets as in the previous regressions.

In the top panel of Table 4, the dependent variable is the contract interest rate level, and the variable of interest is the Canada indicator variable, which is set to 1 for Canadian loans. Across samples, the term to maturity is highly significant in the expected direction, with longer terms associated with higher contract rates, consistent with the usual term structure pattern. Indicator variables for the year of loan origination are highly significant, with 1991 as the excluded year. Neither the loan-to-value ratio nor the loan amount is significant at the 5% level, but the Canadian indicator is positive and significant at the 5% level. This is consistent with the simple descriptive statistics that show a higher mean contract note rate for Canadian loans.

In the lower panel of Table 4, the right hand side of the regression remains the same, but the dependent variable is now the spread over comparable maturity bond yields, not the rate level. Across all samples, our variable of interest, the Canadian indicator, is negative and significant. Therefore, Canadian loans have lower spreads, as seen in the descriptive statistics. The key finding of these analyses are that while Canadian mortgages have higher contract rates, credit spreads are actually lower.

Table 4: Estimation results - Rate and spread

Rate	Entire sample		Large loan sample		Small loan sample		Matching loan sample	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Loan-to-value	–0.0006	0.0013	–0.0009	0.0036	–0.0008	0.0013	0.0049	0.0060
Amount	–0.0078	0.0149	–0.0265	0.0221	–0.0228	0.0436	0.0002	0.0298
Term	0.0060***	0.0005	0.0101***	0.0013	0.0054***	0.0005	0.0143***	0.0023
Canada	0.1878**	0.0727	0.4768***	0.1203	0.1647**	0.0840	0.3721**	0.1837
1992	–0.6637***	0.0563	-0.6589***	0.1337	–0.7040***	0.0579	0.0469	0.2077
1993	–1.6359***	0.0568	–1.7309***	0.1365	–1.6528***	0.0582	–0.8868***	0.2286
1994	–1.4588***	0.0611	–1.5279***	0.1645	–1.4818***	0.0624	–0.8219***	0.2820
1995	–1.2820***	0.0598	–1.2753***	0.1578	–1.3168***	0.0604	–0.5662*	0.3004
1996	–1.5700***	0.0577	–1.8079***	0.1750	–1.5966***	0.0585	–0.9368***	0.2762
Constant	9.3927***	0.1147	9.0928***	0.3118	9.4866***	0.1173	7.7581***	0.5201
N	1700		292		1586		201	
Adjusted R^2	48.0%		60.4%		48.0%		30.6%	

Spread	Entire sample		Large loan sample		Small loan sample		Matching loan sample	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Loan-to-value	0.0002	0.0014	0.0008	0.0039	–0.0002	0.0014	0.0053	0.0071
Amount	–0.0130	0.0161	–0.0435*	0.0240	0.0037	0.0469	–0.0053	0.0351
Term	–0.0021***	0.0005	0.0022	0.0014	–0.0027***	0.0005	0.0049*	0.0027
Canada	–0.9620***	0.0785	–0.6098***	0.1302	–0.9761***	0.0904	–0.7839***	0.2162
1992	0.3331***	0.0607	0.4332***	0.1446	0.2889***	0.0623	1.1831***	0.2445
1993	0.5034***	0.0613	0.5014***	0.1477	0.4794***	0.0627	1.3997***	0.2691
1994	–0.6361***	0.0659	–0.6321***	0.1780	–0.6603***	0.0672	0.2272	0.3319
1995	–0.0513	0.0645	0.0595	0.1707	–0.1001	0.0650	0.6657*	0.3536
1996	–0.2116***	0.0622	0.0062	0.1893	–0.2616***	0.0629	1.0020***	0.3251
Constant	2.4514***	0.1237	1.9976***	0.3374	2.5603***	0.1262	0.8034	0.6123
N	1700		292		1586		201	
Adjusted R^2	23.7%		18.7%		23.6%		19.6%	

The dependent variable is the interest rate of the loan in the top panel, and the spread over respective country's government bond yield in the bottom panel. The estimation methodology is ordinary least squares regression. Coefficients and standard errors are shown. The significance levels of 1%, 5%, 10% are denoted by ***, **, *.

The "entire sample" includes all Canadian and American loans. The "large loan sample" contains those loans with an amount more than or equal to $1 million at initiation. The "small loan sample" includes all loans with an amount less than or equal to $2 million at initiation. The "matching loan sample" contains all Canadian loans and a set of American loans selected to match the Canadian loans by loan amount. The variable named Canada is an indicator variable set to the value 1 if the loan is Canadian. The variable named 1992 is an indicator variable set to the value 1 if the year is 1992. Variables 1993, 1994, 1995 and 1996 are similar.

There are several plausible explanations for the lower Canadian spreads. Guarantees are customary for the Canadian loans, which would be expected to reduce the likelihood of default and/or the losses associated with default. In addition, all the Canadian loans have a yield maintenance penalty restricting prepayments, which should lower prepayment risk. Indeed, the lender's standard contract prohibits early repayment. However, the company policy is to accept early repayment when it is accompanied with a penalty large enough so that the lender can maintain the contract yield by substituting Canadian government bonds. This is identical to yield maintenance penalties observed in the U.S. except that the discount rate is the Canadian government bond yield. This penalty structure is sufficiently severe so that all economic incentive to refinance is eliminated.

Notwithstanding these contract terms, some prepayments are observed for the Canadian loans. In fact, 16 of the 113 loans prepaid, or 14%. In contrast, 1,019 of the 1,865 American loans prepaid, equal to 55%. Table 5 presents statistics related to prepayment. As analyzed at length by Fu et al. (2003), the American mortgages have a variety of prepayment penalties that may be classified into three categories: no penalty, moderate penalty, and large penalty. There were just 7 American loans with no prepayment penalty, and 100% of these loans prepaid. Most loans (89%) had a moderate penalty, and 56% of these loans prepaid. The remaining 11% of loans had a large penalty, and only 44% of these prepaid.

Table 5: Statistics - Prepayment and default

Number of loans that prepaid	Total number of loans	Number that prepaid	Percentage (%)that prepaid
United States	1865	1019	54.6
Canada	113	16	14.2
Penalties in the United States	No penalty	Moderate penalty	Large penalty
Number of loans	7	1658	200
% of loans	0.4	88.9	10.7
Number of these loans that prepaid	7	924	88
% of these loans that prepaid	100.0	55.7	44.0

Note: All Canadian loans have a large penalty.

Term and prepayment	Average term (all loans)	Average term of loans that prepaid	
United States	85.01	77.51	
Canada	59.35	48.75	
Number of loans that defaulted (90 days in arrears)	Total number of loans	Number that defaulted	Percentage that defaulted (%)
United States	1865	46	2.5
Canada	113	9	8.0

We analyzed prepayments using logistic regression, generally following specifications in Fu et al. (2003) and continuing with our four sample sets. The Large Penalty indicator variable is set to 1 if the loan has a large prepayment penalty. None of the Canadian loans have this sort of penalty. Our results for this large penalty variable, and for rate, loan-to-value ratio, amount and term are consistent with findings in the empirical prepayment literature. Our variable of interest is the Canadian indicator, which is largely negative and highly significant across all samples. This result is consistent with the simple descriptive statistics that show lower rates of prepayment for Canadian mortgages. The key finding from the prepayment analysis is that Canadian loans tend to prepay less frequently than American ones.

Our final comparison is on default. We define default as 90-days delinquent, as in Holmes (2005b) and selected references therein. Of the U.S. loans, 46 defaulted, representing 2.5%, while 9 of 113 Canadian loans defaulted, equal to 8.0%. Our default analysis is performed using the "Entire sample", "Large loan sample", and "Small loan sample". By chance, the "Matching loan sample", which includes all Canadian loans and the same number of American loans, selected to match the Canadian loans by loan amount, did not have any defaulting American loans. Therefore, we could not use this sample in our analysis shown in Table 6. Instead, we create a new sample, called the default sample, which includes all Canadian loans, all American loans that defaulted, and some non-defaulting American loans, matched for size.

The mortgage default model includes controls of rate, loan-to-value ratio, loan amount, and term. Despite our small sample size, a logit model (Table 6, bottom panel) shows a positive coefficient for the Canadian indicator variable across samples. However, the coefficient is not significantly positive when the small loan sample is used. Given the limitations of the sample, these results provide weak evidence of higher default probability for Canadian loans. It is certainly possible that the large prepayment penalties for Canadian loans impact the default rates, as borrowers consider their termination options, i.e. given limited prepayment options, default becomes a relatively more attractive choice.

Table 6: Regression results - Prepayment and default

Prepay-ment	Entire sample		Large loan sample		Small loan sample		Matching loan sample	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Rate	0.2665***	0.0667	0.6849***	0.2079	0.2622***	0.0688	0.3284*	0.1928
Loan-to-value	0.0019	0.0041	0.0003	0.0123	0.0012	0.0042	0.0273*	0.0164
Amount	0.1293**	0.0537	0.0493	0.0774	0.4675***	0.1601	0.0310	0.0743
Term	−0.0175***	0.0018	−0.0275***	0.0057	−0.0178***	0.0019	−0.0151**	0.0064
Canada	−2.2678***	0.3631	−2.4374***	0.5654	−2.0248***	0.4251	−2.5838***	0.6520
Large penalty	−0.7319***	0.2467	−2.0003***	0.5235	−0.8934***	0.2854	−0.4721	0.6281
Constant	−0.7263	0.6267	−2.4701	1.8184	-0.7557	0.6514	−2.9833	1.8974
N	1700		292		1586		201	
Pseudo-R^2	9.0%		27.4%		7.9%		22.1%	

Default	Entire sample		Large loan sample		Small loan sample		Default sample	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Rate	0.1452	0.1682	0.0254	0.3604	0.2449	0.1841	−0.0964	0.1827
Loan-to-value	0.0148	0.0138	0.0427	0.0482	0.0117	0.0140	0.0029	0.0194
Amount	−0.0458	0.1267	0.0114	0.1335	−0.9094*	0.5518	−0.6594***	0.1666
Term	−0.0108*	0.0058	−0.0267	0.0175	−0.0075	0.0059	−0.0111*	0.0059
Canada	1.0621**	0.4647	2.4805**	1.2482	0.9376	0.6112	−2.7800***	0.5104
Constant	−5.2116***	1.7458	−6.6326	4.5741	−5.7768***	1.9031	2.4217	2.1834
N	1700		292		1586		197	
Pseudo-R^2	3.7%		27.5%		2.6%		33.2%	

The dependent variable is the incidence of prepayment in the top panel, and the incidence of default in the bottom panel. The estimation methodology is logit. Coefficients and standard errors are shown. The significance levels of 1%, 5%, and 10% are denoted by ***, **, *, respectively.

The "entire sample" includes all Canadian and American loans. The "large loan sample" contains those loans with an amount more than or equal to $1 million at initiation. The "small loan sample" includes all loans with an amount less than or equal to $2 million at initiation. The "matching loan sample" contains all Canadian loans and a set of American loans selected to match the Canadian loans by loan amount. The "default sample" includes all Canadian loans, all American loans that defaulted, and non-defaulting American loans matched for size.

Conclusions

We have compared and contrasted multifamily housing finance in the U.S. and Canada and presented an empirical analysis by combining data from two portfolio lenders. We found that loan terms are longer in the U.S. compared to Canada and attribute this pattern to the more established secondary market in the U.S. which enhances the liquidity of mortgage assets. While nominal rates appear higher in Canada, mortgage spreads are actually lower, due to contract features that raise the cost of default for borrowers and restrict prepayments. Presumably Canadian lenders are able to impose these relatively more onerous contract terms due to greater market power and reduced competition. In terms of loan performance, we found greater prepayment risk in U.S. mortgages and greater default risk in Canadian mortgages, although findings regarding default are limited by small sample size.

Cross-country comparative economic analysis of the type we have presented here may be helpful in assessing the costs and benefits of various institutional arrangements for providing credit to the important multifamily housing sector where, in the U.S. and Canada, roughly one-third of all households reside. We hope to expand our research to include other countries in the future. Moreover, we believe our approach may be helpful to other researchers involved in international comparative economic research on housing finance systems.

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References

Ambrose, Brent, Michael LaCour-Little, and Anthony B. Sanders (2004). The effect of conforming loan status on mortgage yield spreads: A loan level analysis. *Real Estate Economics*, **32**, 4, 541-569.

Courchane, Marsha J. and Judith A. Giles (2002). A comparison of U.S. and Canadian residential mortgage markets, University of Victoria Working Paper EWP0201.

Dennis, Steven A. and Ian G. Sharpe (2005). Firm size dependence and the

determinants of bank term loan maturity. *Journal of Business Finance and Accounting*, **32**, 1, 31-64.

Fu, Qiang, Michael LaCour-Little, and Kerry Vandell (2003). Commercial mortgage prepayments under heterogeneous prepayment penalties. *Journal of Real Estate Research*, **25**, 3, 246-275.

Green, Richard K. and Susan M. Wachter, (2005). The American mortgage in historical and international context. *Journal of Economics Perspectives*, forthcoming.

Holmes, Cynthia (2005a). Commercial mortgage guarantees. Presented at the Annual Meeting of the American Real Estate and Urban Economics Association, Philadelphia, January 8, 2005.

Holmes, Cynthia (2005b). The Outcome of Commercial Mortgage Delinquency: Foreclosure or Reinstatement, unpublished doctoral dissertation, University of British Columbia.

Maddala, G.S. (1983). *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge University Press, Cambridge U.K.

Ortiz-Molina, H and M.F. Penas (2004). Lending to small business: The role of loan maturity in addressing information problems, Tilburg University Center for Economic Research, Discussion Paper 99.

Strahan, Philip (1999). Borrower risk and the price and nonprice terms of bank loans, Federal Reserve Bank of New York Staff Reports number 90.

Zietz, Emily (2003). Multifamily housing: A review of theory and evidence. *Journal of Real Estate Research*, **25**, 2, 185.