

SPECIAL REPORT

TD Economics



November 9, 2015

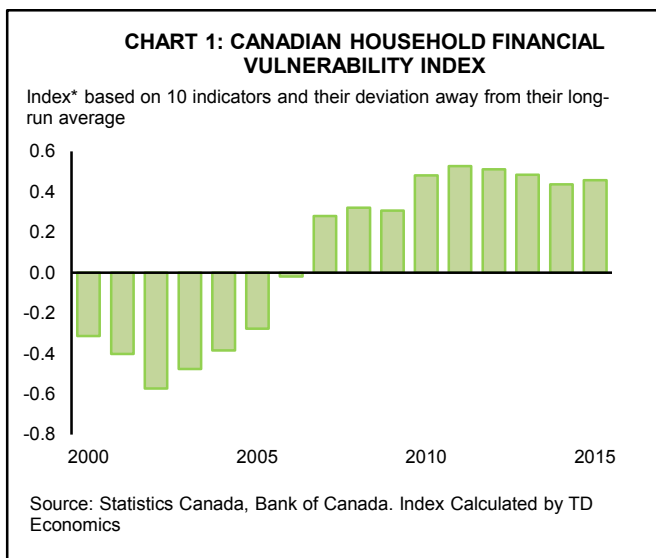
WHO'S THE MOST VULNERABLE OF THEM ALL? MEASURING HOUSEHOLD FINANCIAL VULNERABILITY BY REGION

Highlights

- In this report, we assess to what extent Canadian households' financial positions are exposed to a negative economic shock, and how this exposure varies by province.
- Our analysis reveals that after rising sharply in the decade prior, Canadian household financial vulnerability has stabilized since 2011 as households have eased off the debt accelerator and low interest rates have helped keep monthly debt payments manageable. However, financial vulnerability remains at elevated levels nationally.
- Households in British Columbia, Ontario and Alberta hold the top three spots, in that order. Households in these three provinces report having the highest debt-to-income ratios, devote the greatest share of income to making debt payments and have built up the highest degree of froth in their housing markets over the last decade.
- Saskatchewan and Manitoba have experienced the sharpest upward trend in financial vulnerability since 2002 – a trend that has remained unabated even since 2011. All measures of indebtedness and debt servicing ability hit record levels in 2015 for the two provinces.

Rapid growth in Canadian household debt levels has been a worrying development that has grabbed headlines for years. It motivated the introduction of the TD Household Financial Vulnerability Index (HFVI) back in 2011, enabling us to assess the extent to which households are exposed to a negative economic shock. The issue of household financial vulnerability remains top of mind today with the Canadian economy recently hitting a soft patch. Moreover, the increasingly divergent regional economic conditions puts particular focus on how these trends have shaped up across the provinces.

Our analysis reveals that after rising sharply in the decade prior, Canadian household financial vulnerability has stabilized since 2011 as households have eased off the debt accelerator and low interest rates have helped keep monthly debt payments manageable. However, financial vulnerability remains at elevated levels nationally. Households in British Columbia, Ontario and Alberta remain the most financially-vulnerable, a trend that has been in place for more than a decade. However, Saskatchewan and Manitoba have been narrowing the gap, exhibiting the sharpest deterioration in their respective vulnerability indices since the early 2000s.



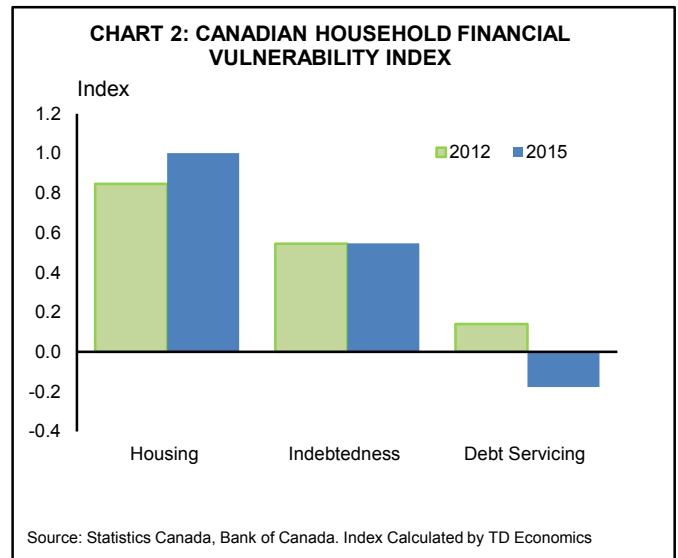
The current vulnerability assessment differs from the one presented in our 2011 report in a few ways. In addition to the series of regional indices, we have created a national index to track how imbalances associated with overall Canadian household debt have evolved over time. Second, partly to more effectively capture risks tied to housing market activity, we have expanded the list of variables used in our calculations from six to ten. These variables are grouped into three main categories, meant to capture (1) level of household indebtedness, (2) household's ability to service their debt and (3) imbalances in the housing market. For a full list of indicators, along with definitions, and the methodology used to calculate the index, please see the annex at the end of the report.

We emphasize that the TD Economics' Household Financial Vulnerability Index is not a predictor of future outcomes. Its objective is to flag regions of Canada where households are most exposed to an unexpected negative economic event such as a dramatic correction in house prices, a major disruption in incomes, or a rapid increase in borrowing rates. Importantly, the probability of one or more of these events occurring over the coming years varies by region.

Measuring vulnerability at the national level

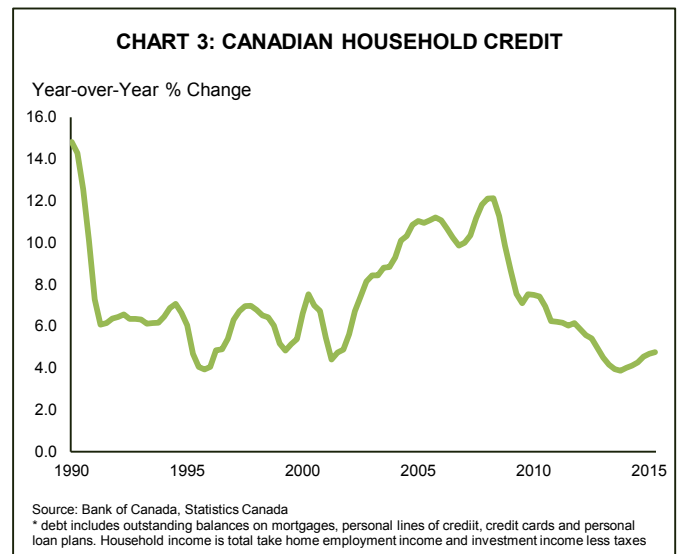
During much of the 1990's, households were accumulating debt at a slow and steady rate of 6.5% per year. But, household debt growth accelerated to a staggering 9.5% per year between 2002 and 2012, as housing markets across the country took off. During that time, household credit was growing at twice the pace of household income growth, while home prices were growing at triple that pace. While the acceleration in debt accumulation began before their implementation, federal government initiatives to loosen qualifying rules on mortgage insurance between 2004 and 2008 nonetheless helped to keep debt growth lofty at that time. First time homebuyers were allowed to amortize their loans over a longer period allowing them to take on more debt relative to their income. And, very briefly, households did not require a down payment to qualify for mortgage insurance.

Households were also saving less, as evidenced by a drop in the share of financial assets in total assets. Still, the overall debt-to-asset ratio held steady until about 2007, as rapid home price appreciation kept asset values elevated. This debt-to-asset ratio didn't start to deteriorate until about 2007, when slowing income growth and ultra-low interest rates encouraged households to draw more heavily on the



equity in their homes for consumption purposes. By 2011, all measures of household financial vulnerability were at record highs with the exception of interest-only debt service payments as a percent of income. Carrying debt was getting cheaper by the year with a continued downward trek in interest rates.

Since 2011, financial vulnerability has stabilized. A number of events have occurred to help ease household financial risks. For one, the federal government reversed course on mortgage insurance qualifying rules in 2009, lowering the amortization rate back down to 25 years (from a peak of 40) and raising the required down payment. This limited the amount of debt that households, particularly first-time homebuyers, could take on relative to their income. In addition, low interest rates have enabled households to pay back principal on their debt quicker than they have in the past.



The share of monthly income households devoted to debt interest costs has been hitting new lows every year. Since 2011, principal payments have been the dominant source of monthly debt payments (see chart 4). As such, household total outstanding debt growth has eased considerably and is now growing at roughly 5% year-over-year, a pace that is more in line with household income growth. The rise in the household debt-to-income ratio since 2013 has been more subdued.

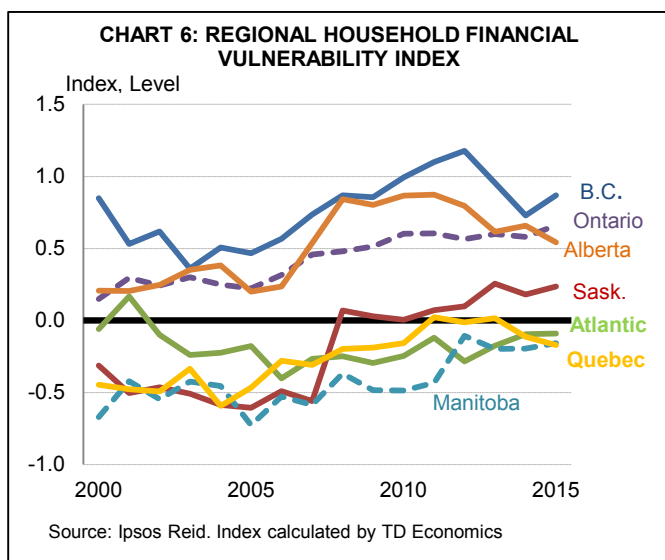
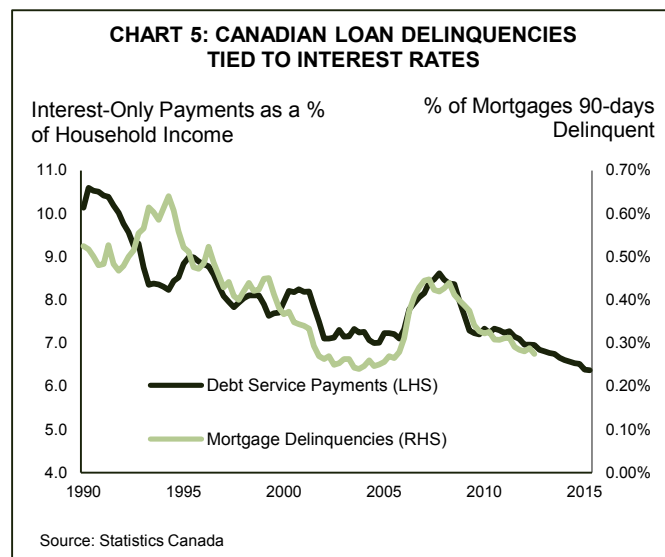
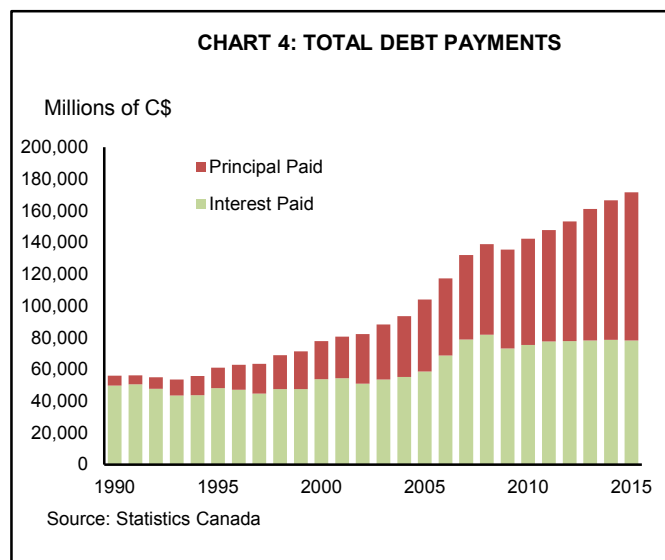
Household debt has also been growing at a slower pace than assets (both financial and real estate) since 2011 and the debt-to-asset ratio has moved back in line with historical levels. As debt payments have remained manageable, only 0.27% of mortgage holders were more than 90 days late on their mortgage payments as of June 2015, marking a historical low (see chart 5).

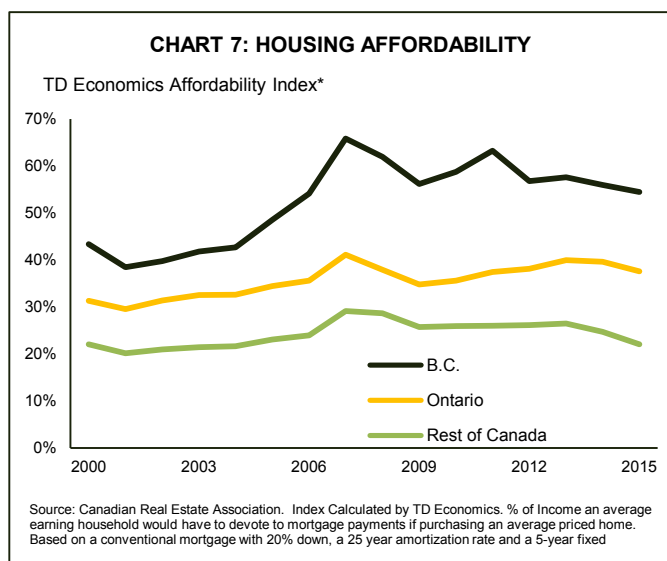
On the other hand, housing is one area where risks have continued to rise since 2011. Financial risks tied to the housing market remain most elevated, and account for the majority of the existing financial risk. Much of this has to do with home prices in Canada, which continued to surprise on the upside leaving the average home between 10% and 15% overvalued. In addition, many housing markets across Canada have a record level of new homes under construction per person.

Which region is the most vulnerable of them all?

Now that we've established some overarching national themes, we will compare financial vulnerability across provinces. Due to data limitations, a slightly different methodology was undertaken at the regional level (see annex). Moreover, in order to correct for small sample sizes, the Atlantic provinces have been aggregated into one region.

We find that households in British Columbia, Ontario and Alberta hold the top three spots as far as vulnerability is concerned. Households in these three provinces report having the highest debt-to-income ratios, devote the greatest share of income to making debt payments and have built up the highest degree of froth in their housing markets over the last decade. Moreover, their vulnerability substantially surpasses that of the other provinces by a large margin. For instance, there is a 40 percentage point difference in the debt-to-income ratio between Alberta (third place) and Saskatchewan (fourth place). In addition to the levels of vulnerability, relative changes in this metric are also important to take into account. This is because large and sudden swings can leave households unprepared in the event of a





shock. Adjustments to spending patterns and/or lifestyles which can mitigate risks can be made, but they take time to take effect. We find that Saskatchewan and Manitoba have experienced the sharpest upward trend in financial vulnerability since 2002 – a trend that has remained unabated even after 2011. All measures of indebtedness and debt servicing ability hit record levels in 2015 for the two provinces. Saskatchewan has moved from the least vulnerable in 2002 to fourth place in 2015. In the following sections, we provide brief provincial snapshots of household risk. While some common themes exist across all provinces, no two regions are exactly the same. Detailed tables can be found at the end of the report.

B.C. tops list of most vulnerable for 16th year in a row

British Columbia remains in the top spot as home to the country’s most financially vulnerable households since the Ipsos Reid survey began in 1999. B.C.’s housing markets rank among the world’s most expensive. To purchase an average priced home, a typical household would have to devote more than 50% of their income to making mortgage payments. It’s therefore not surprising that households in the province report having one of the highest debt servicing ratios. It is estimated that B.C. households devote over 9% of their monthly income to paying interest alone. B.C. is also home to an above average share of households that are 90-days delinquent on their mortgages. Some 0.36% of mortgage holders were late on their mortgage as of June of this year. Still, households in B.C. have benefited from significant wealth gains over the last decade and have one of the lowest debt-to-asset ratios. But, the majority of this wealth accumulation over the last 16 years has come in the

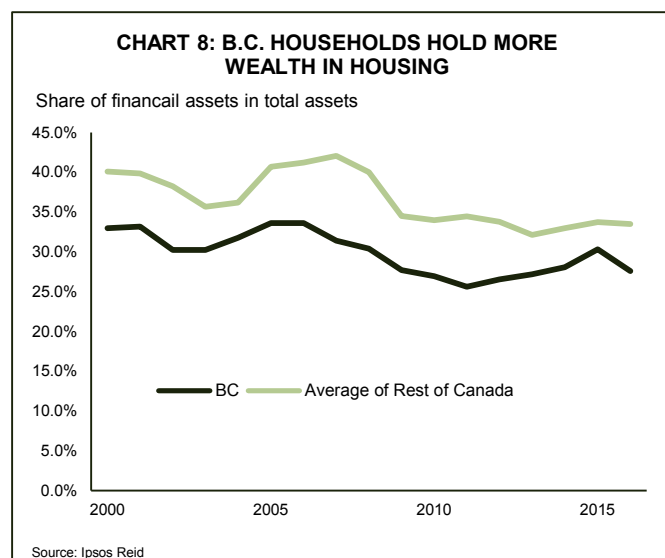
form of housing wealth. At the same time, B.C. households hold less financial assets than all other provinces except Alberta, impinging on their ability to help cover their debts.

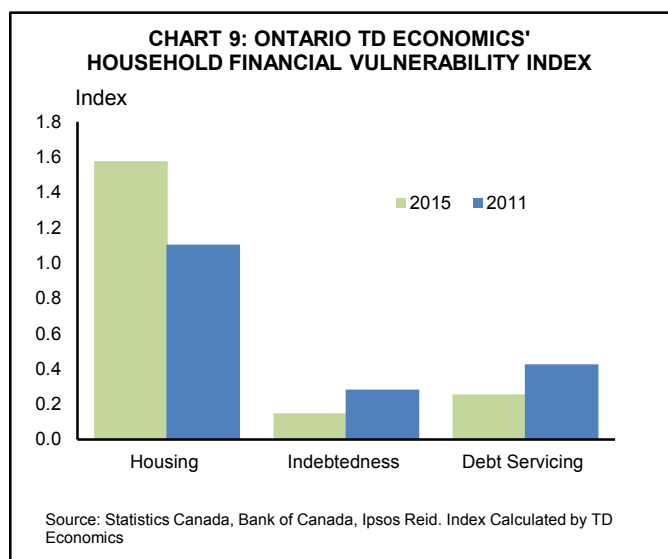
There are several caveats in the case of B.C. that deserve special attention. Relatively high home prices and elevated debt-loads are not new in the province. As such, households have likely adapted or implemented coping mechanisms.. For example, many homeowners rent out part of their homes (their basements, for instance) to help boost income and pay mortgages or other bills. Indeed, secondary rental units in single-family homes are more common in B.C. than most other provinces with the exception of Quebec. Moreover, small businesses and foreign investment are more concentrated in B.C. than other Canadian regions, potentially leading to underestimation of reported incomes and financial assets.

Existence of these caveats suggests the need to put additional weight on changes in vulnerability above and beyond just its level. On that note, B.C. recorded the fastest increase in its index over the 2002 to 2012 period (see chart 6 page 3). But over the past three years, vulnerability metrics have improved as households became less indebted. In fact, the deceleration in household credit growth since the 2008-09 recession has been most pronounced in B.C., where chartered bank personal lending slowed to just 2% y/y in the first half of 2015, outpaced by both assets and incomes. In fact, the most recent reading of the B.C. index puts it back at 2006 levels.

Hot housing markets move Ontario into second place

After sitting firmly in third place between 2008 and 2012,





Ontario overtook Alberta for second place in 2013. Moreover, Ontario's vulnerability index reached a historical record in 2015. Importantly, most of the current vulnerabilities in Ontario are tied to the housing market. This market has seen a modest home price overvaluation, a rising inventory of newly completed homes. However, at the current pace of home sales, the high levels of new home inventory should be well absorbed over the next few years. Strong home price gains in the province have eroded housing affordability since the early 2000's (see chart 7) despite ultra-low interest rates, while keeping debt servicing costs relatively elevated. Finally, Ontario has one of the highest shares of vulnerable households, second only to Saskatchewan.

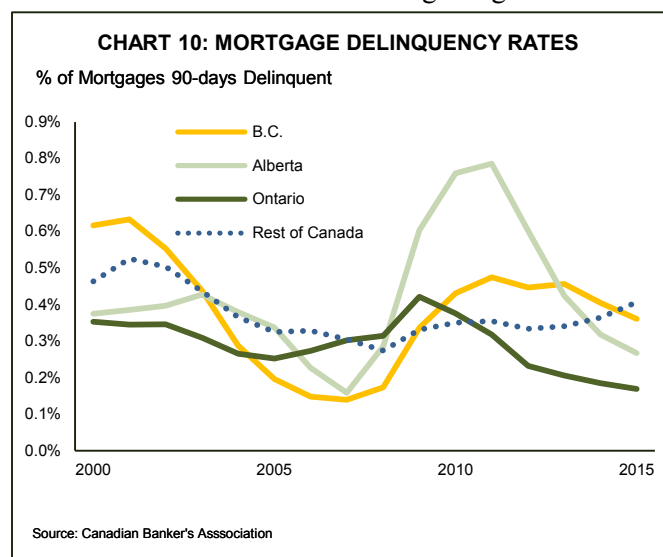
Outside of housing, however, risk metrics have improved since 2012. Despite having higher debt servicing costs, households in Ontario have the best track record for meeting their monthly mortgage payments. Only 0.17% of households were 90 days delinquent on their loans in early 2015 – nearly half of the national metric. And, overall household indebtedness has stabilized since 2012 with Ontario now ranking second last on the list for most indebted households, when considering both the household debt-to-income and debt-to-asset ratio. However, like B.C., wealth gains in Ontario have been largely tied to housing and households report a smaller share of liquid assets than a decade ago.

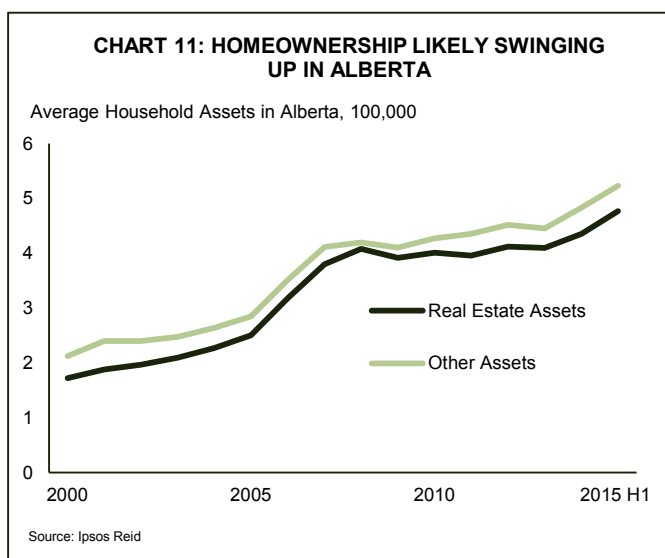
Alberta sees cyclical improvement, but economic conditions turning

Alberta has typically held second place in terms of vulnerability, but fell to third place in 2013, overtaken by Ontario. Like B.C., there has been an improvement in

household financial vulnerability since a peak was reached in 2011. However, the peak in financial vulnerability in 2011 was tied to weak economic circumstances. The province was hard hit by the economic and financial crisis of 2008/09 and the market experienced what was a multi-year housing downturn. It took a number of years for households to shake-off the shock caused by the financial crisis and the share of households delinquent 90-days or more on their mortgage peaked in 2011 at 0.8% (chart 13). Financial vulnerability has improved along with economic conditions since. Following the multi-year correction, the housing market is less inflated than it was in 2008/2009 and most signs point to home prices being fairly valued. The share of households late on their mortgages has since improved and was near historical lows for the province (0.27%) in June of this year.

But, looking beyond the cyclical improvement in household financial risk in Alberta, households appear more vulnerable than they have been in the past. Household debt has continued to rise in Alberta at a relatively swift pace over the last 13 years. The household debt-to-income ratio in Alberta is now the highest in the country. It is higher than that in B.C. and is more than 20 percentage points higher than in Ontario. Over the last decade, the province has benefited from an influx of young Canadians which has boosted the share of first time homebuyers - a segment of the population that typically has far less equity to put into their homes. As such, household debt has been used primarily to accumulate housing assets, helping to keep the debt-to-asset ratio relatively stable since 2011. But, higher indebtedness has resulted in higher monthly debt burdens, with households in Alberta devoting the greatest share of





their monthly income to making debt payments, relative to their counterparts in other provinces. Alberta is one of few provinces where debt payments have risen faster than incomes since interest rates started falling in 2008. The new home market has also popped up as a key vulnerability in the province. The province now has more new homes under construction per person than even B.C. and Ontario. New homebuilding has only become a problem recently, with slowing economic and population growth. Too much building started at the wrong time.

The province is currently facing a potentially severe economic shock related to the plunge in oil prices since 2014, and may as a result become the litmus test of the TD Economics' Household Financial Vulnerability Index. Financial vulnerability has remained steady so far, and the province is slightly less vulnerable than it was back in 2008/09 thanks to the unwinding in many housing market imbalances. But, risks to household balance sheets remain significant.

Any impact from the economic shock is likely to be lagged. Investment and labor demand takes time to adjust to the new pricing reality, with unemployment rate only spiking in recent months. It has reached 6.5% in September of this year, the highest level since the 2008/09 recession, when the unemployment rate peaked at 7.3%. This is likely to put additional strain on households with delinquency rates likely to rise. Still, given the better financial position, delinquencies are unlikely to reach the levels seen during the 2008/09 recession.

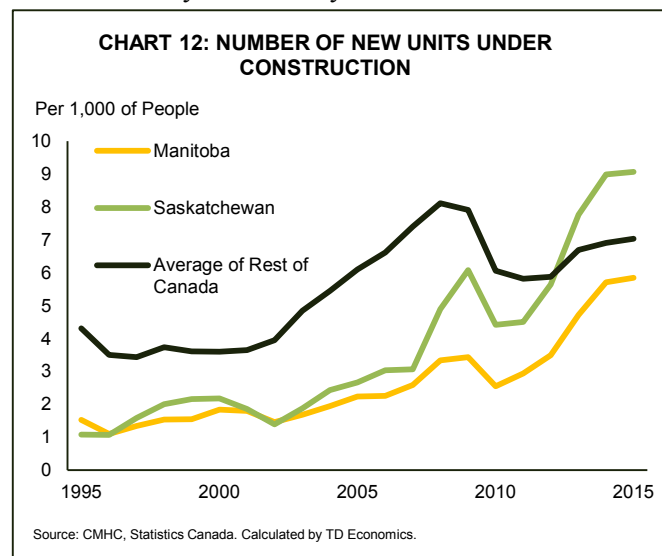
Saskatchewan quickly moving up the list

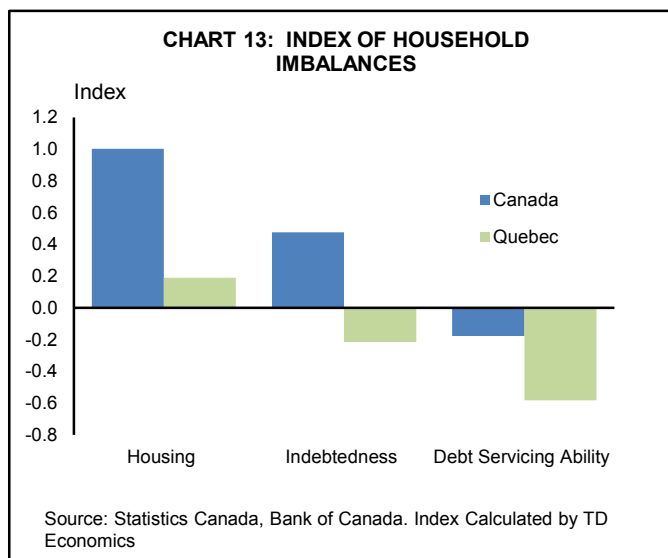
As recently as 2007, households in Saskatchewan would

have been ranked the least financially vulnerable by the TD Economics Household Financial Vulnerability index. However, the province has moved quickly up the list, placing fourth in 2015 and overall experiencing the fastest growth in financial vulnerability since 1999. Households in Saskatchewan still have a fairly low debt-to-income ratio. However, the moderation in the pace of borrowing in Saskatchewan has been less pronounced than in other provinces, with chartered bank household lending increasing by 8% per year in early 2015. Alongside a deceleration in income growth, the provincial debt-to-income ratio has continued to rise sharply.

In fact, Saskatchewan is the only province where household's ability to meet their monthly debt obligations are more strained today than they were in the early 2000's – a time when interest rates were more than 4 percentage points higher. Saskatchewan also tops all other provinces in the share of households (7.8%) with a debt service ratio of above 40%. This may already be showing up in repayment records, with the share of households that were more than 90-days past-due on their mortgages rising to 0.41% in May of this year, up from just 0.30% in 2013.

Key vulnerabilities also exist in the housing market. Home prices have come under some downward pressure this year despite a fairly valued housing market. Moreover, Saskatchewan has seen an unprecedented rise in the number of new homes under construction per person in recent years. New home construction this year is some 6 times higher than it was in 2002 – while most other provinces saw a two-fold increase during the same period. As such, the market is facing a growing glut of homes for sale which has tipped the market into buyer's territory.





Much like Alberta, Saskatchewan will also have to grapple with the fallout from the sharp drop in oil prices. The unemployment rate rose to 5.1% by September of this year. The rate is still well below the 6.0% peak reached during the 2008/2009 recession, but is nonetheless 1.6 percentage points higher than a year ago. The Saskatchewan economy is slightly more diversified than Alberta's, with a substantial share of agricultural expected to cushion the economic downturn. However, the household sector has amassed more froth than it had during the years leading up to the last recession, while the housing market is also an area of sensitivity following years of anticipatory overbuilding leading up to sharply deteriorating economics.

Quebec not rocking the cradle

Quebec has moved down the list of most financially vulnerable households since 2012, falling from fourth to fifth place this year. Overall, Quebec households don't stand out on any metric used to calculate the index. Aside for the lowest share of households (3.5%) reporting a debt service ratio of over 40%, most provincial metrics appear rather balanced. Instead, Quebec's improvement in moving down the list is due to the modest improvements on all fronts, including housing, indebtedness and debt servicing ability.

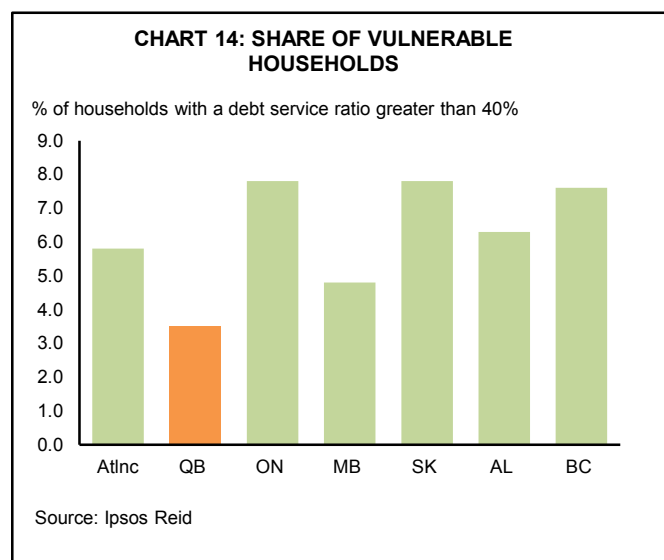
The Quebec housing market went through a soft landing between 2012 and 2014. This helped to unwind some of the housing imbalances that had accumulated across the province, with only a modest overvaluation (below 5%) still existing. In addition, while the economic backdrop in the province has been soft since 2013, pushing up the unemployment rate and mortgage delinquencies, at 7.7% and 0.36% respectively, both rates remain only relatively

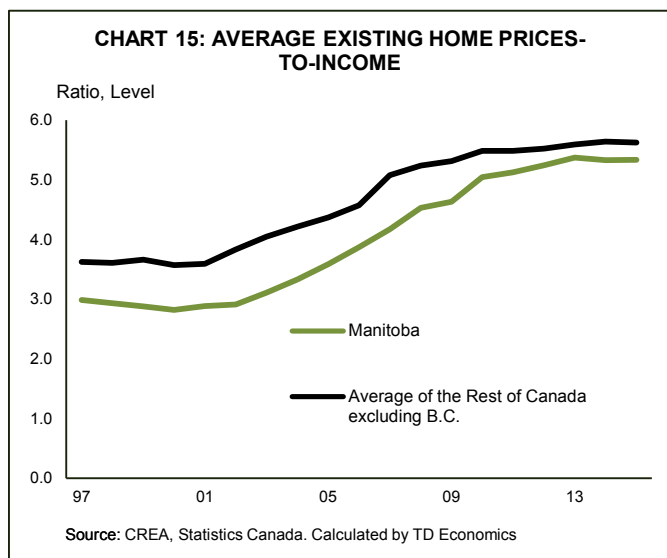
elevated. Better yet, delinquency rates should move back in line with their long averages as the economic backdrop improves with households already in the best financial position in nearly a decade.

Housing activity drives vulnerability in Manitoba

Manitoba had predominately held the honour for least financially vulnerable households since the Ipsos Reid Survey began in 1999. But, the province lost that distinction to Atlantic Canada in 2015. Manitoba's hot housing markets are the main reason for the province losing its crown. Existing home prices have risen at double-digit rates on average between 2003 and 2012 – a pace typically indicative of a bubbly market. As a result, Manitoba went from having one of the lowest home-price-to-income ratios and being the most affordable market in Canada in 2002, to having the fourth most expensive housing market in Canada in this year. Manitoba has also experienced a building surge since 2002. The pace of housing construction this year to date is four times the pace experienced in 2002 (see chart 12 on page 6) – about twice the gain seen elsewhere

Importantly, by all other measures, the degree of vulnerability in Manitoba is low. Indebtedness is among the lowest in the country. Not only did households in Manitoba report having the lowest debt service ratio among Canadian households in 2015, the share of income households devote to making monthly debt payments has come down the most since interest rates started to fall in 2008. And, only 4.8% of households surveyed reported having a debt service ratio of greater than 40% - second only to Quebec's. Meanwhile, the share of households late on their mortgage payments





was in line with the national average in May of this year.

All in all, the province has been right behind Saskatchewan in terms of growth in household financial vulnerabilities. But, while financial vulnerabilities are rising fast in Manitoba, the province still has a long way until it catches up to indebtedness levels reached in other parts of the country.

The Atlantic Region: More debt + less assets = more problems

Manitoba's loss is the Atlantic Region's win, with regional vulnerability deemed lowest across the four Atlantic provinces this year. But, this honour has fallen on Atlantic Canada less due to outright improvement in metrics, and more as a result of deterioration elsewhere. In fact, most of the financial indicators in the Atlantic Region have held relatively steady over time.

Following a multi-year soft landing in the housing market, the Atlantic provinces are now home to the most fairly valued and balanced housing markets across the country. The region has one of the lowest household debt-to-income ratios across the country and fairly low debt service costs when compared to other provinces during the first half of this year – placing third after Quebec and Manitoba for best debt affordability. Only two indicators point to higher vulnerabilities in the Atlantic Region: the debt-to-asset ratio and the share of mortgages in arrears of 90-days or more. Household debt has been growing faster than assets in the Atlantic Region, and households reported having the highest debt-to-asset ratio across the country over the first half of 2015. This is likely a combination of housing market weakness weighing on home price gains and asset values,

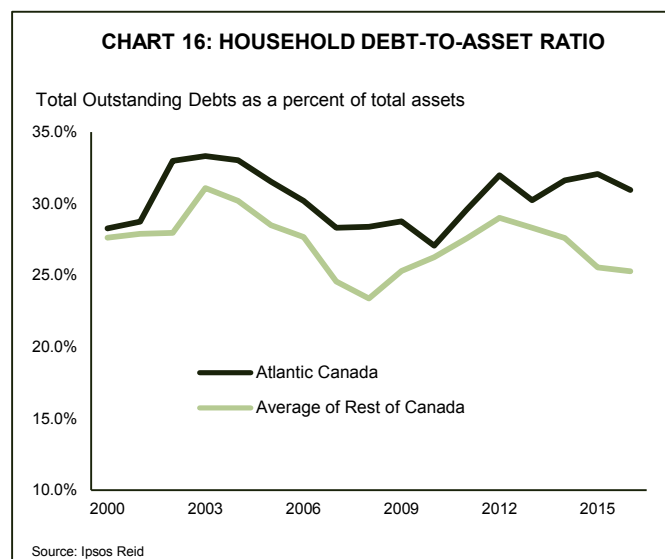
as well as heavier reliance on debt for funding consumption.

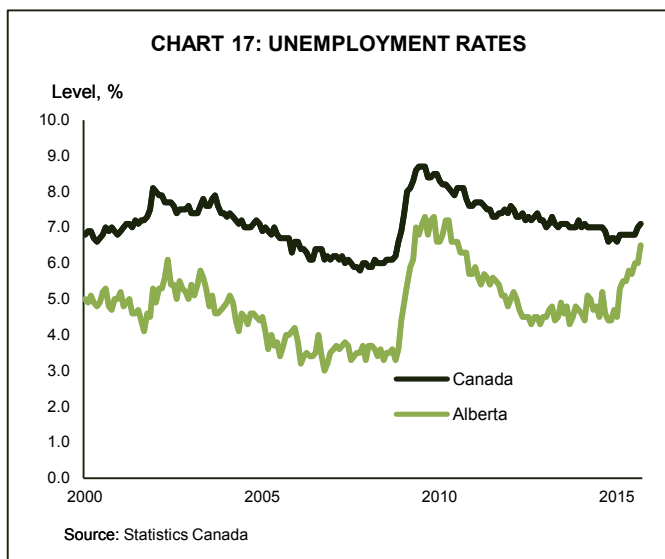
Households in the Atlantic region have reported stagnating savings in financial assets for a decade now and have the least amount of financial assets to cover their debts. Weak economic prospects in the region have also nudged financial vulnerability among households. Rising unemployment has led to a sharp upward trek in the share of delinquent mortgages. Since bottoming out in 2007, the ratio of mortgages in arrears rose by one-half to 0.59%, a record high for the region and more than twice the national average.

Bottom Line

Overall, we find that after rising sharply in the decade prior, Canadian household financial vulnerability stabilized since 2011 as households have eased off the debt accelerator and low interest rates have helped keep monthly debt payments manageable. However, financial vulnerability remains at elevated levels nationally and there is no doubt that households are more vulnerable to a negative shock than they were in 2008/2009. Households in British Columbia, Ontario and Alberta remain the most financially-vulnerable. However, Saskatchewan and Manitoba have been narrowing the gap, exhibiting the sharpest deterioration in their respective vulnerability indices since the early 2000s.

The Canadian economy did skid through an unanticipated soft patch through the first half of the year – but the contraction was modest. And, a 50 basis point reduction in both short-term and long-term consumer borrowing rates helped to offset the soft economic backdrop once again. Looking forward, the combination of only gradually rising interest rates and improving economic growth should help





keep risks tied to household debt and housing manageable in the near-term. However, the outlook and risks differ by region.

Commodity-dependent markets are likely to see a further acceleration in household financial vulnerabilities through the rest of 2016 and 2017, tied to weak economic conditions. The job market in oil-dependent economies such as Alberta and Saskatchewan has remained relatively stable over the first half of the year. However, the provinces have suffered a substantial blow to economic activity given the drop in oil prices over the last year. The employment market tends to

be a lagging indicator and job losses could mount through the rest of 2015 and into 2016, pushing up delinquency rates. As such, our base case calls for the housing market downturn currently underway in Saskatchewan and Alberta to persist into 2016.

Economic prospects are far brighter in most other regions. Economies of B.C., Ontario and Quebec should benefit from a lower Canadian dollar and robust U.S. growth over coming quarters. Incomes should continue growing at a decent pace, keeping debt manageable for the majority of households across non-commodity dependent Canada. At the same time, the odds of major setbacks occurring are not insignificant. In particular, the risk of a severe home price correction in B.C. and Ontario has risen to a medium probability event given the continued run-up in prices in Toronto and Vancouver. Based on expectations for relatively gradual Federal Reserve rate hikes through 2017, we project the Canadian 5-year government bond yield to rise by some 145 basis points by the end of 2017. Given the stretched valuations and heightened sensitivity to interest rate movements, our base case forecast calls for a modest unwinding in housing activity in Ontario and B.C. beginning in the second half of 2016. However, the faster home prices rise, the higher the risk of a deeper downturn over the next few years.

Table 1: Canadian Household Debt-to-Income Ratio								
Year	CANADA	Atlantic	QB	ON	MB	SK	AL	BC
99	107.4	88.3	84.4	105.3	87.3	82.6	105.0	120.7
00	108.3	88.7	87.8	106.0	78.5	89.7	108.7	137.7
01	106.9	99.7	85.0	111.3	86.0	84.5	119.1	129.0
02	109.8	95.7	87.3	113.9	90.3	90.8	127.2	141.7
03	113.7	86.2	92.1	114.1	90.6	93.0	122.8	132.8
04	120.6	90.2	82.1	117.4	92.1	98.9	121.5	137.8
05	127.3	100.4	85.6	114.4	86.7	102.1	121.9	135.0
06	131.2	89.7	87.6	116.7	86.8	94.2	112.0	139.9
07	138.2	91.0	87.6	118.8	90.3	82.2	118.5	146.6
08	144.9	89.9	90.5	118.8	97.5	92.7	131.5	143.8
09	151.8	93.8	93.4	124.5	91.2	100.0	127.3	144.9
10	156.6	99.1	98.3	137.8	103.5	112.8	144.8	160.2
11	158.5	111.4	110.1	138.6	107.6	127.9	155.8	168.8
12	160.3	102.1	105.7	138.2	124.0	122.0	163.3	163.0
13	161.1	108.4	107.1	136.7	116.9	113.2	160.9	163.7
14	162.3	110.5	105.7	136.3	110.0	108.7	165.4	145.3
15	163.0	110.6	112.2	132.3	119.0	112.4	155.4	153.1

Source: Statistics Canada, Ipsos Reid. Note the provincial debt-to-income ratios will not align with the national overall due to different methodology and data sources.

Table 2: Canadian Household Debt-to-Asset Ratio								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	15.96	0.28	0.31	0.27	0.28	0.24	0.28	0.28
00	15.44	0.29	0.30	0.26	0.27	0.26	0.30	0.29
01	15.97	0.33	0.31	0.28	0.25	0.25	0.30	0.28
02	16.51	0.33	0.33	0.30	0.28	0.29	0.34	0.33
03	17.01	0.33	0.35	0.27	0.27	0.30	0.33	0.29
04	17.03	0.32	0.28	0.27	0.26	0.29	0.32	0.30
05	17.00	0.30	0.29	0.27	0.23	0.29	0.32	0.27
06	16.81	0.28	0.26	0.26	0.21	0.26	0.24	0.25
07	16.81	0.28	0.25	0.26	0.24	0.20	0.22	0.23
08	18.56	0.29	0.28	0.26	0.27	0.22	0.26	0.24
09	19.97	0.27	0.28	0.27	0.27	0.23	0.27	0.26
10	19.67	0.30	0.27	0.29	0.27	0.25	0.31	0.27
11	19.55	0.32	0.28	0.28	0.26	0.30	0.33	0.29
12	19.45	0.30	0.28	0.27	0.27	0.28	0.33	0.27
13	19.12	0.32	0.28	0.26	0.27	0.25	0.32	0.28
14	18.28	0.32	0.27	0.25	0.24	0.21	0.32	0.24
15	17.97	0.31	0.28	0.23	0.25	0.24	0.27	0.25

Source: Statistics Canada, Ipsos Reid. Note the provincial debt-to-income ratios will not align with the national overall due to different methodology and data sources.

Table 3: Total Debt Service Ratio (Monthly debt payments as a % of income)								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	11.6	20.5	19.5	20.2	19.8	18.9	20.2	22.3
00	11.8	21.1	19.8	21.6	18.7	20.7	20.7	23.4
01	11.7	21.1	19.6	22.2	20.0	19.2	21.0	22.1
02	11.6	20.3	19.1	21.4	19.0	18.3	20.0	22.9
03	11.9	20.1	21.8	20.2	19.8	17.2	20.6	21.6
04	12.0	19.2	18.1	20.3	18.7	17.9	20.6	21.7
05	12.8	20.0	17.9	19.1	16.7	17.9	19.4	21.6
06	13.3	17.9	19.5	19.7	19.7	17.6	18.2	20.4
07	14.1	19.7	17.0	19.5	18.0	16.3	18.1	20.9
08	14.1	18.2	17.1	19.6	16.3	17.1	18.8	22.8
09	13.6	17.5	17.4	18.9	15.1	18.8	19.1	19.7
10	13.8	17.3	16.8	18.9	14.6	17.3	19.4	21.9
11	13.7	17.8	18.5	19.3	15.7	19.3	20.6	22.7
12	13.7	16.5	17.4	20.1	17.1	18.2	20.9	26.2
13	13.9	16.2	17.1	19.3	15.7	19.9	22.2	21.1
14	13.9	18.3	17.0	18.8	16.3	16.4	21.7	19.5
15	14.0	16.4	16.8	20.3	15.9	19.8	21.8	21.5

Source: Statistics Canada, Ipsos Reid. Note the provincial debt-to-income ratios will not align with the national overall due to different methodology and data sources.

Table 4: Interest-Only Debt Service Payments as a % of Monthly Income								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	7.7	7.4	7.2	8.4	6.7	8.0	8.3	10.2
00	8.1	8.0	7.4	8.9	7.4	8.6	8.8	10.9
01	7.9	7.9	6.9	9.0	7.1	8.3	8.1	10.1
02	7.2	7.0	6.1	8.3	6.2	7.2	7.3	9.0
03	7.2	7.1	6.2	8.3	6.3	6.9	7.5	9.1
04	7.1	7.0	6.2	8.1	6.2	6.6	7.3	8.9
05	7.2	7.0	6.5	8.2	6.3	6.7	7.1	9.1
06	7.8	7.3	7.0	8.9	6.9	7.2	7.8	9.7
07	8.4	7.8	7.5	9.7	7.3	7.5	8.8	10.7
08	8.3	7.6	7.5	9.4	7.4	7.1	8.9	10.5
09	7.3	6.5	6.6	8.0	6.6	6.5	8.1	9.7
10	7.3	6.4	6.6	7.9	6.7	6.5	8.0	9.6
11	7.2	6.6	6.3	8.0	6.5	6.3	7.6	9.5
12	6.9	6.3	6.5	7.7	6.4	6.2	6.8	9.1
13	6.7	6.1	6.6	7.5	6.2	5.8	6.4	8.8
14	6.6	6.1	6.6	7.4	6.1	5.7	6.1	8.7
15	6.4	5.9	6.4	7.2	5.9	5.5	5.9	8.3

Source: Statistics Canada, Ipsos Reid.

Table 5: Share of Households with a Debt Service Ratio of > 40%								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	7.2	6.3	6.7	7.6	7.4	3.4	6.0	10.0
00	8.4	9.1	7.8	8.2	3.3	7.2	9.5	10.1
01	8.3	11.5	7.5	9.1	5.8	6.1	8.9	6.7
02	6.7	6.2	6.8	6.0	4.8	6.8	7.1	8.6
03	6.9	5.4	6.8	7.5	7.5	5.7	7.9	5.6
04	7.0	7.2	4.8	6.8	10.5	6.0	9.8	9.1
05	5.9	7.2	4.8	6.2	5.2	4.6	6.4	7.4
06	6.5	5.3	7.4	6.1	7.3	6.7	6.2	7.3
07	5.6	5.4	5.3	6.4	3.0	2.0	3.8	7.3
08	6.2	5.4	5.5	6.7	5.7	10.2	5.1	7.4
09	6.2	5.7	5.3	6.9	3.8	8.7	5.2	6.4
10	6.6	5.7	5.5	7.2	2.5	7.8	8.0	7.1
11	6.5	4.8	6.6	6.8	2.3	4.2	7.2	8.4
12	6.8	3.4	6.1	6.3	4.7	4.9	8.6	9.9
13	5.9	4.6	5.9	6.1	3.1	9.0	4.8	8.2
14	5.7	4.8	4.6	5.7	4.0	8.7	6.4	7.6
15	6.3	5.8	3.5	7.8	4.8	7.8	6.3	7.6

Source: Ipsos Reid

Table 6: Ratio of Financial Assets to Total Assets								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	0.58	0.40	0.38	0.38	0.41	0.44	0.39	0.33
00	0.60	0.39	0.40	0.39	0.41	0.43	0.38	0.33
01	0.58	0.36	0.40	0.36	0.39	0.43	0.36	0.30
02	0.56	0.34	0.35	0.34	0.41	0.39	0.31	0.30
03	0.54	0.36	0.34	0.34	0.40	0.38	0.35	0.32
04	0.54	0.39	0.40	0.37	0.47	0.46	0.35	0.34
05	0.55	0.41	0.38	0.37	0.48	0.46	0.36	0.34
06	0.55	0.43	0.42	0.38	0.50	0.44	0.36	0.31
07	0.55	0.42	0.41	0.39	0.44	0.41	0.33	0.30
08	0.53	0.37	0.35	0.35	0.39	0.31	0.29	0.28
09	0.52	0.38	0.34	0.33	0.34	0.35	0.30	0.27
10	0.53	0.36	0.36	0.33	0.38	0.34	0.30	0.26
11	0.54	0.34	0.35	0.33	0.39	0.31	0.31	0.27
12	0.53	0.34	0.33	0.33	0.34	0.29	0.31	0.27
13	0.54	0.34	0.32	0.33	0.35	0.33	0.31	0.28
14	0.55	0.34	0.35	0.34	0.35	0.33	0.32	0.30
15	0.55	0.30	0.36	0.33	0.37	0.33	0.32	0.28

Source: Statistics Canada, Ipsos Reid. Note the provincial debt-to-income ratios will not align with the national overall due to different methodology and data sources.

Table 7: Share of Mortgages in Arrears 90-Days or More								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	0.47%	0.52%	0.53%	0.41%	0.60%	0.41%	0.43%	0.62%
00	0.42%	0.50%	0.39%	0.35%	0.52%	0.44%	0.38%	0.62%
01	0.43%	0.59%	0.44%	0.34%	0.65%	0.43%	0.39%	0.63%
02	0.41%	0.58%	0.30%	0.35%	0.67%	0.47%	0.40%	0.55%
03	0.34%	0.50%	0.22%	0.31%	0.57%	0.45%	0.43%	0.44%
04	0.29%	0.43%	0.19%	0.27%	0.45%	0.39%	0.38%	0.29%
05	0.26%	0.42%	0.17%	0.25%	0.40%	0.32%	0.34%	0.20%
06	0.25%	0.41%	0.19%	0.27%	0.38%	0.34%	0.23%	0.15%
07	0.25%	0.38%	0.22%	0.30%	0.25%	0.37%	0.16%	0.14%
08	0.28%	0.40%	0.25%	0.31%	0.21%	0.24%	0.29%	0.17%
09	0.41%	0.48%	0.35%	0.42%	0.25%	0.25%	0.60%	0.34%
10	0.43%	0.47%	0.36%	0.38%	0.28%	0.30%	0.76%	0.43%
11	0.41%	0.46%	0.34%	0.32%	0.28%	0.34%	0.79%	0.47%
12	0.34%	0.46%	0.32%	0.23%	0.24%	0.32%	0.60%	0.45%
13	0.31%	0.49%	0.32%	0.21%	0.25%	0.30%	0.42%	0.46%
14	0.29%	0.55%	0.34%	0.18%	0.24%	0.33%	0.32%	0.40%
15	0.28%	0.59%	0.36%	0.17%	0.27%	0.41%	0.27%	0.36%

Source: Canadian Banker's Association

Table 8: Home Price-to-Income Ratio								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	4.5	3.1	3.3	4.6	2.9	3.3	4.0	6.4
00	4.4	3.1	3.1	4.5	2.8	3.3	3.9	6.3
01	4.5	3.2	3.2	4.7	2.9	3.2	3.7	6.1
02	4.9	3.4	3.5	5.1	2.9	3.2	4.0	6.4
03	5.2	3.4	4.0	5.4	3.1	3.2	4.2	6.9
04	5.5	3.6	4.4	5.6	3.3	3.2	4.2	7.3
05	5.8	3.8	4.6	5.8	3.6	3.4	4.3	8.1
06	6.1	3.6	4.8	5.9	3.9	3.5	5.1	9.0
07	6.6	3.9	5.0	6.2	4.2	4.4	6.0	9.9
08	6.3	4.1	5.1	6.1	4.5	5.2	5.7	10.0
09	6.6	4.1	5.3	6.3	4.6	5.2	5.6	10.2
10	6.8	4.3	5.6	6.6	5.0	5.2	5.6	11.0
11	7.1	4.3	5.7	6.9	5.1	5.1	5.4	11.7
12	6.8	4.3	5.7	7.1	5.2	5.2	5.3	10.5
13	7.1	4.3	5.7	7.3	5.4	5.3	5.3	10.6
14	7.3	4.2	5.7	7.7	5.3	5.3	5.3	10.9
15	7.6	4.1	5.7	7.9	5.3	5.2	5.2	11.6

Source: Canadian Real Estate Association and Statistics Canada. Calculated by TD Economics

Table 9: TD Economics' Affordability Index								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	32.2%	22.3%	23.6%	32.4%	20.4%	23.7%	28.1%	45.4%
00	30.7%	21.5%	21.4%	31.3%	19.5%	22.7%	26.6%	43.4%
01	28.3%	20.1%	19.8%	29.6%	18.1%	20.0%	23.2%	38.4%
02	30.2%	20.8%	21.9%	31.4%	18.0%	19.8%	24.9%	39.8%
03	31.7%	20.9%	24.0%	32.5%	18.8%	19.5%	25.7%	41.8%
04	32.0%	21.1%	25.5%	32.6%	19.4%	18.9%	24.7%	42.7%
05	34.5%	22.4%	27.6%	34.5%	21.4%	20.4%	25.6%	48.5%
06	37.0%	21.9%	29.0%	35.6%	23.4%	20.9%	30.9%	54.1%
07	43.9%	25.7%	33.5%	41.2%	27.9%	29.0%	40.2%	65.8%
08	39.4%	25.4%	31.8%	37.9%	28.2%	32.5%	35.3%	62.0%
09	36.4%	22.8%	29.2%	34.8%	25.6%	28.9%	31.1%	56.2%
10	36.7%	22.9%	30.3%	35.6%	27.1%	28.0%	30.3%	58.8%
11	38.2%	23.1%	30.8%	37.4%	27.8%	27.9%	29.4%	63.3%
12	36.9%	23.4%	30.8%	38.1%	28.3%	28.1%	28.4%	56.8%
13	38.4%	23.4%	31.2%	40.0%	29.3%	29.0%	28.7%	57.6%
14	37.7%	21.6%	29.3%	39.6%	27.5%	27.4%	27.4%	56.0%
15	36.0%	19.0%	26.5%	37.6%	25.3%	24.5%	24.2%	54.5%

Source: Canadian Real Estate Association and Statistics Canada. Calculated by TD Economics. Defined as the share of income a household would have to devote to paying mortgage payments if purchasing an average priced home. Assumes a conventional mortgage with 20%, a 5-year fixed mortgage rate amortized over 25 years.

Table 10: Number of New Homes Under Construction Per 1,000 of People								
Year	Canada	Atlantic	QB	ON	MB	SK	AL	BC
99	3.1	2.1	1.2	3.3	1.5	2.2	5.6	5.8
00	3.4	2.0	1.4	4.0	1.8	2.2	5.9	4.7
01	3.6	2.1	1.6	4.6	1.8	1.9	6.0	3.9
02	3.9	2.4	1.8	5.3	1.5	1.4	6.2	4.1
03	4.6	2.8	2.7	5.6	1.7	1.9	8.3	4.9
04	5.2	3.4	3.3	6.0	1.9	2.4	8.9	5.7
05	5.8	3.0	4.3	6.4	2.2	2.7	9.0	7.8
06	6.2	2.9	4.5	6.4	2.3	3.0	9.9	9.4
07	6.6	3.1	4.4	6.3	2.6	3.1	12.5	10.8
08	7.1	3.3	4.2	6.4	3.3	4.9	14.8	11.8
09	7.2	3.4	4.1	6.9	3.4	6.1	12.9	12.4
10	5.9	3.3	3.8	6.4	2.5	4.4	7.9	8.8
11	5.7	3.8	4.2	6.4	2.9	4.5	7.4	7.2
12	5.9	4.1	4.5	6.4	3.5	5.6	6.6	7.7
13	6.9	4.5	4.8	7.8	4.7	7.8	8.1	8.3
14	7.1	4.6	4.4	8.2	5.7	9.0	9.3	8.0
15	7.3	3.7	4.2	8.4	5.8	9.1	10.4	8.5

Source: CMHC and Statistics Canada. Calculated by TD Economics

Annex 1 – Methodology for building a financial vulnerability index

Data sources

Most indicators used in the calculation of the national index are provided by Statistics Canada and the Canadian Real Estate Association. While the Canadian Real Estate Association provides extensive housing market data by region, Statistics Canada does not provide up-to-date information on the metrics on a provincial basis. The detailed regional household financial snapshot comes from the Ipsos Reid Financial Monitor, which is based on a comprehensive quarterly survey of 12,000 households from coast to coast. This survey has its limitations. For one, the quality of this data is reliant on the accuracy of the responses. There might be, for example, a tendency for households to over/under estimate the value of their homes. In addition, for smaller jurisdictions in the Atlantic, the reliability of the survey is reduced by the relatively small sample sizes, thus necessitating the need to aggregate the data across smaller regions. In addition, the historical perspective at the regional level is limited to 1999 onwards. Despite these limitations, the Financial Monitor is a highly credible source. In fact, it is used extensively by the Bank of Canada in its assessment of financial stress among households. As such, several indicators within the survey form the backbone of our regional household vulnerability index.

Indicators:

Measure of household indebtedness

- The household debt-to-personal disposable income ratio: Measures how much debt households are holding relative to their income. Calculated as outstanding debt (including credit cards, personal lines of credit and mortgages) as a percent of their after-tax income.
- The household debt-to-asset ratio: Calculated as total outstanding household debt divided by total financial and real estate assets. Taking into account what debt is used for (i.e., to purchase assets or for consumption purposes) is important. Rising debt levels may prove sustainable if households are also building wealth. Note that at the provincial level, the value of this ratio is subject to household's perception of assets values.

Ability to meet household debt obligations

- The total debt service ratio: Monthly interest and

principal payments as a percent of after-tax household income. This captures households' ability to cope with their monthly debt obligations.

- Interest-only debt-service ratio: Monthly interest payments as a percent of after-tax household income. Including the overall debt service ratio and interest-only portion may seem redundant; however interest is the true cost of debt, while principal payments on mortgages can be viewed as forced savings. Indeed, the interest-only debt service ratio is the best leading indicator of credit delinquencies.
- The share of financially vulnerable households. Proportion of households with a debt service ratio of 40% or above. Averages can be deceiving, and low debt service ratios may mask a growing share of vulnerable households. This threshold is used because Bank of Canada research shows that the probability of defaulting on one's loans increases significantly once the debt-service ratio reaches that mark.
- Mortgage delinquency rate: Percent of mortgages in arrears 90-days or more. Household's track record on meeting their debt payments. While the unemployment rate is usually considered a leading indicator for delinquencies, this ratio started to tick up in the U.S. prior to the unemployment rate, suggesting that higher delinquencies may be a leading indicator of financial stress.
- Household liquid assets-to-total assets: Calculated as the ratio of financial assets (including cash, deposits and equity holdings) to total assets. Much of Canadians' assets are tied up in their homes, which is not easily converted into cash. To meet immediate debt obligations (or to avoid having to sell their homes), households will require other liquid assets.

Housing Market Imbalances:

- Existing Home Prices-to-Income Ratio: Average resale prices from Multiple Listing Service (MLS) as a percent of disposable income. This provides a measure (albeit an imperfect one) of overvaluation in the housing market as well as the susceptibility of household balance sheets to a housing price correction.
- Housing Affordability Ratio: The share of income an average income earning household would have to devote to mortgage payments if purchasing an average priced home with a conventional mortgage. A

conventional mortgage is defined as a mortgage with a 25 year amortization rate, 20% down and a 5-year fixed mortgage rate. This is an alternative measure of overvaluation to the one directly above, taking into account the structural decline in borrowing rates. Lower rates allow households to purchase more expensive homes relative to their income.

- Number of new homes under construction per person. This is the number of new homes under construction divided by the population of those 15 years and older. This is a leading indicator of overbuilding. If overbuilding is underway, home prices could come under considerable pressure once units are completed.

Index Construction:

For the majority variables, the degree of vulnerability is measured by how far each indicator has deviated away from the long run average, where:

Measured risk for indicator (i) at time (t) = Current Value of indicator (i) – long-run average of indicator (i) divided by the standard deviation of indicator (i)

Where,

- The standard deviation measures the degree to which each variable has historically deviated from its long-run average. It is a measure of volatility.
- At the national level, the long-run average and standard deviation are calculated over the full sample from 1990 to 2015
- At the regional level, the long-run average and standard deviation is calculated over 1999 to 2015. The Ipsos Reid survey began in 1999, therefore restricting the time frame we have to work with. Also, note, this implies that the regional indices are a better gauge of how risk has evolved since 1999 by province and less so of a direct measure of excesses related to household debt and housing activity.

The sole difference is calculation for the measured level of risk of the overall Canadian household debt-to-income ratio. The above methodology relies on the indicators being stationary – meaning they roughly oscillate around a long-run average. The household debt-to-income ratio has been on an upward trend through time. Low interest rates and financial innovation have allowed households to take on more debt relative to their income over time. The key is

how fast the debt-to-income rose during 2002 to 2007. In this instance, we use the U.S. deleveraging experience as a guide. In both Canada and the U.S. the debt-to-income ratio rose at a slow and steady pace during the 1990’s (Chart A1). Then debt growth picked up substantially in the early 2000’s in both the U.S. and Canada. We can calculate a sustainable debt-to-income ratio by carrying the 1990’s trend forward. And, in the U.S., the debt-to-income ratio corrected back to this estimated “sustainable level”. As such, for the debt-to-income ratio we calculate the measured risk as:

Measured risk of the debt-to-income ratio at time (t) = Current actual debt-to-income ratio less estimated sustainable debt-to-income ratio at time (t) divided by the standard deviation in the debt-to-income ratio;

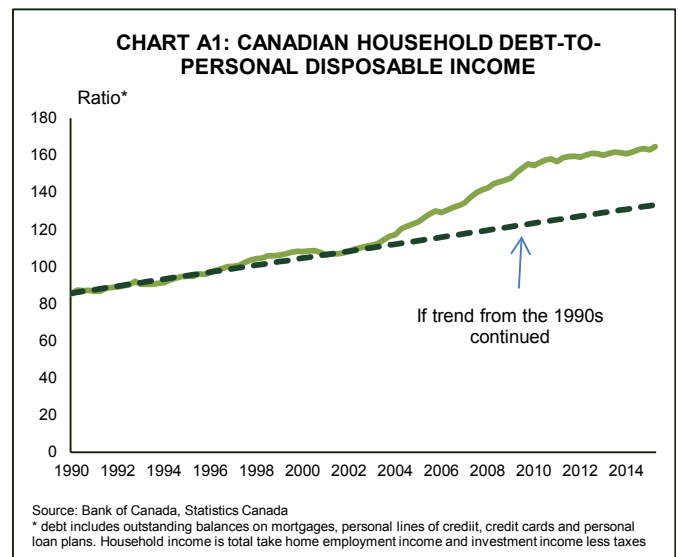
Where;

- The sustainable trend is calculated by carrying the trend of the 1990’s forward. Or in other words, what would the debt-to-income ratio be today, if it only rose by 0.5 percentage points per quarter between 2000 and 2015.
- The standard deviation is the same as above, but is estimated as standard deviations away from the sustainable long-run trend.

Once we have calculated the measured risk for each variable, we bucket them into each category, where:

Measured risk (MR) for household indebtedness = MR(debt-to-income ratio)*0.5+MR(debt-to-asset ratio)

Measured risk (MR) with households’ ability to meet debt obligations = MR(total debt-service ratio)*1/5 +



$MR(\text{interest only debt-service ratio}) * 1/5 + MR(\text{financial assets as a \% of total assets}) * 1/5 + MR(\text{share of vulnerable households}) * 1/5 + MR(\text{\% of mortgages in arrears 90 days or more}) * 1/5$

Measured risk (MR) with housing imbalances = $MR(\text{housing affordability index}) * 1/3 + MR(\text{home price-to-income ratio}) * 1/3 + MR(\text{units under construction per 1000 people}) * 1/3$

Then the overall index is then calculated as an equal weighted average of the three subcomponents:

TD Household Financial Vulnerability Index = $1/3 * MR(\text{household indebtedness}) + 1/3 * MR(\text{debt serviceability}) + 1/3 * MR(\text{housing imbalances})$

TD Economics has adopted an equal weighting strategy. Each indicator is equally weighted within their subcomponents. The overall index is then calculated as an equal weighted average of the three subcomponents. The system of weighting is arbitrary, and one could very well put more importance on certain variables by changing these weights.

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