

Competition in the Canadian Mortgage Market

Jason Allen, *Financial Stability Department**

- *The Canadian mortgage market has changed substantially in the past 20 years: trust companies have been taken over by banks; small virtual banks have offered new mortgage products; and brokers now play an important role in matching borrowers and lenders.*
- *The changing structure and practices of the Canadian mortgage market have implications for competition authorities and for financial system regulation.*
- *Recent research suggests that the rate paid for a mortgage depends on the borrower's observable characteristics, as well as their local market. Unobserved bargaining ability also appears to play an important role.*
- *Mortgage-rate discounting affects the speed and degree of pass-through from changes in the central bank's key policy rate to mortgage rates. Research also suggests that bank mergers do not necessarily lead to mortgage-rate increases.*

At the end of 2010, the Canadian mortgage market had grown to more than \$1 trillion, representing almost 40 per cent of total outstanding private sector credit. The market is dominated by Canada's six major banks, although this has not always been the case. Their most recent increase in market share coincides with changes to the Bank Act in 1992, which allowed chartered banks to enter the trust business. They did this largely through acquisition.¹ Recent research at the Bank of Canada has analyzed the Canadian mortgage market in this context. The purpose of the research is to understand how the interaction of market structure, product differentiation, and information frictions determines rates in the Canadian mortgage market. This article summarizes the main findings.

Understanding how rates are determined in the Canadian mortgage market is important for the central bank, competition authorities, and financial regulation. For example, the gap between posted rates and transaction rates should be taken into account when addressing some questions about the monetary policy transmission mechanism. Do financial institutions fully pass through changes in monetary policy rates to mortgage rates, and do they move equally fast from above and below equilibrium? Using posted rates, Allen and McVanel (2009) find that the answer to the first question is no and to the second, yes. But using transaction rates, they find that the answer to the first question is yes and to the second, no.

The changing market structure of the mortgage industry has implications for competition, but the analysis is complicated because banks are vertically and horizontally differentiated. For example, the location of branches determines the cost of shopping for mortgages (horizontal differentiation), while the quality of complementary services affects the value of

* I have benefited from discussions with and comments from Ian Christensen, Robert Clark, Toni Gravelle, Darcey McVanel, Larry Schembri, and Mark Zelmer.

¹ See Freedman (1998) for a discussion of the evolution of deregulation in Canada.

signing with a particular bank (vertical differentiation). If consumers differ in their preferences for these services, then changes in market structure can have welfare effects that are more complex than those typically assumed in merger analysis.

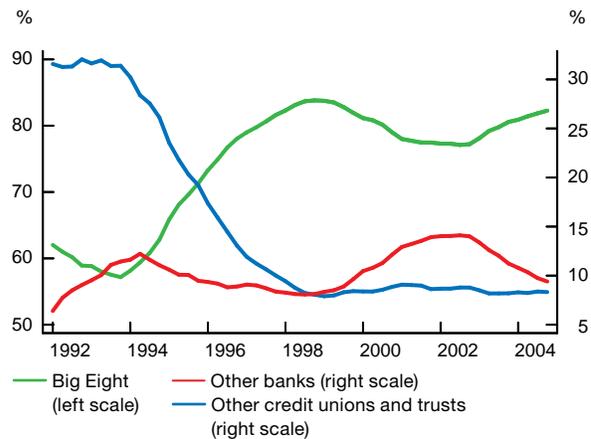
Financial regulators should also take a keen interest in understanding how lenders price mortgages, especially if mortgage-related instruments are to be included under the umbrella of “system-wide prudential regulation.” For example, the effectiveness of changing the rules governing mortgage lending depends on how lenders and borrowers negotiate rates. The research summarized here shows that borrowers do not simply take the posted rate as given.

This article first provides a brief examination of the Canadian mortgage market, focusing on the evolution of the market following legislative changes to the Bank Act in 1992. This is followed by an overview of the data, which is noteworthy in its own right because it is very detailed. Key research by the Bank of Canada on the Canadian mortgage market is then reviewed.

The Canadian Mortgage Market

Canada’s mortgage market is dominated by the “Big Six” Canadian banks: Bank of Montreal, Bank of Nova Scotia, Banque Nationale, Canadian Imperial Bank of Commerce, Royal Bank Financial Group, and TD Bank Financial Group. Together with a large regional co-operative network—the Desjardins Movement—and a provincially owned deposit-taking institution—Alberta’s ATB Financial—this group controls 90 per cent of the assets in the banking industry. Collectively, these institutions are called the “Big Eight.” **Chart 1** presents their market share of outstanding mortgages, which grew from 60 per cent to 80 per cent between 1992 and 2004 (the period for which we have detailed data and conduct the majority of our analysis) as banks entered the trust business. They all offer the same types of mortgage products, as well as other products, such as credit cards, personal loans, and wealth-management advice. In fact, most Canadians treat their primary financial institution as a “one-stop shop” (universal bank) where they purchase the majority of their financial services. This article argues that this is one reason why Canadian banks compete so fiercely in the mortgage market: a lender has many opportunities for cross-product selling once a client is locked in with a mortgage.² In addition to the large

Chart 1: Market share of Canada’s major mortgage lenders



Sources: CMHC and Genworth Financial

lenders, small foreign banks, including virtual banks, entered the Canadian market in the 1990s, offering new products to Canadians.

The Canadian mortgage market is relatively simple and conservative, particularly when compared with its U.S. counterpart.

Mortgage products

The Canadian mortgage market is relatively simple and conservative, particularly when compared with its U.S. counterpart (Kiff 2009). Many Canadians sign five-year, fixed-rate mortgages that are rolled over with new five-year, fixed-rate contracts for the life of the mortgage—typically 25 years (the amortization period).³ The rate is renegotiated every five years. The popularity of variable-rate mortgages has waxed and waned over time. In this case, the monthly payment is typically fixed, but the portion that is interest and not principal changes with fluctuations in interest rates. Longer-term mortgages, which are the norm in the United States, were phased out of Canada in the late 1960s after lenders experienced difficulties with volatile interest rates and maturity mismatch.

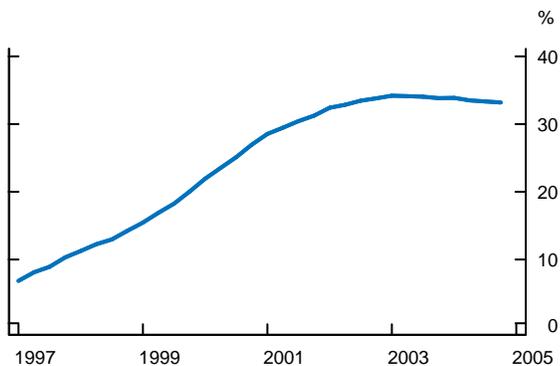
² Consumers are said to be “locked in” if they do not switch to a seller offering a lower price. This is because there are costs to switching sellers, in terms of financial costs and effort.

³ The percentage of mortgages with longer amortization periods has increased in recent years. In the sample period covered by the analysis (1992 to 2004), however, almost every mortgage was amortized over 25 years.

Mortgage brokers

Although the 1990s saw the large Canadian banks acquire nearly all of the country's trust companies, there were a number of important developments in the mortgage industry that encouraged competition. For example, mortgage brokers became important participants in the lending process. Brokers typically earn between 1 and 1.3 per cent of the value of mortgages that they bring to a lender, which could be anything from a small deposit-taking institution to a large bank. **Chart 2** presents the share of transactions that were broker assisted over an eight-year sample period. The share increases from less than 10 per cent to over 30 per cent between 1997 and 2004.⁴ This suggests that a large number of consumers sought the help of a broker when shopping for a mortgage. In addition to mortgage brokers, foreign competitors entered the Canadian banking market, although their market share remains small.

Chart 2: Broker-assisted transactions



Sources: CMHC and Genworth Financial

The Data: Mortgage Insurers

The data used in this research are provided by the Canada Mortgage and Housing Corporation (CMHC) and Genworth Financial, Canada's two mortgage insurers over the course of the sample period, which runs from 1992 to 2004 (consent for the Bank of Canada to access the data was provided by individual financial institutions). During this time, borrowers who contributed less than 25 per cent to the purchase price of a house were required to purchase mortgage insurance (today that number is 20 per cent). The majority of borrowers are insured by the CMHC, but

⁴ Survey evidence from CAAMP post-2004 shows the market share of mortgage brokers reaching as high as 40 per cent in 2008, before falling to 35 per cent in 2009.

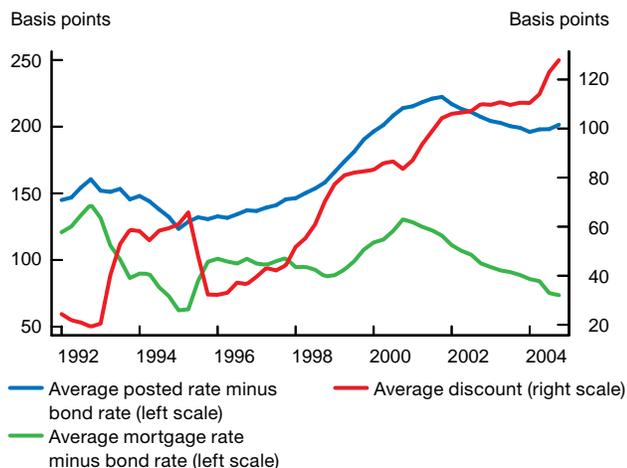
Genworth has an important share of the market. In total, over 50 per cent of the mortgages on the balance sheets of financial institutions are insured—a proportion that has been relatively stable over time. The insurers charge the lender a premium for insurance that protects the lender in case of borrower default. Typically, a lender will pass this cost on to the borrower. To assess a loan for mortgage insurance, CMHC and Genworth Financial collect detailed information on the borrower and the property—information related to the mortgage contract and to the borrower's ability and history in managing their debts, including information on incomes and credit scores. Information related to the contract includes the interest rate negotiated between the lender and the borrower. The difference between the contract rate and the posted rate is the discount. There is also information on house prices and loan amounts and, therefore, loan-to-value (LTV) ratios. Collectively, these data help the Bank to understand how mortgages rates are determined in Canada.

Discounting

Allen, Clark, and Houde (2011) are the first to use data at the individual level to document the use of mortgage discounting in Canada. Discounting is a situation where sellers, in this case lenders, post one rate but are willing to negotiate a different rate. The practice began in earnest in the early 1990s and is considered the norm in today's mortgage market. In its annual report on the state of the residential mortgage market, the Canadian Association of Accredited Mortgage Professionals (CAAMP) indicated that in 2009 the average consumer received a discount of 123 basis points on a five-year, fixed-rate mortgage. A natural question to ask might be why lenders post high rates if they are going to offer discounts to the majority of consumers. Allen, Clark, and Houde (2011) argue that over time lenders have improved their ability to price discriminate, that is, to offer discount rates to different sets of consumers based on their willingness to pay. Lenders can thus increase their profits through price discrimination instead of offering a blanket reduction in rates.

The increased use and magnitude of discounting hides the fact that some types of borrowers experience gains while others are worse off.

Chart 3: Evolution of mortgage rates in Canada



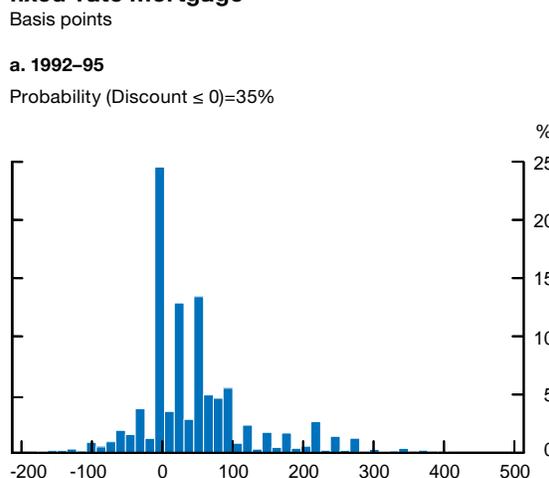
Sources: CMHC and Genworth Financial

Chart 3 illustrates the evolution of discounting from 1992 to 2004 for the five-year, fixed-rate mortgage. Over this period (and, according to survey data, beyond this period), discounting increased. However, the markup in the posted rate also rose, so that the average margin between the transaction rate and the five-year bond rate (which proxies the cost of funding) is relatively constant over time. **Chart 4** shows the dispersion in the discounts over periods 1992–95 and 2000–02. In both periods, different borrowers paid different rates, but more so in the latter period. Therefore, although the average consumer is as well off under a zero-discount environment as they are in a high-discount environment, the increased use and magnitude of discounting hides the fact that some types of borrowers experience gains while others are worse off.

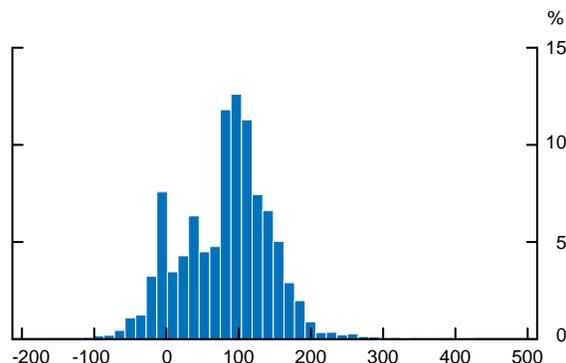
Allen, Clark, and Houde (2011) examine factors that might explain differences in mortgage rates. The key variables considered are loan, borrower, and market characteristics. They also control for time trends and unobservable characteristics of the banks and neighbourhoods that do not change over time. Allen, Clark, and Houde find that over the period 1999 to 2004 consumers living in less-competitive markets (high Branch HHI) pay higher rates than consumers living in competitive markets.⁵ In addition, banks with large branch networks charge higher rates than banks with smaller branch networks. This could be because more

⁵ HHI stands for Herfindahl-Hirschman Index. It is the sum of the square of the share of each bank's branches in a market. The result ranges from 0 to 1, where a low number indicates that the market is highly competitive, and a high number indicates that the market is not competitive.

Chart 4: Dispersion of discounts on five-year, fixed-rate mortgage



a. 1992–95
Probability (Discount ≤ 0)=35%



b. 2000–02
Probability (Discount ≤ 0)=13%

Sources: CMHC and Genworth Financial

branches imply more market power. It could also imply that consumers prefer banks with an extensive branch network and are therefore willing to pay more to do business with such a bank.

The results also indicate that, *ceteris paribus*, higher-income households pay higher rates, on average, than lower-income households. High-income households are likely less inclined to spend the time shopping for and negotiating a mortgage. Since information on the age of the borrowers was not available, proxies are used: previous homeowners are classified as the oldest category, current renters as the middle category, and mortgage applicants living with their parents as the youngest category. The results show that the youngest borrowers receive the largest rate discount. This is consistent with the larger literature on price discrimination (e.g., Goldberg 1996) since banks, like most firms, try hard to attract new, younger customers because they can potentially lock them in for a long period.

With respect to LTV ratios, which are discussed in the **Box** on page 6, the authors find that borrowers who make the minimum down payment pay a rate premium over those able to put more equity into the house. Borrowers with larger equity in their houses have better bargaining positions than borrowers with minimum equity. Lenders compete for these borrowers more fiercely not only because they are less risky, but also because they are more profitable. Borrowers with more equity in the house are more likely to be in a position to take advantage of the lender's complementary services (such as wealth management or personal loans) than the most financially constrained borrowers and are thus more attractive to lenders. Lenders must therefore compete for this type of borrower by offering them larger discounts, while the most constrained borrowers pay a premium.

The authors also find that borrowers with better credit scores receive larger discounts. Banks also offer larger discounts to new clients than to existing clients. Consumers willing to switch financial institutions when shopping for their mortgage will see, on average, an additional discount of 7 basis points from the posted rate. The results also indicate that borrowers who use a mortgage broker pay less, on average, than borrowers who negotiate with lenders directly. This average discount is about an additional 19 basis points.

Finally, the authors find that a substantial amount of discounting cannot be explained by observable characteristics. The results are consistent, however, with a model of consumer heterogeneity in search and bargaining efforts/abilities, where the latter is unobserved. Borrowers who both search for and bargain more intensively with lenders can achieve larger discounts than other borrowers.

Discounting and monetary policy

Mortgage-rate discounting has implications for the transmission of monetary policy (Allen and McVanel 2009). Central banks rely on assumptions about the rate of pass-through of changes in the Bank rate to lending rates because it affects how much they should raise or lower rates when macroeconomic conditions change. These assumptions are usually based on estimates using historical data—typically the average posted mortgage rates. Allen and McVanel show that ignoring Canadian mortgage-discounting practices leads to a significant underestimation of pass-through. That is, if discounts are not factored in, Canadian lenders appear to be extremely slow to pass on changes in the Bank Rate to their customers. As noted earlier, however, discounting is

an integral part of lenders' pricing strategies in Canada. Since discounting has increased over time, a downward bias potentially exists in previous measures of pass-through. Taking into account the upward trend in discounting and using data from 1991 to 2007, Allen and McVanel show that pass-through is indeed complete in the long run.

If discounts are not factored in, Canadian lenders appear to be extremely slow to pass on changes in the Bank Rate to their customers.

Once discounting is controlled for, however, the authors uncover another interesting facet of mortgage rates. They find that in the short, run five of the six largest Canadian banks adjust their rates upward more quickly when there are upward cost pressures than downward when costs fall.⁶ There are a few reasons why there might be an asymmetric price response to changes in input costs. First, if banks have some market power, there is scope for banks to coordinate implicitly or explicitly. If costs rise, then banks will all want to increase their prices. If costs fall, however, there is an incentive to wait before passing on the lower costs in the form of lower rates because all the banks can earn higher profits. Second, if search is costly, banks can maintain high rates even after their costs have fallen because it takes time for mortgage shoppers to realize that rates should have fallen. The difference between posted rates and transaction rates in this market is further evidence that search costs are important.

Mergers

Most researchers that examine the effect of competition on prices take the same approach as Allen, Clark, and Houde (2011). That is, they regress prices on a measure of concentration. This approach does not directly address the effects of competition on mortgage rates, however, but measures correlation. The positive correlation between mortgage rates and branch concentration strongly suggests that rates are higher in

⁶ This is in line with previous research on the U.S. mortgage market (Arbatskaya and Baye 2004) or the market for deposits (Hannan and Berger 1991). More generally, Peltzman (2000) finds asymmetric price adjustments in most consumer and producer prices that he examines. Anecdotally, the Bank of Montreal's chief economist was quoted in *The Globe and Mail* (18 November 2009) as saying, "It's a safe thing to say that [mortgage] interest rates tend to move higher a lot faster than they move lower."

Loan-to-Value Ratios

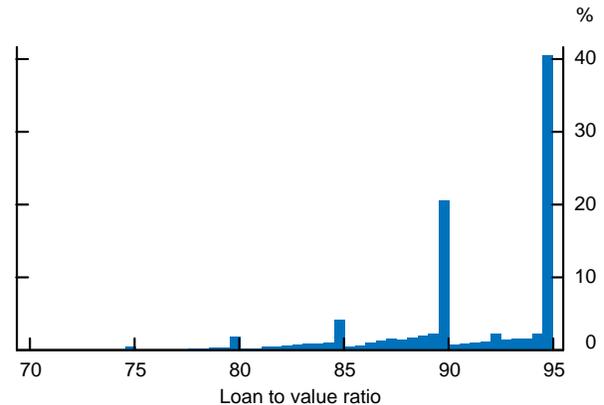
An LTV ratio is defined as the loan amount divided by the appraised value of the house at the time of the loan. Currently, mortgages with an LTV ratio below 80 are conventional mortgages that do not require mortgage insurance. Those with LTV ratios above 80 require insurance, which is provided by CMHC or Genworth Financial. The maximum allowable LTV ratio in Canada is 95 per cent. A borrower can therefore contribute 5 per cent of their own equity to borrow 95 per cent of the purchase price from a lender for the purpose of buying a house. Since the 2007 U.S. subprime-mortgage crisis, LTV ratios have become an important source of discussion as a potential tool for system-wide risk management (e.g., CGFS 2010). Requiring borrowers to increase the amount of equity that they contribute when purchasing a house (e.g., lowering the maximum LTV ratio from 95 to 90), would likely have a dampening effect on house prices in the short-run. This is because in the short run fewer people would enter the housing market, and those who did would buy less-expensive houses.¹

Chart A shows the LTV ratios of insured borrowers over two periods, 1992 to 1998 and 1998 to 2003, that correspond to two different insurance-premium regimes. In both cases, the majority of households are clustered at LTV ratios of 90 and 95, suggesting that most insured borrowers are highly leveraged. Changes to the maximum LTV ratio are thus likely to affect a large share of new insured mortgages. In 1998, the cost to the borrower of insuring a 95 LTV mortgage relative to a 90 LTV mortgage increased by 50 per cent. This led some borrowers to increase the equity portion of their mortgage, since the fraction of borrowers in the 95 LTV bin fell, and the fraction of borrowers in the 90 LTV bin increased. This suggests that, in addition to altering the LTV ratio, changes to mortgage-insurance premiums have the potential to influence household decisions to take on increased leverage.

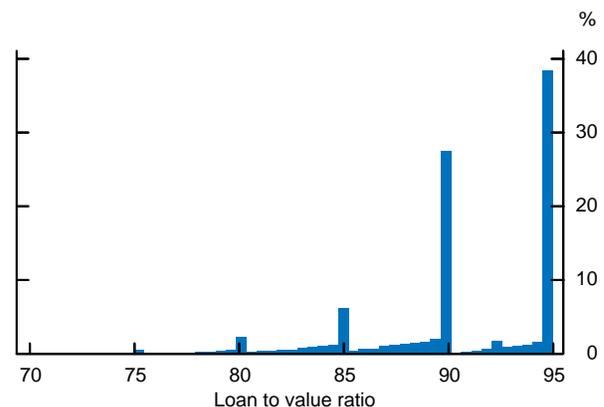
¹ Note that a quality-based house price index might actually increase if consumers drive up the value of low-quality houses, even though the value of more expensive houses is falling because of the policy.

Chart A: Loan to value ratio at time of issuance

a. 1992 to May 1998



b. June 1998 to 2003



Sources: CMHC and Genworth Financial

less-competitive markets, but there might be some unobservable reason for the correlation. Another approach is to look at mergers to directly measure the effects of changes in local market competition on rates. In this section, we follow this strategy by examining the impact of a merger between a bank and a trust company.

In the 1990s, Canadian banks acquired virtually all of the existing trust companies, together with hundreds of their branches across the country.⁷ Consequently, these mergers and acquisitions created a discrete change in the structure of local banking markets. In particular, when two neighbouring branches merge because of a national acquisition, competition in the local market is immediately reduced, since banks begin internalizing the impact of their actions on each other's profits. That is, branches that once competed stop doing so once the merger is announced.⁸

Since most Canadian mortgage shoppers negotiate their contracts directly with local bankers, the potential impact of a merger is determined by the number of available local bank branches. Therefore, the most direct approach is to study the impact on rates of removing lender options from the choice set of consumers.⁹ The effect of this change in competition on rates is captured by comparing the rates paid by the consumers affected by the merger ("treated") with those paid by a base group as follows:

$$r_{it} = \alpha_t + \theta_0(N_i M_t) + \gamma_0 N_i + \beta X_{it} + \delta_{bank} + \epsilon_{it}, \quad (1)$$

where r_{it} is the discount; N_i is equal to 1 if household i has the merging institutions in its neighbourhood and 0 otherwise; M_t indexes the merger and is therefore equal to 1 post-merger and equal to 0 pre-merger; and θ_0 is the coefficient of interest, which captures the aggregate effect of the merger on prices.

Table 1 summarizes the key results. From column (1) it is clear that overall the merger did not have a significant impact on rates. The coefficient is small, about 1.6 basis points, and not statistically significant. In

7 Examples include TD-Central Guaranty Trust (1992), Royal Bank-Royal Trust (1993), BMO-Household Trust (1995), CIBC-FirstLine Trust (1995), Scotiabank-National Trust (1997), and TD-Canada Trust (2000).

8 For an econometrician trying to identify the effects of competition on prices, these changes in competition can be viewed as exogenous to the local market conditions.

9 The impact on rates of removing one bank option can be identified because not all consumers face the same bank options. Some consumers live in markets offering many bank choices, including the two merging banks, while others live in markets containing neither of the merging banks or only one of them. The last two groups of consumers are not affected by the merger and therefore constitute the base group. The first set of consumers ("treated") is affected by the merger, since their shopping options are reduced post-merger.

Table 1: Effects of mergers on mortgage rates

Variables	Equation (1)	Equation (2)	Equation (3)
Aggregate effect	0.0161 (0.0107)	0.0527† (0.0180)	
Aggregate effect X HHI		0.184† (0.0695)	
Bank-specific effects			
Merging FIs			0.0850† (0.0166)
Competing FIs			- 0.0342† (0.0108)

† Significant at 1 per cent
Note: Standard errors are in parenthesis.

addition to estimating equation (1), column (2) presents estimates from the following regression, which allows for the effect of the merger to vary across different markets:

$$r_{it} = \alpha_t + \theta_0(N_i M_t) + \theta_1(N_i M_t) HHI_t + \gamma_0 N_i + \beta X_{it} + \delta_{bank} + \epsilon_{it}, \quad (2)$$

where HHI_t is the Herfindahl-Hirschman measure of branch concentration.

Here we see that rates in the most competitive neighbourhoods fell after the merger, while they increased significantly in the most concentrated markets.

Rates in the most competitive neighbourhoods fell after the merger, while they increased significantly in the most concentrated markets.

The aggregate results can be explained once the merger effect is broken down into its two components: the direct effect, which is the rate impact on the set of consumers who banked with the merging institutions pre- and post-merger, and the indirect effect, which is the rate impact on the set of consumers who banked with the merging institution's competitors pre- and post- merger. The estimating equation is given by:

$$r_{it} = \alpha_t + \sum \{ \theta_K(KN_i M_t) + \gamma_K(KN_i) \} + \beta X_{it} + \delta_{bank} + \epsilon_{it}, \quad K = I\{(AB, AB^c)\}, \quad (3)$$

where K is an indicator variable for whether or not the lender is one of the merging institutions or one of its competitors. The coefficients of interest are θ_K , since these capture the merger effects.

The results suggest an interesting asymmetry. Consumers dealing with the merging bank saw a significant increase in rates post-merger—about 8.5 basis points—while consumers dealing with the competition saw rate decreases, by approximately 3.4 basis points.

The results suggest at least two channels of influence from the merger. The asymmetric price responses could be explained by a quality increase. If the merged bank provides higher-quality service (e.g., a larger network of branches and ATM machines), then, *ceteris paribus*, it can charge higher rates and still attract customers, while its competitors must offer larger discounts. An alternative interpretation of the price results (perhaps complementarily) is that banks in neighbourhoods that experienced a merger might be attracting a different mix of consumers. For instance, by exerting a larger degree of price control, the new entity might be less likely to attract consumers willing to shop intensively for their mortgages. This would explain the result that rates are higher at the merging bank and lower at the competing banks.

The asymmetric price effect of the merger suggests that the relationship between bankers and consumers is complicated. The merging banks are able to raise rates post-merger, extracting more from borrowers than pre-merger. Given that the mortgage is the largest purchase for most households, the costs of the merger are not negligible. These borrowers value more than the price of the mortgage, however, because they have the option of paying a lower rate at a competing lender in the same neighbourhood. Competition agencies may want to consider this possibility in analyzing any future mergers.

Conclusion

This article summarizes key research on the Canadian mortgage market currently being undertaken at the Bank of Canada in conjunction with external academics. Overall, the findings are consistent with a model where consumers have different preferences and skills when shopping and bargaining for a mortgage and where lenders maximize profits based on observing these preferences and skills. The results indicate that high-income borrowers pay more for their mortgages, as do loyal consumers, consumers who search less, and those that value large branch networks. Unobserved bargaining ability also appears to play an important role in determining mortgage rates.

Results also suggest that mortgage-rate discounting affects the speed and amount of pass-through of changes in the central bank's policy rate to mortgage rates. In particular, once discounting is taken into account, the major mortgage lenders in Canada are slower to cut rates than to increase them. This asymmetry has implications for monetary policy because it means that the actions of the central bank might need to be adjusted, depending on whether it is cutting or increasing interest rates. The reasons for the asymmetric responses of mortgage lenders should also be investigated.

Finally, this research suggests that bank mergers can lead to asymmetric effects on mortgage rates. The merging parties, because of market power, can increase rates, while the competition actually decreases rates in order to attract consumers. This result is non-standard in the industrial-organization literature where both sets of lenders would typically increase prices because of market power. Given the preference of consumers for factors other than low rates (e.g., branch-network size), however, the competitors actually decrease rates, because post-merger they are relatively smaller than the merging entities in terms of their branch network.

Together, these findings are important to the central bank and to competition authorities because of their impact on our understanding of the factors affecting competition and the monetary policy transmission mechanism.

Literature Cited

- Allen, J., R. Clark, and J.-F. Houde. 2011. "Discounting; in Mortgage Markets." Bank of Canada Working Paper No. 2011-3.
- Allen, J. and D. McVanel. 2009. "Price Movements in the Canadian Residential Mortgage Market." Bank of Canada Working Paper No. 2009-13.
- Arbatskaya, M. and M. Baye. 2004. "Are Prices 'Sticky' Online? Market Structure Effects and Asymmetric Responses to Cost Shocks in Online Mortgage Markets." *International Journal of Industrial Organization* 22 (10): 1443–62.
- Committee on the Global Financial System (CGFS). 2010. "Macroprudential Instruments and Frameworks: A Stocktaking of Issues and Experiences." CGFS Papers No. 38.
- Freedman, C. 1998. "The Canadian Banking System." Bank of Canada Technical Report No. 81.
- Goldberg, P. 1996. "Dealer Price Discrimination in New Car Purchases: Evidence from the Consumer Expenditure Survey." *Journal of Political Economy* 104 (3): 622–54.
- Hannan, T. and A. Berger. 1991. "The Rigidity of Prices: Evidence from the Banking Industry." *American Economic Review* 81 (4): 938–45.
- Kiff, J. 2009. "Canadian Residential Mortgage Markets: Boring But Effective?" IMF Working Paper No. 09/130.
- Peltzman, S. 2000. "Prices Rise Faster Than They Fall." *Journal of Political Economy* 108 (3): 466–502.