What Explains Trends in Household Debt in Canada?

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- The aggregate debt-to-income ratio of Canadian households has trended upward over the past 30 years. Both mortgage and non-mortgage (consumer) credit have contributed to this increase.
- We use microdata to focus on the main factors underlying the strong trend increase in household credit since the late 1990s. The mean level of debt has risen for all age groups, suggesting that a variety of factors are at work.
- Generally favourable income growth and low interest rates have made mortgages more affordable, supporting significant increases in home-ownership rates and mortgage debt.
- Higher house prices, financial innovation and low interest rates have underpinned the expansion in consumer credit.

Household indebtedness rose considerably in many advanced economies over recent decades. This upward trend intensified in the years preceding the recent financial crisis as ratios of household debt to disposable income rose sharply in a number of major economies (**Chart 1**). In the United States and the United Kingdom, for example, excessive easing of lending conditions led to unsustainable growth in household debt, which fuelled higher debt-service burdens and increases in house prices. Following the onset of the crisis, pressures for deleveraging in the banking and household sectors have led to significant reductions in the debt ratios in these countries.

While the ratio of household debt to disposable income also increased in the euro area, it has remained at a relatively low level. The average for the euro area, however, conceals considerable variation among individual countries. Ratios are substantially higher in the Netherlands and Ireland, for example, as well as in some northern European countries that are not members of the euro area.[1]

Household borrowing in Canada has followed less-pronounced swings than in some other countries in recent years, but has nevertheless maintained a steady upward trend. Credit growth has remained strong over the past decade (**Table 1**), and the ratio of debt to disposable income for Canadian households has now risen to approximately 150 per cent.[2] Before the mid-1990s, the increase in the debt-to-income ratio was driven mostly by residential mortgage

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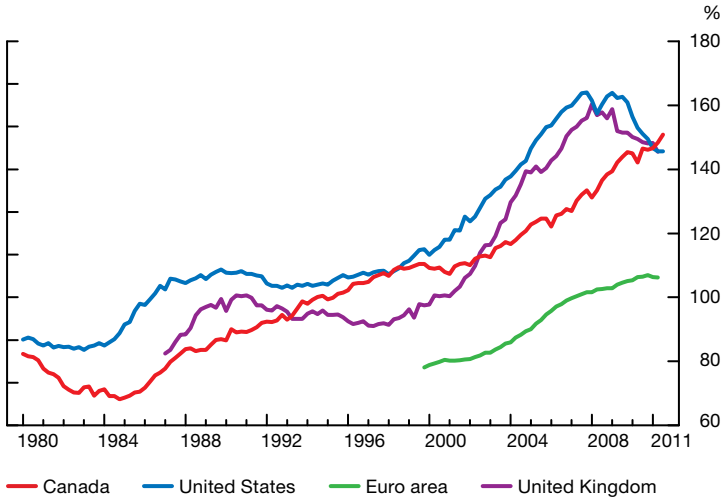
1 Debt-to-income ratios in these countries are greater than the peak levels observed in the United States and United Kingdom. Glick and Lansing (2010) provide international comparisons.

2 The aggregate debt-service ratio (i.e., the share of income required to make interest payments) has remained low despite the increase in debt levels, owing to historically low interest rates. Since a significant share of the increase in total debt has been used to purchase housing, the debt-to-asset ratio for the household sector has been relatively stable, although it has moved upward since 2008.

Chart 1: Ratio of household debt to personal disposable income



Sources: Statistics Canada, U.S. Federal Reserve, Bank for International Settlements and U.K. Office for National Statistics

Last observations: Canada, United Kingdom and United States: 2011Q3; euro area: 2011Q2

Table 1: Measures of household debt in Canada

	Growth of household debt (average annual rate, %)		Debt-to-asset ratio (%)
	Nominal	Real[a]	
1980–89	9.6	3.1	16.0
1990–99	5.9	3.7	16.8
2000–11	7.4	5.3	17.6

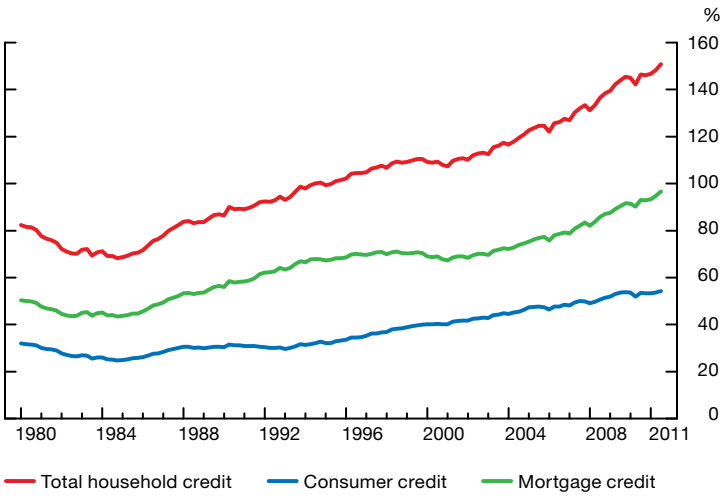
a. Deflated using total consumer price index
Source: Statistics Canada

credit, but since then, consumer credit has also been a contributing factor (**Chart 2**). The rising importance of consumer credit has coincided with a strong increase in non-mortgage borrowing secured by housing assets. The purpose of this article is to examine the major factors underlying these recent trends in household debt in Canada.

Trends in household indebtedness reflect a mix of supply and demand factors. On the demand side, an important motivation for borrowing is that it can increase a household's lifetime welfare by allowing consumption in different stages of the life cycle to differ significantly from current levels of income. Borrowing can also act as a buffer that permits a household to maintain a stable level of consumption following a temporary loss of income.

While borrowing can enhance welfare, recent international experience shows that excessive indebtedness and looser lending standards can also make households more vulnerable to adverse shocks and increase risks to the financial system. The rise in indebtedness in the United States was heavily influenced by relaxation of mortgage underwriting standards that made it easier for riskier households to enter the housing market, and by other financial innovations that made it easier for existing homeowners to access borrowing secured by home equity (Dynan and Kohn 2007). Data for the subprime segment of the mortgage market illustrate the importance of these supply factors. In the United States, the subprime market had grown

Chart 2: Ratio of debt to personal disposable income in Canada



Source: Statistics Canada Last observation: 2011Q3

to account for about 14 per cent of outstanding mortgages before the financial crisis, compared with about 3 per cent in Canada.[3]

An understanding of the underlying causes of past growth in debt in Canada will provide insight into the forces likely to affect future changes in indebtedness. In turn, this information can guide analysis of both financial stability and monetary policy issues.[4] A comprehensive analysis of these questions cannot be conducted using the aggregate credit data alone, since these data mask many important aspects of borrower behaviour. The demand for credit will vary considerably across households, depending on characteristics such as age, income and home-ownership status. The willingness of lenders to supply credit will also depend on these characteristics. This means that information on the distribution of debt across different types of households is essential to help identify the factors contributing to the increase in total indebtedness. Accordingly, the findings in this article are based largely on a data set that contains information at the household level that is available from 1999 onward (**Box 1**). This time frame broadly coincides with the accelerated growth in household debt and the shift in the composition of consumer credit toward borrowing secured by home equity.

While this article focuses on explaining the broad trends in household debt, it is important to note that the implications for financial stability depend on the ability of individual households to make their debt payments when faced with adverse shocks. Assessments of the risks to financial stability arising from elevated indebtedness are provided in the *Financial System Review*, including stress tests based on the distribution of the debt-service ratio across households.

We begin by highlighting some general observations from the microdata, and then discuss the key determinants of growth in mortgage and consumer credit.

3 Box 1 in the December 2007 issue of the *Financial System Review* describes other important differences between the subprime-mortgage markets in the United States and Canada before the financial crisis.

4 See Bailliu, Kartashova and Meh (this issue) for a discussion of the links between household debt and spending.

Box 1

Household Microdata

The *Canadian Financial Monitor* (CFM) survey conducted by Ipsos Reid provides comprehensive information on the balance sheets of approximately 12,000 households for each year from 1999 to the present. For the liability side of the balance sheet, there is detailed household-level information on the outstanding amounts of residential mortgage credit and five types of consumer credit (secured lines of credit, unsecured lines of credit, credit cards, leases and other consumer loans). Basic socio-economic information, including age, income, education, family size, home-ownership status and the value of housing equity, is also reported for each household. Survey responses from participating households are weighted to obtain data series that are representative of the Canadian population. This data set is used regularly by the Bank of Canada to conduct the household-sector stress tests reported in the *Financial System Review*.

Household Borrowing over Time: Age and Demographic Effects

If borrowing were not possible, household consumption would fluctuate widely over the course of a lifetime, since spending would be constrained to follow movements in current income closely over time. According to the life-cycle hypothesis, borrowing can improve a household's lifetime welfare by allowing it to spread consumption more smoothly across different stages of its life cycle. When income is relatively low during the early adult years, households will typically borrow to support higher consumption than could be financed by current income alone.[5] Conversely, as income rises during the middle years of the life cycle, households save (and reduce their debt) in order to accumulate the wealth necessary to support consumption during retirement years when income is lower. This consumption-smoothing behaviour implies an inverted-U pattern between age and indebtedness.

Chart 3 shows the mean level of debt in 2010 for households in different age categories. Consistent with the life-cycle hypothesis, indebtedness peaks in the 31–35 age range and then gradually declines with age. Mortgage credit is the primary source of changes in total debt over the life cycle. As expected, mortgage credit is particularly significant for younger households.

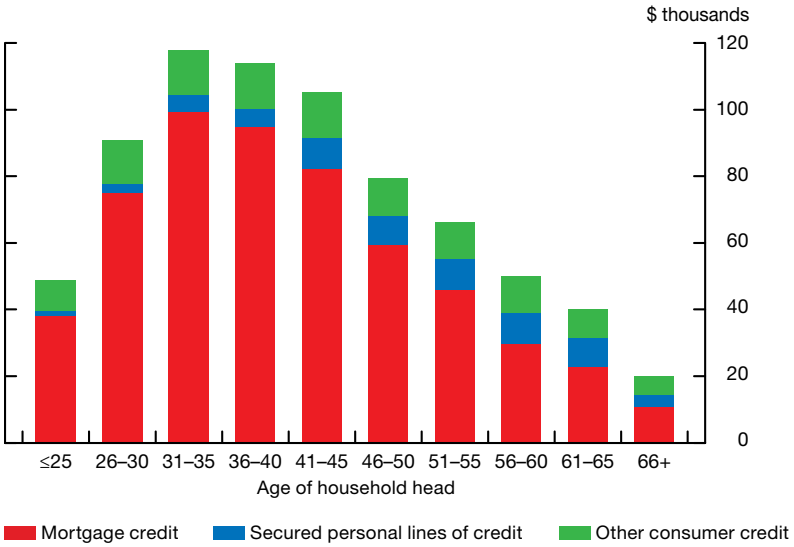
While the relationship between age and indebtedness follows a similar inverted-U shape in each year, the age differences have become greater since the late 1990s. Particularly large increases in mean debt (most notably, mortgage credit) have occurred for households in the age groups spanning 31 to 45 years (**Chart 4**).[6] These are also the age ranges in which increases in debt were most widespread across households. Secured personal lines of credit have accounted for most of the growth in total consumer credit for each age group.

Since the late 1990s, particularly large increases in mean debt have occurred for households in the age groups spanning 31 to 45 years

5 For example, young adults often choose to raise their current consumption of housing services by borrowing to purchase a house.

6 To control for the effects of inflation, Chart 4 shows the change in real debt between 1999 and 2010 (constant 2010 dollars, based on the consumer price index).

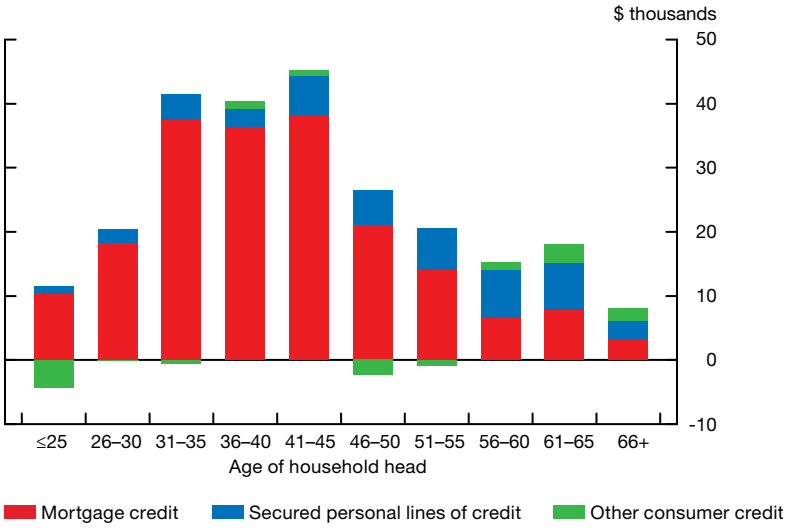
Chart 3: Mean debt, by age group, 2010



Sources: *Canadian Financial Monitor* and authors' calculations

Chart 4: Change in mean debt, by age group, 1999–2010

In 2010 dollars, based on total consumer price index



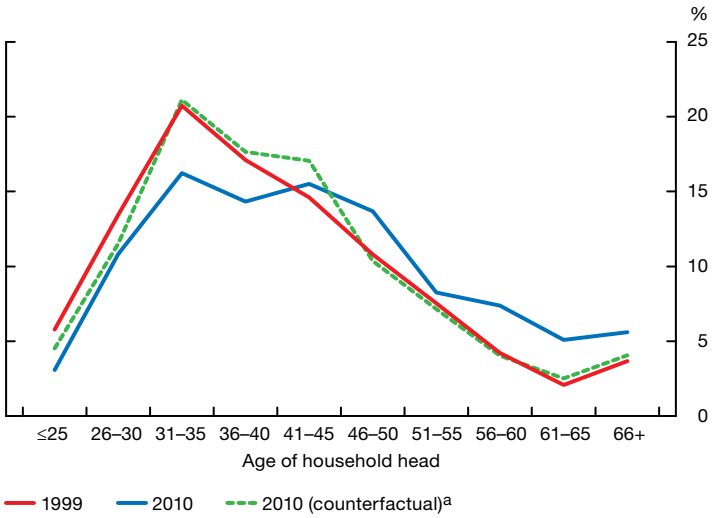
Sources: *Canadian Financial Monitor* and authors' calculations

Chart 3 and **Chart 4** provide important initial insights for understanding the causes of trend movements in household debt. The aging of the population over our sample period means that trends in aggregate credit have become increasingly influenced by older households. One consequence of the aging population is that the *proportion* of total debt held by older households has risen significantly since the late 1990s (**Chart 5**), even though they had smaller increases in indebtedness than most younger households.[7] The dashed line in **Chart 5** represents a counterfactual distribution for 2010, which assumes the demographic weights remain constant at their 1999 values, while mean debt levels for each age category rise according to their

7 The proportion of households headed by individuals older than 45 years increased by 14 percentage points between 1999 and 2010; the share of total debt held by these households rose by 12 percentage points.

Chart 5: Distribution of household debt, by age group

Share of total household sector debt



a. The counterfactual distribution holds the population weights for each age group fixed at 1999 levels.
Sources: *Canadian Financial Monitor* and authors' calculations

historical evolution. The counterfactual (constant age) distribution for 2010 is quite similar to the 1999 distribution, which implies that the share of total debt held by older households would have been relatively unchanged in the absence of population aging.

Since older households tend to have lower debt (**Chart 3**), population aging has also had a moderating effect on total household credit. Under the hypothetical scenario described above (with a constant age structure), aggregate debt would have been about 12 per cent higher in 2010. This result is only suggestive, since the level of interest rates and other lending conditions might have been different, given the greater demand for credit. It does, however, illustrate the importance of the demographic structure for understanding historical trends and projecting future growth in credit.

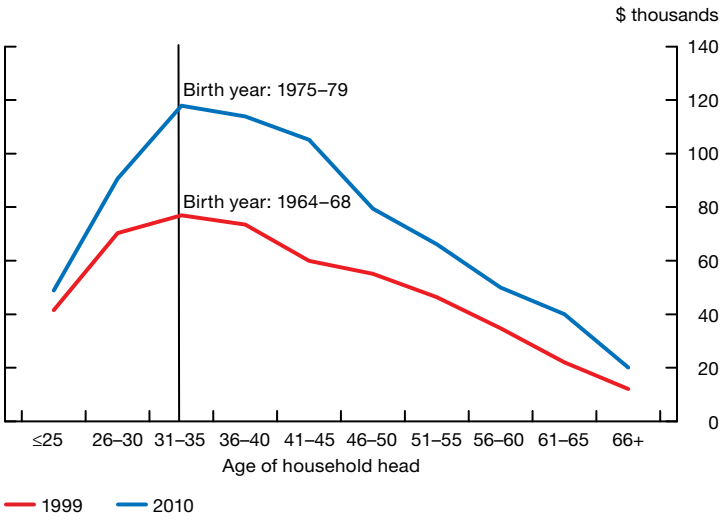
For each stage of the life cycle, mean debt levels are systematically greater for household heads born in later years

Since the aging population has dampened the rise in aggregate household debt, other factors must have more than offset this effect in order for the strong upward trend in indebtedness to have occurred. Mean debt levels increased for each age range between 1999 and 2010 (**Chart 4**), implying that the increase in aggregate indebtedness reflects a systematic positive "cohort" effect; that is, for each stage of the life cycle, mean debt levels are systematically greater for household heads born in later years. For example, while a typical household aged 31 to 35 years in 1999 (i.e., born between 1964 and 1968) had total real debt of approximately $75,000, a representative household in the same age range in 2010 (i.e., born between 1975 and 1979) had a mean real debt of almost $120,000 (**Chart 6**).

There are several potential explanations for the higher indebtedness of the more recent cohorts. First, increased borrowing by younger cohorts may reflect ongoing shifts in the underlying preferences in favour of current consumption relative to future consumption. Second, it could result from trend movements in the variables that affect the demand for credit (such as expected income and the cost of borrowing). Finally, new lending practices or financial innovations may have increased access to credit over time.

Chart 6: Mean household debt, by age group

In 2010 dollars



Sources: *Canadian Financial Monitor* and authors' calculations

It is difficult to disentangle the relative importance of these explanations. However, the broad-based nature of the increases in debt—across all age ranges and for both mortgage and consumer credit—suggests that a combination of these factors has contributed to the positive cohort effect and the trend growth in total household debt. These influences are explored further in the following sections.

Mortgage Credit

The ratio of mortgage debt to disposable income has increased significantly over the past 30 years, from about 50 per cent to almost 100 per cent (**Chart 2**). This growth is consistent with census data that show a rise in the home-ownership rate from 62.1 per cent to 63.6 per cent of households between 1981 and 1996, and a more-pronounced increase to 68.4 per cent in 2006 (CMHC 2011). *Canadian Financial Monitor* data suggest that the home-ownership rate increased further after 2006.[8] Another factor contributing to the rise in the mortgage debt-to-income ratio since the late 1990s is that house prices have risen at a faster pace than income.[9]

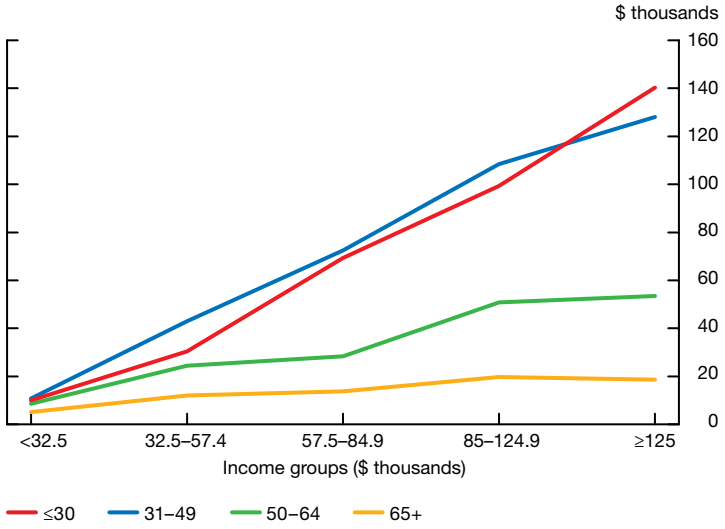
Roles of income and interest rates

Lifetime consumption-smoothing implies that current spending will depend on "permanent income," which is the present value of current and expected future income. Intuitively, a household with higher expected future earnings will use some of the expected increase in lifetime consumption to raise current spending. Thus, a household's demand for housing (and mortgage credit) should be positively correlated with indicators of its lifetime earnings, such as current income and educational attainment. Consistent with expectations, mortgage debt rises with income for households in each age group

8 The link between the long-run trends in mortgage credit and home ownership is also clear in the household-level data: similar to the cohort effects on credit discussed earlier, the rate of home ownership in recent decades has peaked at higher levels for later-birth cohorts (Hou 2010).

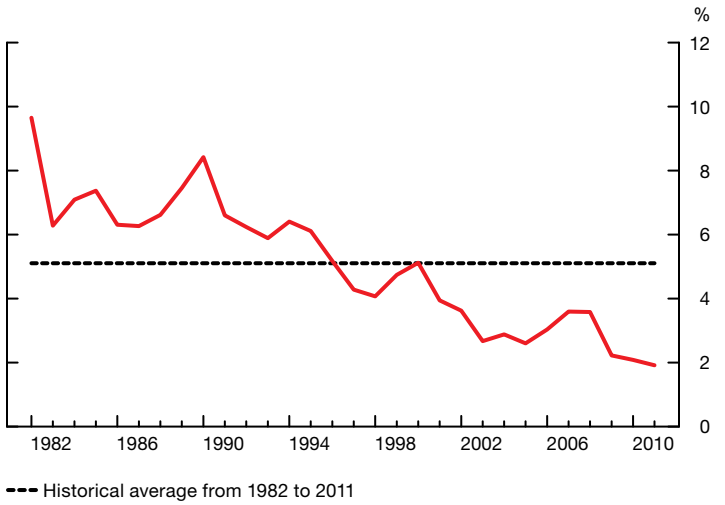
9 Increases in mortgage refinancing (in which existing homeowners increase the size of their mortgage while staying in the same house) have also contributed to the rise in total mortgage credit since the late 1990s. See Bailliu, Kartashova and Meh (this issue).

Chart 7: Mean mortgage debt, by income and age group, 2010



Sources: *Canadian Financial Monitor* and authors' calculations

Chart 8: Real discounted 5-year mortgage rate



Note: The real 5-year mortgage rate is calculated as the difference between the discounted mortgage rate and the medium-term expectation of consumer price index inflation from the Towers Watson Canadian Survey of Economic Expectations.
Sources: Bank of Canada, Towers Watson, ING Canada and authors' calculations Last observation: 2011

(**Chart 7**). This relationship implies that trend increases in real household income (caused, for example, by trend growth in productivity) have contributed to the increase in home-ownership rates and higher mortgage debt.[10]

Increases in real household income and low interest rates have contributed to the increase in home-ownership rates and higher mortgage debt

A low-interest-rate environment will also lead to stronger growth in mortgage credit. The real 5-year mortgage rate was highest during the 1980s when there was a higher premium for inflation uncertainty (**Chart 8**).[11] More recently, real borrowing rates have been significantly below the 30-year average.

10 Morissette (2008) reports that earnings growth in the decade preceding 2007 was greatest for individuals in the age range of most first-time homebuyers (i.e., under 35 years). The median level of real household income (after tax) increased by 9 per cent between 2001 and 2009 (CMHC 2011).

11 The data for the real 5-year mortgage rate incorporate estimates of discounts from posted rates.

Overall housing affordability

The data for residential mortgage credit include debt related to both house purchases and mortgage refinancing. The movements in income and interest rates described above would have supported growth in both of these forms of mortgage credit. To provide further perspective on credit growth related to house purchases, we use a comprehensive measure of the overall affordability of mortgage payments that takes into account house prices as well as mortgage rates and income.

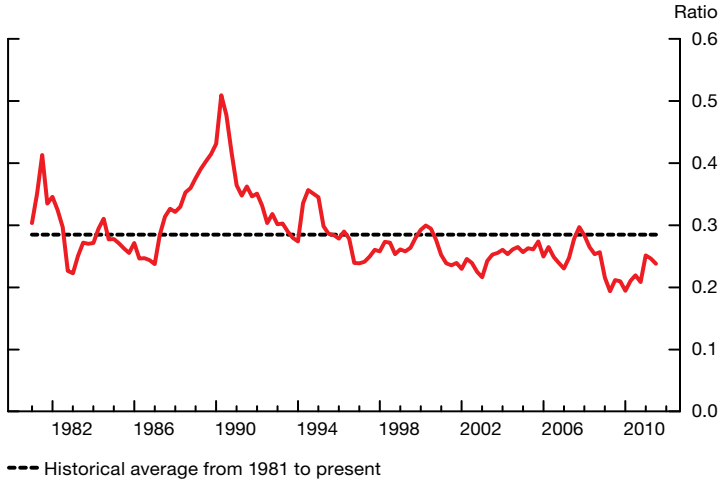
The affordability measure (AFF) is defined as the ratio of monthly mortgage payments to disposable income (DI):

$$\mathrm{AFF} = \frac{\frac{r}{(1-(1+r)^{-N})}M}{\mathrm{DI}}.$$

The monthly payment depends on the mortgage rate r; the maximum amortization period in months N; and the total value of the mortgage M. For example, with a 95 per cent loan-to-value ratio, the mortgage size M is equal to 0.95 x P, where P is the purchase price of the average house. An increase in the AFF ratio indicates a decrease in affordability. Higher house prices and interest rates lower affordability, while a higher income (DI) and a longer amortization period increase affordability and improve access to mortgage financing.[12]

This measure of affordability has been consistently favourable by historical standards since the late 1990s (**Chart 9**). Despite increases in house prices, generally favourable labour market conditions (gains in real income) and low interest rates have supported affordability and contributed to the significant increases in home ownership and mortgage debt.

Chart 9: Ratio of mortgage affordability



Note: This measure estimates the size of mortgage payments for a first-time homebuyer, given prevailing interest rates and house prices, and then scales this value by personal disposable income. A higher value of this ratio represents lower affordability.
Source: Bank of Canada calculations Last observation: 2011Q3

12 This measure is the same as the affordability series available on the Bank of Canada's website (reported in the Credit Conditions dashboard at <**http://credit.bank-banque-canada.ca/financialconditions#hai**>), with the exception that it uses historical data for the maximum amortization period rather than assuming a constant 25-year maximum amortization.

Quantitative evidence of the impact of mortgage affordability is obtained from analysis using household-level data (**Box 2**). The results confirm that changes in affordability have a significant effect on mortgage credit. They also suggest that an easing of affordability would have a greater impact on the housing decisions of younger age groups, which is consistent with the micro evidence on the growth in mortgage debt by age groups (**Chart 4**).

An easing of affordability would have a greater impact on the housing decisions of younger age groups

Box 2

Mortgage Affordability and Home Ownership

Greater insight into the determinants of mortgage credit is obtained by examining the factors that influence the decision of renters to buy a house. We use a subset of the *Canadian Financial Monitor* microdata containing only those households that appear in the sample in consecutive years. We then use a probabilistic regression model (commonly known as a *probit* model) to estimate the impact of demographic and economic variables on the probability of a household transitioning from a renter to a homeowner. These variables include the household's size, ability to afford a mortgage and capacity to make a down payment. The affordability variable is similar to the aggregate measure shown in **Chart 9**, although it exploits more disaggregated information by using household-specific data for income and regional house prices.

Table 2-A shows the estimated impact of affordability on the probability of a renter becoming a homeowner (transition probability) in 2010 based on the probit model. Column (A) in the middle panel of the table reports the transition probability for selected age groups if home ownership were more affordable than was actually observed in 2010, while column (C) shows the probability under an assumed value for affordability that would be closer to the longer-run average value. Based on these estimated probabilities, tighter affordability would have resulted in approximately 36,000 fewer renters entering the housing market in 2010 (or approximately 10 per cent of the estimated activity by first-time homebuyers in 2010). As illustrated by the shaded column in the table, changes in affordability have a greater impact on the decisions of younger households.

Table 2-A: Impact of mortgage affordability on the probability of a house purchase in 2010

	Transition probability			Change in transition probability
Age group	0.75 × actual affordability (A)	Actual 2010 affordability (B)	1.25 × actual affordability (C)	(C) – (B)
18–35	0.156	0.144	0.133	-0.012
46–54	0.095	0.086	0.078	-0.008
All	0.105	0.095	0.085	-0.010

These estimates are only illustrative: they do not reflect all channels through which changes in affordability would affect housing decisions and the amount of outstanding mortgage credit. By focusing on the transition from renter to homeowner, the estimates capture only the entry decisions of first-time homebuyers; they do not show the impact of affordability on the size of the mortgage (for households that purchase) or the impact on repeat buyers. Nevertheless, the results suggest that changes in affordability have been an important factor in the rise in mortgage credit since the late 1990s.

Consumer Credit

As shown in **Chart 2**, the ratio of consumer debt to disposable income was relatively stable until the mid-1990s when it began to move persistently higher. The predominant source of this upward trend has been secured personal lines of credit (PLCs), which grew at a much faster pace than more traditional forms of consumer credit such as credit card debt. Secured PLCs, which are mostly secured by housing assets (i.e., home-equity lines of credit), have risen sharply both in absolute terms and as a share of total consumer credit. In 1995, secured PLCs represented about 11 per cent of consumer credit; by the end of 2011, this share was close to 50 per cent (**Chart 10**).

The rapid increase in the importance of secured PLCs implies that identifying the causes of this growth is critical to understanding the overall trend in consumer credit. Some of the factors described earlier that supported growth in mortgage credit, such as income growth and low interest rates, would have had similar effects on consumer credit.

The strong growth in secured consumer debt is also linked to other interconnected factors. Significant gains in house prices over this period have eased borrowing constraints for some households by raising the amount of collateral available to support borrowing against home equity (**Chart 10**).[13] Financial innovation that made it easier for households to access this type of borrowing has probably been another important factor. For example, while PLCs have been available in Canada for some time, anecdotal information suggests that marketing of these products was stronger after the mid-1990s, and the range of PLC products was expanded to appeal to a larger segment of the population. The broader use of secured consumer credit is illustrated by the significant increase in the proportion of households with a positive secured PLC balance within each age group (**Chart 11**).

A key question for identifying the causes of the rising consumer debt-to-income ratio is the extent to which the growth in secured consumer credit reflects a substitution away from higher-cost unsecured debt such as credit cards, rather than a net increase in consumer credit. Some substitution has undoubtedly taken place. Since the spread between the typical interest rates for unsecured consumer debt and a secured PLC is approximately 250 basis points, there is a strong incentive for households to consolidate existing debt into a PLC to reduce debt payments,[14] and to use the secured account for new borrowing.

It is likely that the factors contributing to the growth in home-equity borrowing, however, led to stronger growth in total consumer credit than would otherwise have occurred. It is noteworthy that the beginning of the strong rise in the ratio of consumer debt to income in the mid-1990s coincided with the accelerated increase in the share of PLCs in total consumer credit. Moreover, as noted earlier, increases in house prices and broader access to secured borrowing would have raised indebtedness for credit-constrained households. Finally, even some households that are not credit constrained may have increased their total debt, since expanded access to secured PLCs lowers the effective cost of borrowing. Therefore, financial innovation and increases in house prices have probably been significant factors underlying the increase in total consumer credit.[15]

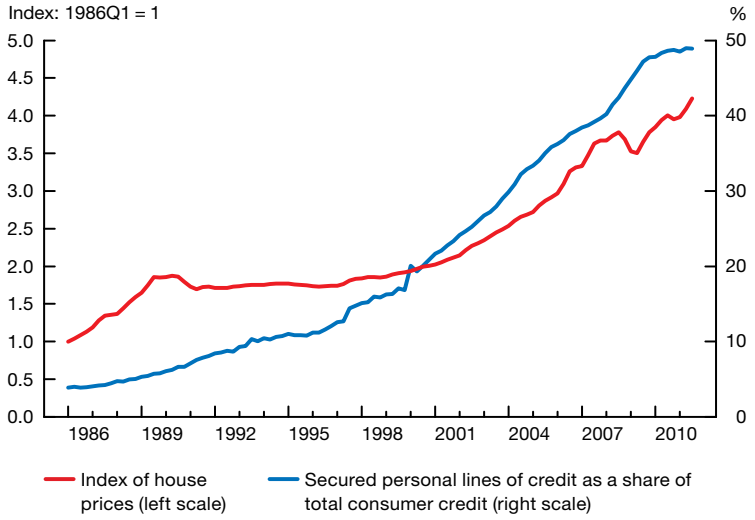
The beginning of the strong rise in the ratio of consumer debt to income in the mid-1990s coincided with the accelerated increase in the share of PLCs in total consumer credit

13 Grant (2003) and Crook and Hochguertel (2007) report international evidence on the incidence and characteristics of credit-constrained households.

14 Bailliu, Kartashova and Meh (this issue) provide evidence on the use of home-equity lines of credit for debt consolidation.

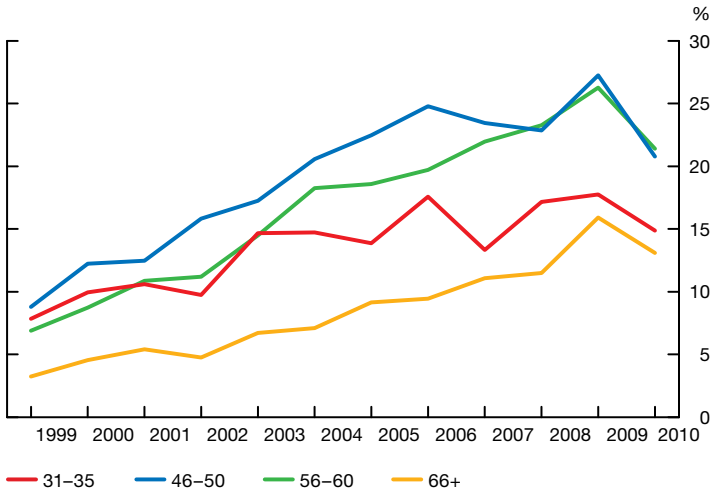
15 Future research will seek to obtain additional empirical evidence on the relative importance of changes in borrowing constraints and other determinants of growth in household credit.

Chart 10: Secured personal lines of credit and house prices



Note: House prices are based on a combination of the levels of average house prices from the Teranet–National Bank National Composite House Price Index and the Canadian Real Estate Association (CREA) Multiple Listing Service. The series for secured personal lines of credit (PLCs) is obtained by adjusting total PLCs at chartered banks to account for securitization, lending by other financial institutions and unsecured lines of credit.
Sources: Bank of Canada, Teranet, CREA and authors' calculations Last observation: 2011Q3

Chart 11: Proportion of households in selected age groups with a positive secured personal line of credit balance



Sources: *Canadian Financial Monitor* and authors' calculations Last observation: 2010

Conclusions

Similar to the experiences in many other countries, measures of household indebtedness in Canada have exhibited an upward trend over the past 30 years. In this article, we use microdata to focus particularly on the reasons for the continued increases since the late 1990s. Population aging has had a moderating effect on the overall growth in credit over this period, but this influence has been more than offset by a strong positive cohort effect; that is, for each stage of the life cycle, the mean level of household debt is systematically greater for cohorts born in later years. The widespread nature of the increases—across all age groups and in both mortgage and consumer credit—suggests that a variety

of factors, such as low interest rates, higher house prices and financial innovation, have contributed to the growth in total household debt.

A goal of future research will be to provide further evidence on the relative importance of the various determinants of growth in household credit. It will also be important to monitor the impact of new financial innovations on debt levels. This work will improve our understanding of the forces affecting future growth in household debt.

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