Are Wealth Effects Important for Canada?

Lise Pichette, Research Department

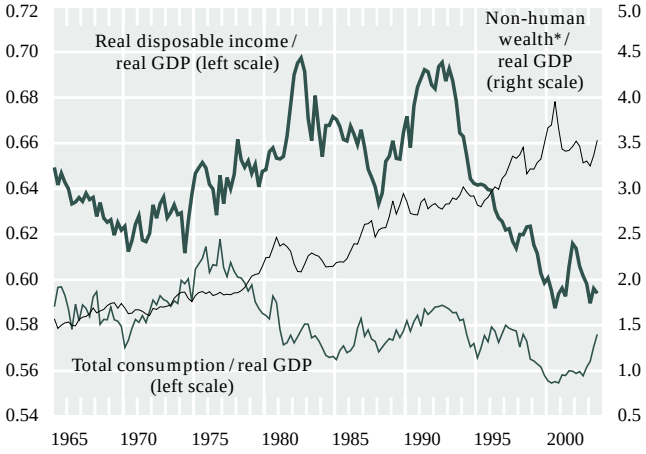
- *Some analysts believe that a sharp rise in equity values was an important factor in the strong consumer spending between 1995 and 2000.*
- *Empirical evidence for Canada suggests that consumer spending responds very little to changes in equity wealth but is sensitive to changes in housing wealth.*
- *This difference can be explained by two factors: changes in equity prices tend to be more temporary than changes in housing prices, and only a small share of households hold equities in their portfolios.*
- *Since changes in wealth directly affect aggregate demand, central banks must pay attention to this factor when formulating monetary policy.*

This article examines the empirical relationship between wealth and consumer spending in Canada, focusing in particular on the role of stock market wealth and housing wealth in explaining movements in aggregate consumption.[1]

Many economists have argued that the sizable appreciation in stock prices from 1995 through 2000 and the subsequent increase in household wealth were important factors in the strong consumer spending during that period. A cursory glance at the data for Canada suggests that increased household wealth may have played a role in maintaining consumer spending over the past decade. As shown in Chart 1, the ratio of disposable income to gross domestic product (GDP)

Chart 1

Ratios of Disposable Income, Wealth, and Consumption to Real GDP



* Non-human wealth is the sum of all real and financial assets net of liabilities, expressed at market value.

1. See Pichette and Tremblay (2003) for the complete analysis (including technical details), which is summarized in this article.

decreased during this period, while the ratio of consumption to GDP remained relatively stable. One possible explanation lies in the increasing ratio of wealth to real GDP, which is also shown in Chart 1.

Nevertheless, if equity prices really were driving consumer expenditures, then a slowdown in consumption would have been expected, all else being equal, once stock market valuations fell back to lower levels. In fact, consumer spending has remained strong. This phenomenon could be explained by the strength of housing prices.

Stock Market Wealth vs. Housing Wealth

Although theories that highlight the role of wealth in determining patterns of consumption do not usually imply different effects for different types of wealth, there are many reasons to believe that the marginal propensity to consume (MPC)[2] from housing wealth and stock market wealth could be different.

First, housing wealth is less concentrated among the most affluent households than stock market wealth. According to the *1999 Survey of Financial Security* published by Statistics Canada (Canada 2003) approximately two-thirds of Canadian households own their residence, while less than one-third of households own equities, either directly or in mutual funds. Since a relatively small proportion of households own stocks compared with those that own their homes, the effects of these two types of wealth on consumption are expected to be different when the data are aggregated.

Second, changes in equity prices have a higher probability of being reversed than changes in housing prices. For that reason, households might be more likely to modify their consumption habits following a change in housing prices than they would for a change in equity values.

Third, housing wealth is less liquid than stock market wealth, and transactions costs in the housing market are usually higher because the financial system can, in some cases, restrain households from using their houses as collateral. This results in a relatively smaller wealth effect from housing. But such constraints have been reduced in Canada since the 1960s, when previous restrictions on the involvement of banks in residential mortgage financing were eliminated (Freedman 1998). This, in turn, has allowed banks to compete more effectively in the market for mortgage lending and should, in principle, facilitate the use of property as collateral. Nevertheless, mortgage refinancing is still more costly, and thus less widespread, in Canada than it is in the United States.

According to the 1999 Survey of Financial Security . . . *approximately two-thirds of Canadian households own their residence, while less than one-third of households own equities, either directly or in mutual funds.*

Fourth, capital gains on wealth resulting from owner-occupied housing may lead to a higher MPC, since these gains have a tax advantage over stock market gains. When homeowners dispose of their principal residence, any profit might be exempted from the capital gains tax.

Literature Review

Since the publication of Friedman's (1957) permanent-income hypothesis and Ando and Modigliani's (1963) life-cycle model, considerable research has been devoted to examining the relationship between consumption, wealth, and income. With the surge in equity wealth in the second half of the 1990s and the more recent increase in housing prices, the impact of stock market wealth and housing wealth on consumption has received particular attention. The bulk of the studies in this field apply to the United States, but some economists have analyzed the Canadian situation.

Macklem (1994) develops a measure of wealth for Canada that can be divided into two components: human wealth and non-human wealth. Human wealth is a measure of permanent income, which is the present value of future labour income. Non-human wealth is the sum of all real and financial assets net of liabilities, expressed at market value. Macklem notes that most of the variations in non-human wealth are driven by fluctuations in stock prices. Using an error-correction model (ECM) estimated over the period

2. The MPC is the ratio of a change in consumer expenditure to a change in either disposable income or in any measure of wealth.

1964–93, Macklem finds a long-run relationship between consumption of non-durable goods and services, human wealth, and non-human wealth (excluding equities). He suggests two possible reasons for the exclusion of equity wealth: (i) consumers may consider changes in equity prices to be largely transitory, and (ii) only a small share of households own equities. Based on Macklem's estimates, consumption of non-durable goods and services increases by 3.5 cents for every one-dollar increase in non-human wealth (excluding equities).

Using the same methodology as Macklem (1994), but extending the sample to the end of 1998, Pichette (2000) focuses on the effect of stock market wealth on total consumer spending (including durable goods) in Canada. The author finds that, on average, a one-dollar increase in the value of equities leads to an increase of 2.2 cents in total consumer expenditures.

In the United States, the MPC from non-human wealth, estimated with traditional macroeconomic models, is generally found to be between 3 and 7 cents per dollar. Maki and Palumbo (2001) find estimates that fall into the same range (3 to 5 cents per dollar). They combine macroeconomic and microeconomic data for their analysis, which allows them to investigate the effect of stock market wealth on households with different levels of income. Their results demonstrate that only the richest households benefited from the exceptional performance of the stock market in the late 1990s. These households also lowered their savings rates (as conventionally measured)[3] the most significantly. Maki and Palumbo also report that most U.S. households held a relatively modest share of equity in their portfolios and that the surge in stock prices did not significantly increase their net worth.

Using more sophisticated econometric methods, Lettau and Ludvigson (2001) distinguish between permanent and transitory changes in wealth.[4] Interestingly, they find that most of the variations in wealth are transitory and are largely attributable to fluctuations in equity prices. The authors also find that consumption responds only to permanent changes in wealth. As a result, they estimate that U.S. consumption rises by only 1.4 cents, on average, following a one-dollar increase in wealth, a significantly smaller effect than that obtained in previous studies.

3. Conventional measures of income and savings exclude capital gains.

4. Their measure of wealth does not include human wealth.

[Pichette] finds that, on average, a one-dollar increase in the value of equities leads to an increase of 2.2 cents in total consumer expenditures.

Most authors who examine disaggregated wealth find that housing wealth has a larger effect on consumption than stock market wealth does. Using a panel of 14 countries and a panel of U.S. states, Case, Quigley, and Shiller (2001) find, at best, weak evidence of a significant effect from stock market wealth on consumption. In contrast, their results show that an increase in housing prices has a large and robust impact on consumption. For the U.S. economy, Desnoyers (2001) defines wealth as consisting of only two elements: stock market wealth and housing wealth. He finds that the MPC from stock market wealth is about 5.8 cents per dollar, whereas the tendency to consume from housing wealth could be as large as 20 cents per dollar. These wealth effects are transitory, however; that is, shocks to wealth do not have any significant permanent effect on consumption.

Data

In this study, we follow Macklem (1994) and divide total wealth into two broad components: human wealth and non-human wealth. Human wealth depends on the present value of current and future disposable income, as well as on the expected real interest rate. Stock market wealth and housing wealth, the variables of particular interest in this article, are part of non-human wealth and are defined, respectively, as stocks held by persons and unincorporated businesses, and residential structures net of mortgages. Most of the data used in the calculation of non-human wealth are from Statistics Canada's *National Balance Sheets* (Canada 2004), except for those on real assets. The value of durable goods and residential structures is adjusted to take into account their depreciation rate and market value. Equities are adjusted from book values to market values, using the Toronto Stock Exchange (TSX) index.

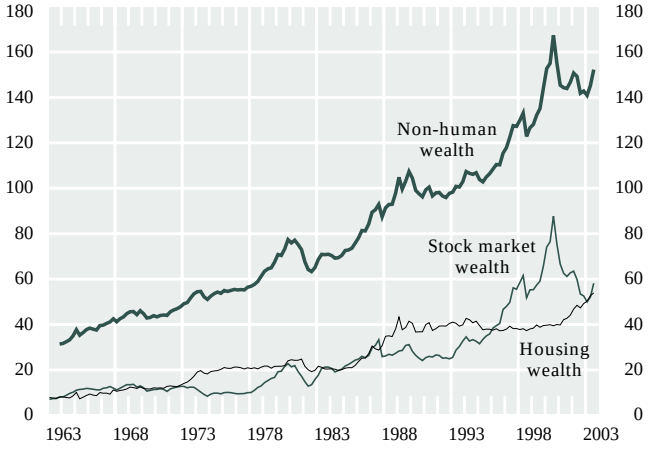
Chart 2 illustrates the evolution of non-human wealth, including both stock market wealth and housing wealth, over the period 1965–2003. Developments in non-human wealth over the past decade seem to have

been driven mainly by stock market wealth. The share of equities in non-human wealth, which was less than 30 per cent in the early 1960s, increased significantly, to more than 50 per cent in 2000. It has fallen back to about 40 per cent since the stock market bubble burst in 2001. Conversely, the importance of housing has increased over the past three years and now represents more than 30 per cent of the non-human wealth of households.

Chart 2

Real Per Capita Non-Human Wealth and Its Stock Market and Housing Components

$ thousands



Another crucial variable in this model is consumer spending. Standard consumer theory suggests that the appropriate measure of aggregate consumption focuses on the service flow from durable goods, rather than from the purchase of such goods. To illustrate, the utility from owning a car derives not from the car itself, but from the services it provides (e.g., transportation and convenience). But there is no straightforward method of computing the service flows obtained from durable goods. In this study, real expenditures on non-durable goods and services are used as a proxy for total consumption. This supposes that consumption of non-durable goods and services is a constant share of total consumption. The exclusion of durable goods from the analysis does bias the MPC slightly downward, since stock market gains are often redirected towards the purchase of this type of good.[5]

5. Poterba and Samwick (1995) find a more important wealth effect for consumption of durable goods than for non-durable goods and services in the United States.

Regarding the measurement of consumption, it should be noted that consumption of services includes actual and imputed rent, which is directly related to housing wealth.

Empirical Results

Until recently, the methodology commonly used to estimate the MPC was a simple ECM. This is a single dynamic equation which includes a term that takes into account the long-run level relationship between consumption, labour income, and various types of wealth. Lettau, Ludvigson, and Barczi (2001) criticize this approach because it assumes that consumption is the only variable that will adjust when the levels of consumption, wealth, and labour income are inconsistent with what is implied by their long-run relationship. To address this problem, they suggest proceeding with a vector-error-correction model (VECM). This more advanced econometric method allows us to take into account the dynamic responses of all the variables included in the analysis. Their results for the United States indicate that wealth (through a change in the prices of financial assets), rather than consumption, does most of the adjusting that is required to restore the long-run level relationship between consumption, wealth, and labour income following shocks.[6]

Another aspect to consider in the choice of the methodology is whether it allows permanent shocks to be distinguished from transitory shocks. Assuming consumers prefer a smooth consumption profile throughout their lifetime, we would expect consumer spending to be considerably less sensitive to transitory shocks than to permanent shocks. The procedure that allows us to identify the reaction of consumption to both types of shocks is a VECM in which permanent and transitory shocks are identified, using restrictions implied by long-run relationships as proposed by King et al. (1991) and Gonzalo and Granger (1995).[7] Following Lettau and Ludvigson (2001), we find a unique long-run relationship (also called a cointegrating relationship) between consumption, disposable income, human wealth, stock market wealth, housing wealth, and non-human wealth (excluding stock market wealth and housing wealth).[8] To calculate the MPC from an aver-

6. Our analysis confirms this result in the Canadian context.

7. See the Technical Box in the Appendix for detailed results.

8. All of these variables are expressed in log level.

age change in each type of wealth, we use the following formula:

$$MPC_i = \pi_i \Phi_i^T + (1 - \pi_i) \Phi_i^P ,$$

where i is a wealth component (e.g., stock or housing), π is the percentage of the wealth variation that is transitory, $1 - \pi$ is the percentage of the wealth variation that is permanent, Φ^T is the MPC from a transitory movement in wealth, and Φ^P is the MPC from a permanent movement in wealth.

Our findings suggest that consumption does not respond significantly to a permanent increase in stock market wealth, while a permanent increase in housing wealth leads to a significant rise in consumption.

The first item of information necessary to calculate the MPC from an average change in each of the measures of wealth is the percentage of the change in wealth that is transitory. Our analysis suggests that, for all horizons, most of the variability in consumption, disposable income, housing wealth, and non-human wealth (excluding equities and housing), is explained by permanent shocks. As in previous studies, our work also finds that movements in human and stock market wealth have a much larger transitory component.[9]

The second piece of information needed is the MPC from permanent and transitory shocks to each of the measures of wealth. Our findings suggest that consumption does not respond significantly to a permanent increase in stock market wealth, while a permanent increase in housing wealth leads to a significant rise in consumption. In addition, we find that the response of consumption to temporary changes in both equity and housing wealth is not statistically significant.

On average, the MPC from stock market wealth is small and statistically insignificant (less than 0.5 cents per dollar). This result is not surprising, since, as argued earlier, direct holdings of equities are concentrated in the hands of a relatively small proportion of households.

With a significant MPC of 5.7 cents per dollar, housing wealth is, without doubt, the variable to examine when studying the future evolution of consumption. Again, the stronger link between housing wealth and consumption relative to stock market wealth can be explained by its more equal distribution among households and the greater likelihood that the average change in housing wealth will be permanent.[10]

Conclusion

When the empirical relationship between various components of wealth and consumer spending (particularly housing and stocks) is examined, the effect of stock market wealth on consumption is found to be significantly different from the effect of housing wealth. This finding is consistent with the results of previous studies for the United States, such as those by Case, Quigley, and Shiller (2001) and Desnoyers (2001). Using Canadian data, we found an average MPC from housing wealth of 5.7 cents per dollar, which is much greater than the very small and statistically insignificant MPC from stock market wealth.

If movements in wealth, especially housing wealth, directly affect consumption, they will also influence aggregate demand and inflation.

These results can be explained by the higher concentration of stocks among a relatively small group of wealthier households and by the tendency of changes in equity values to reverse themselves more often than changes in housing wealth. Other factors, such as an increased incidence of mortgage refinancing and the

9. In both variables, 22 per cent of the variations are transitory.

10. As noted above, this result might be slightly overstated, since consumption of services includes imputed rent from housing, which is directly related to housing wealth.

more frequent use of housing wealth as collateral, are likely to increase the wealth effect from housing.[11]

These results are important from the viewpoint of monetary policy. If movements in wealth, especially housing wealth, directly affect consumption, they will also influence aggregate demand and inflation. Of course, wealth effects are not the only channel through which changes in asset prices affect aggregate demand. Other connections exist as well, such as a possible direct causal link from stock prices to business investment or a cost-of-capital effect. These, too, need to be taken into account when studying the full impact of asset prices on aggregate demand.

11. A recent study by the Canadian Imperial Bank of Commerce (2003) indicates that, since 2001, Canadians have obtained an additional $22 billion from the refinancing of their houses and the use of this asset as collateral.

Literature Cited

Ando, A. and F. Modigliani. 1963. "The Life Cycle Hypothesis of Saving: Aggregate Implications and Tests." *American Economic Review* 53 (1): 55–84.

Canada. Statistics Canada. 2003. *1999 Survey of Financial Security—Public Use Microdata File*. Catalogue No. 13F0026MIE2003002.

———. 2004. *National Balance Sheet Accounts*. Catalogue No. 13-214XIE .

Canadian Imperial Bank of Commerce (CIBC). 2003. "Banking on the House."Available on the CIBC Web site at: <http://research.cibcwm.com/economic_public/download/or-06192003.pdf>

Case, K., J. Quigley, and R. Shiller. 2001. "Comparing Wealth Effects: The Stock Market Versus the Housing Market." NBER Working Paper No. 8606.

Desnoyers, Y. 2001. "L'effet de la richesse sur la consommation aux États-Unis." Bank of Canada Working Paper No. 2001–14.

Freedman, C. 1998. *The Canadian Banking System*. Technical Report No. 81. Ottawa: Bank of Canada.

Friedman, M. 1957. *A Theory of the Consumption Function*. Princeton: Princeton University Press.

Gonzalo, J. and C. Granger. 1995. "Estimation of Common Long-Memory Components in Cointegrated Systems." *Journal of Business and Economic Statistics* 13: 24–35.

King, R., C. Plosser, J. Stock, and M. Watson. 1991. "Stochastic Trends and Economic Fluctuations." *American Economic Review* 81 (4): 819–40.

Lettau, M. and S. Ludvigson. 2001. "Understanding Trend and Cycle in Asset Values: Bulls, Bears, and the Wealth Effect on Consumption." Centre for Economic Policy Research Discussion Paper No. 3104.

Lettau, M., S. Ludvigson, and N. Barczi. 2001. "A Primer on the Economics and Time Series Econometrics of Wealth Effects: A Comment." Federal Reserve Bank of New York.

Macklem, T. 1994. *Wealth, Disposable Income and Consumption: Some Evidence for Canada*. Technical Report No. 71. Ottawa: Bank of Canada.

Maki, D. and M. Palumbo. 2001. "Disentangling the Wealth Effect: A Cohort Analysis of Household Saving in the 1990s." Federal Reserve Board Finance and Economics Discussion Series No. 2001–21.

Pichette, L. 2000. "Les effets réels du cours des actions sur la consommation." Bank of Canada Working Paper No. 2000–21.

Pichette, L. and D. Tremblay. 2003. "Are Wealth Effects Important for Canada?" Bank of Canada Working Paper No. 2003–30.

Poterba, J. and A. Samwick. 1995. "Stock Ownership Patterns, Stock Market Fluctuations, and Consumption." Brookings Papers on Economic Activity No. 2.

Appendix

Technical Box

Our analysis is based on the following reduced-form VECM:

$$\Delta X_t = \mu_t + \sum_{j=1}^{l} A_j \Delta X_{t-1} + \alpha\beta' X_{t-1} + \varepsilon_t, \qquad (1)$$

where X_t is an $n \times 1$ vector of cointegrated $I(1)$ variables, that is, $X = (c, y, hw, s, h, nhwxsh)$. All of these variables are expressed in log level. The $n \times r$ matrices (α) and (β) are both full rank, and $0 \leq r \leq n$ is the number of cointegrating vectors. The reduced-form shocks are assumed to have the following properties: $E_t[\varepsilon_t \varepsilon_{t-j}] = 0 \ \forall j \neq 0$, $E_t[\varepsilon_t] = 0$ and $Var[\varepsilon_t] = \Sigma_\varepsilon$.

The long-run relationship is defined as:

$$c_t = 2.21 + 0.36 y_t + 0.15 hw_t + 0.02 s_t + 0.09 h_t + 0.08 nhwxsh_t.^{1} \qquad (2)$$

In equation (1), $\beta' X_{t-1}$ is the error-correction term. When this term is not equal to zero, variables deviate from the long-run equilibrium. The matrix α includes the adjustment coefficients, which tell us which variables will adjust to restore the equilibrium. The estimated parameters are $\hat{\alpha} = (-0.047, 0.176, \mathbf{1.346}, \mathbf{2.236}, -0.606, 0.094)$.[2]

Following King et al. (1991) and Gonzalo and Granger (1995), the permanent and transitory components are identified. The forecast-error variance decomposition is calculated (Table 1); this gives the fraction of the total forecast-error variance that is attributable to permanent (σ_P^2) and transitory (σ_T^2) shocks for each variable.

Table 1

Forecast-Error Variance Decomposition

	σ_T^2	σ_P^2
Δc_t	0.09 (0.03,0.19)*	0.91 (0.81,0.97)
Δy_t	0.10 (0.03,0.24)	0.90 (0.76,0.97)
Δhw_t	0.22 (0.07,0.43)	0.77 (0.56,0.93)
$\Delta nhwxsh_t$	0.09 (0.03,0.18)	0.91 (0.82,0.97)
Δs_t	0.22 (0.09,0.38)	0.78 (0.62,0.91)
Δh_t	0.10 (0.03,0.23)	0.90 (0.77,0.97)

* The 90 per cent confidence intervals are in parentheses.

Because the forecast-error variance decomposition gives the share of each shock in the variability of a variable in squared changes, the percentage in wealth fluctuations that is transitory is given by

$$\pi_i = \frac{\sqrt{\sigma_{Ti}^2}}{\sqrt{\sigma_{Ti}^2} + \sqrt{\sigma_{Pi}^2}}.$$

1. All coefficients are significant at the 5 per cent level.

2. Bold numbers indicate significance at the 5 per cent level.