

# Credit conditions and consumption, house prices and debt: What makes Canada different?



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# Disclaimer

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The views expressed are those of the authors and should not be attributed to the Bank of Canada or its staff

# Outline

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- **Introduction & main findings**
- Background
- Methodology
- Results
- Policy implications
- Conclusions

# Motivation

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“[A] lesson of the current crisis is that central banks need to improve their understanding of the workings of the financial system, its vulnerabilities, and its links to the real economy.

We must try to find ways to discern more quickly if financial innovation and other factors are leading to a buildup of destabilizing forces, such as rapidly rising asset prices or excessive leverage.”

*- Donald L. Kohn (2009), then Vice Chairman, US Federal Reserve BOG*

# Motivation

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- Credit markets are
  - Imperfect and evolving, intrinsically
  - Important to real and portfolio outcomes
  
- Significant changes over the last 30 years
  
- Role of credit is not well-handled by existing models
  - Large, persistent errors / Low explanatory power
  - Long-run variables that should move together, don't
  - Unstable parameters / sensitivities

# Our approach

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- **Jointly** estimate 3 equilibrium correction models of consumption, house prices, mortgage debt (data: 1982-2015 quarterly national accounts & flow of funds)
- Reformulate the consumption function
- Credit constraints
  - Not only about liquidity constraints on consumption smoothing
  - Central to mortgage markets and house price impacts on consumption
- Vary over time and across countries
  - Down-payment constraint on home buyers
  - Home equity loans to collateralise housing wealth

# Main findings

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- Strong co-integration relationships (adjustment to “fundamentals”)
- Estimated CCI fits history of Canada’s credit institutions & data
- No pure housing wealth effect and – unlike US, UK, Australia – no housing collateral channel: home equity loans used for investment
- Policy has negative indirect feedbacks on the real economy via higher debt and house prices that materialise in the medium term
- High house prices and debt
  - Mostly explained by cheaper and easier credit
  - Outlook dependent on outlook for fundamentals

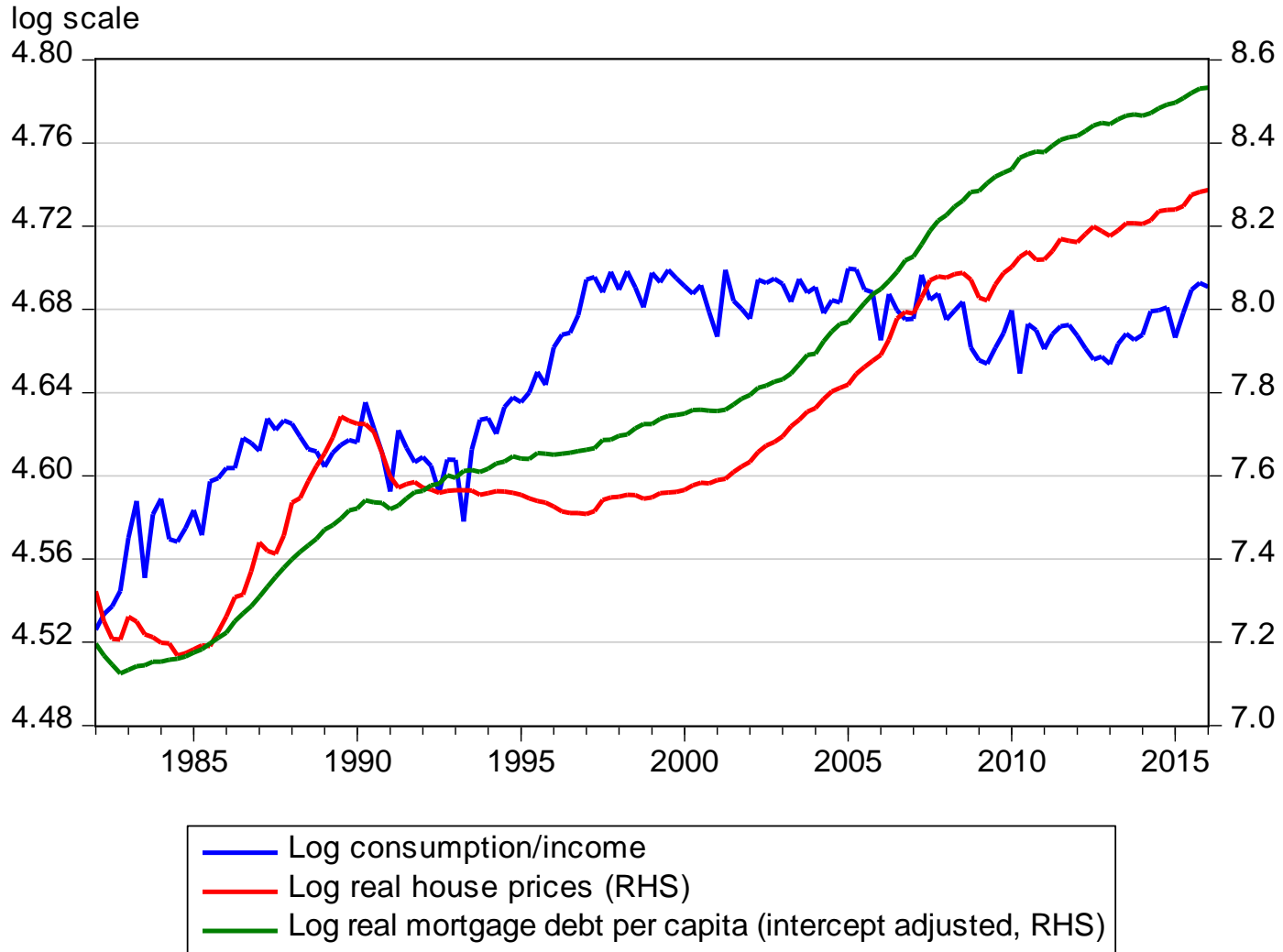
# Outline

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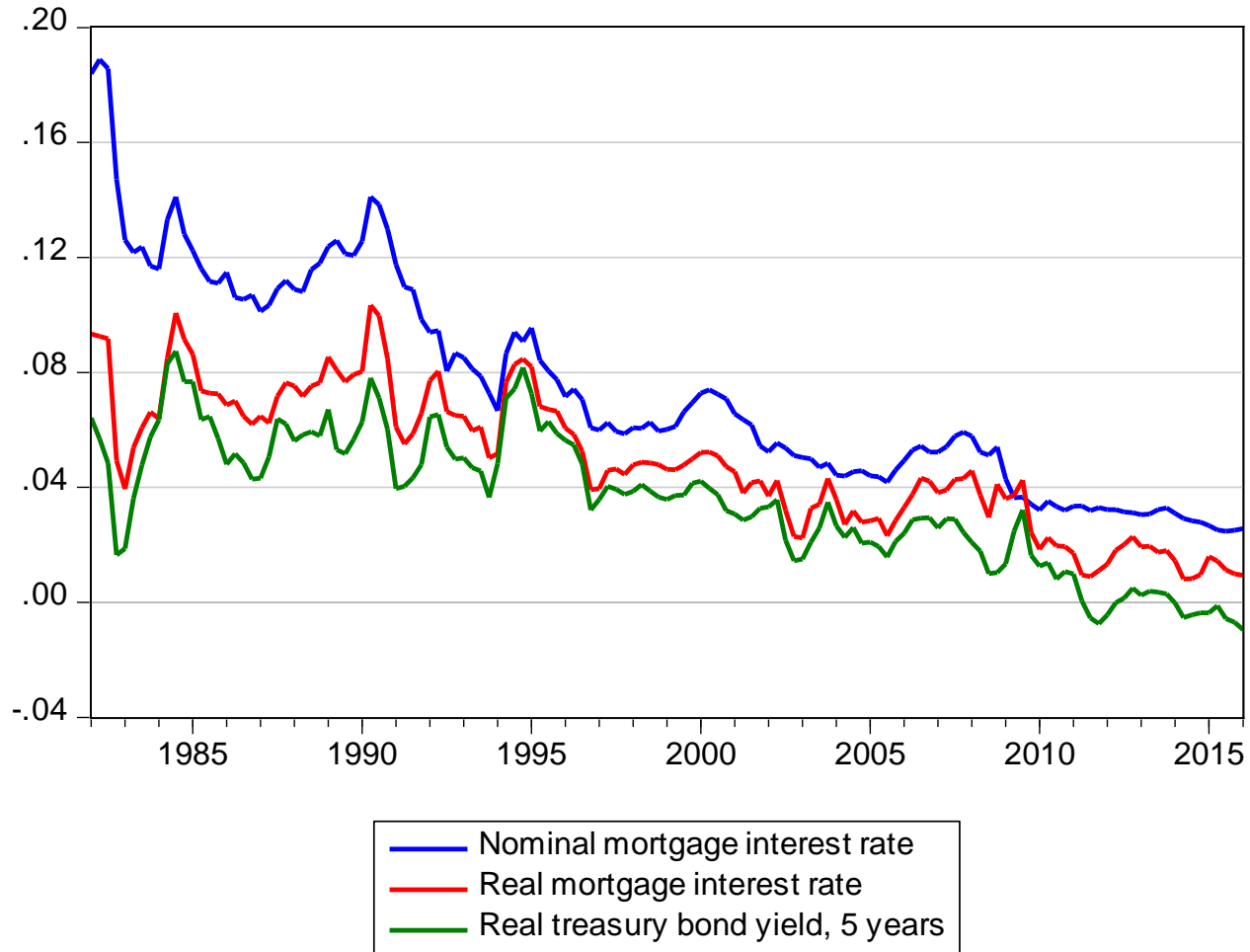
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# Consumption/income, house prices, debt



# Structural and cyclical declines in interest rates



Current policy rate 0.5% vs  $2\frac{3}{4}$ - $3\frac{3}{4}$ % neutral (Mendes 2014)

# Canadian mortgage market is different to the US

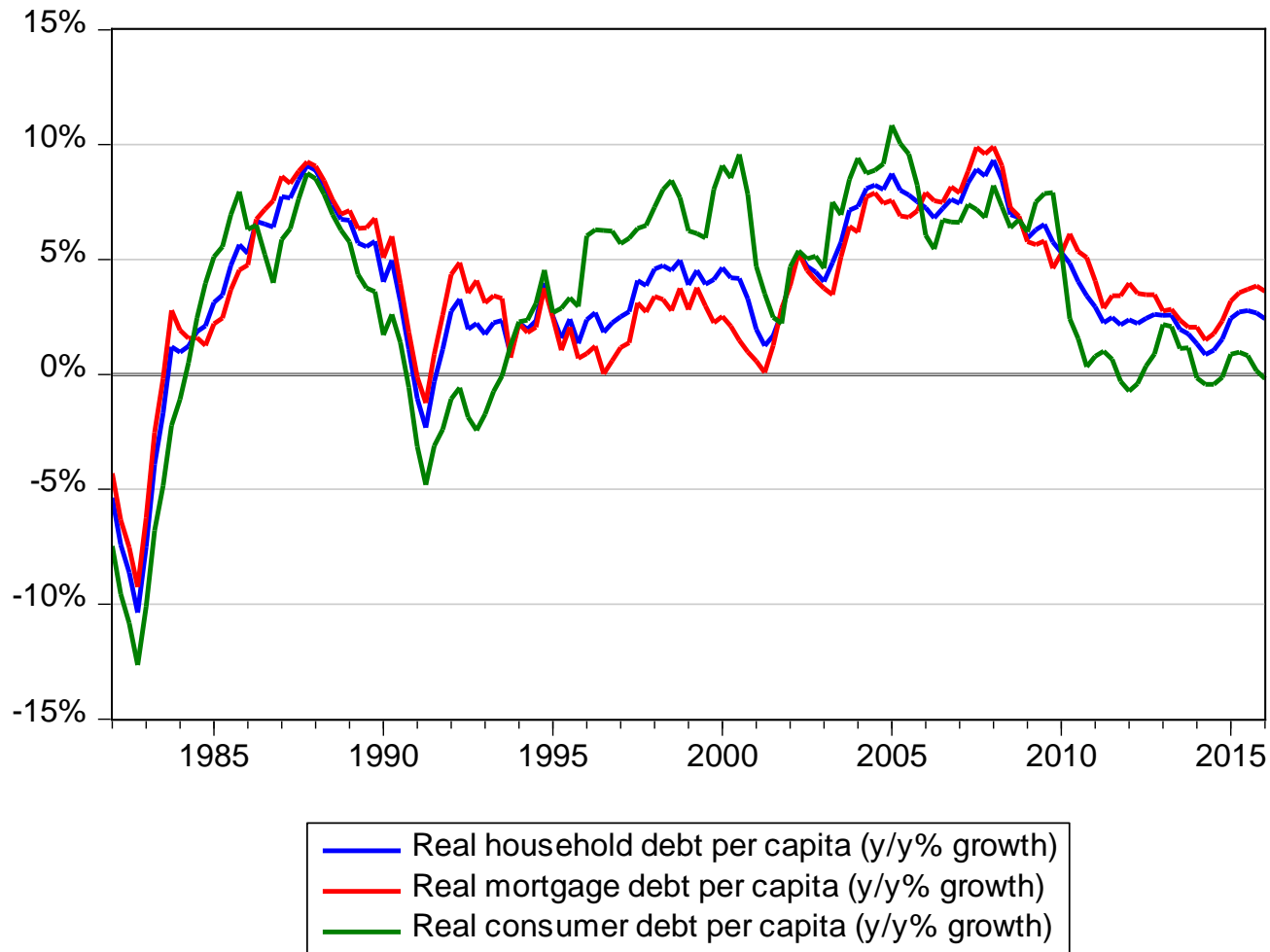
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- Oligopolistic banking structure with mostly conservative lending practices
  - Almost no sub-prime
- Mostly full recourse mortgages
- No tax relief on interest for owner-occupiers
- Highly regulated market with compulsory, mainly state-underwritten insurance if loan-to-value exceeds 80%
- Nevertheless, mortgage credit has grown strongly since early 1980s

# Structural changes in Canadian credit markets

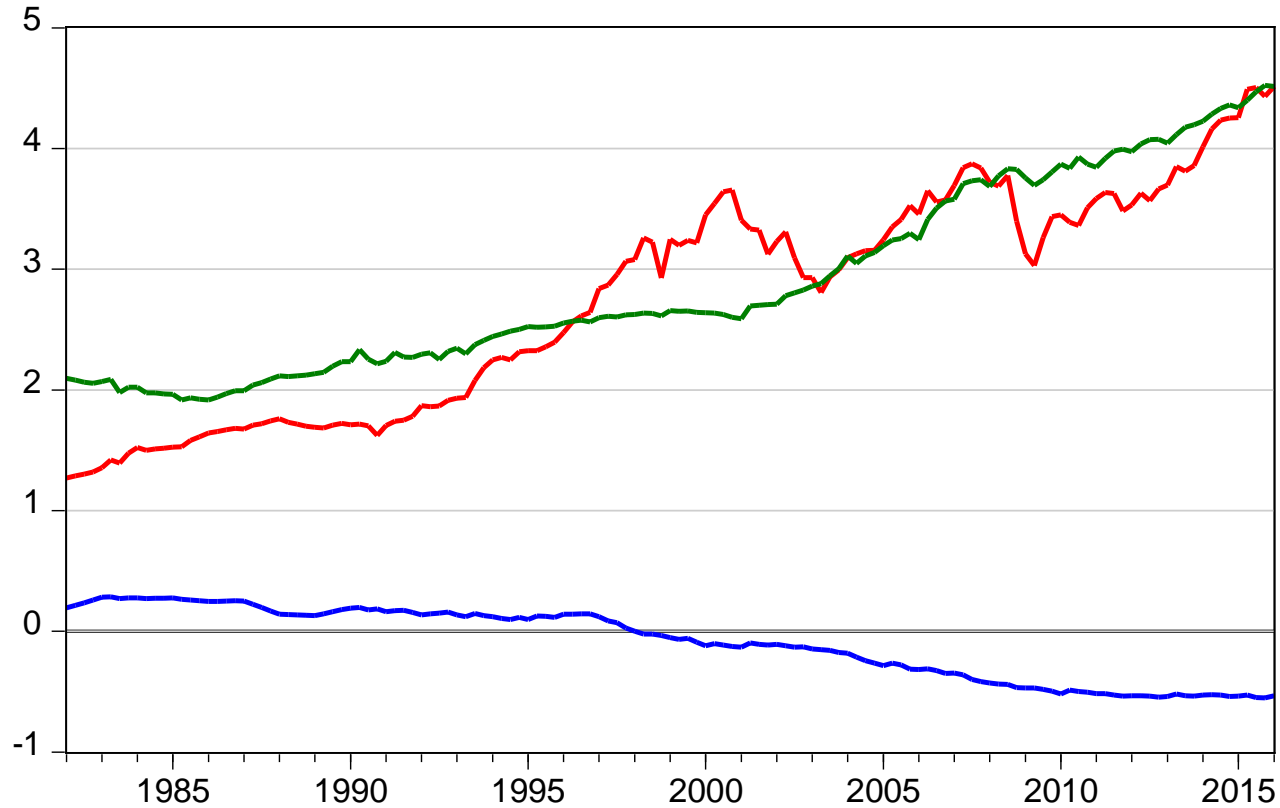
Period	Key institutional changes	Credit conditions
1982-88	Banks establish mortgage loan subsidiaries Lower risk aversion post-recession	Easing
1989-92	Basel 1, higher risk aversion	Tightening
1993-99	Various	Offsetting
2000-07	Mortgage insurance rules, growing MBS market Bank regulations, capital ratios, new lenders Product innovations (e.g. HELOCs)	Easing
2008-	Crisis Tighter bank regulations & mortgage insurance rules	Tightening

...consistent with data on household credit growth



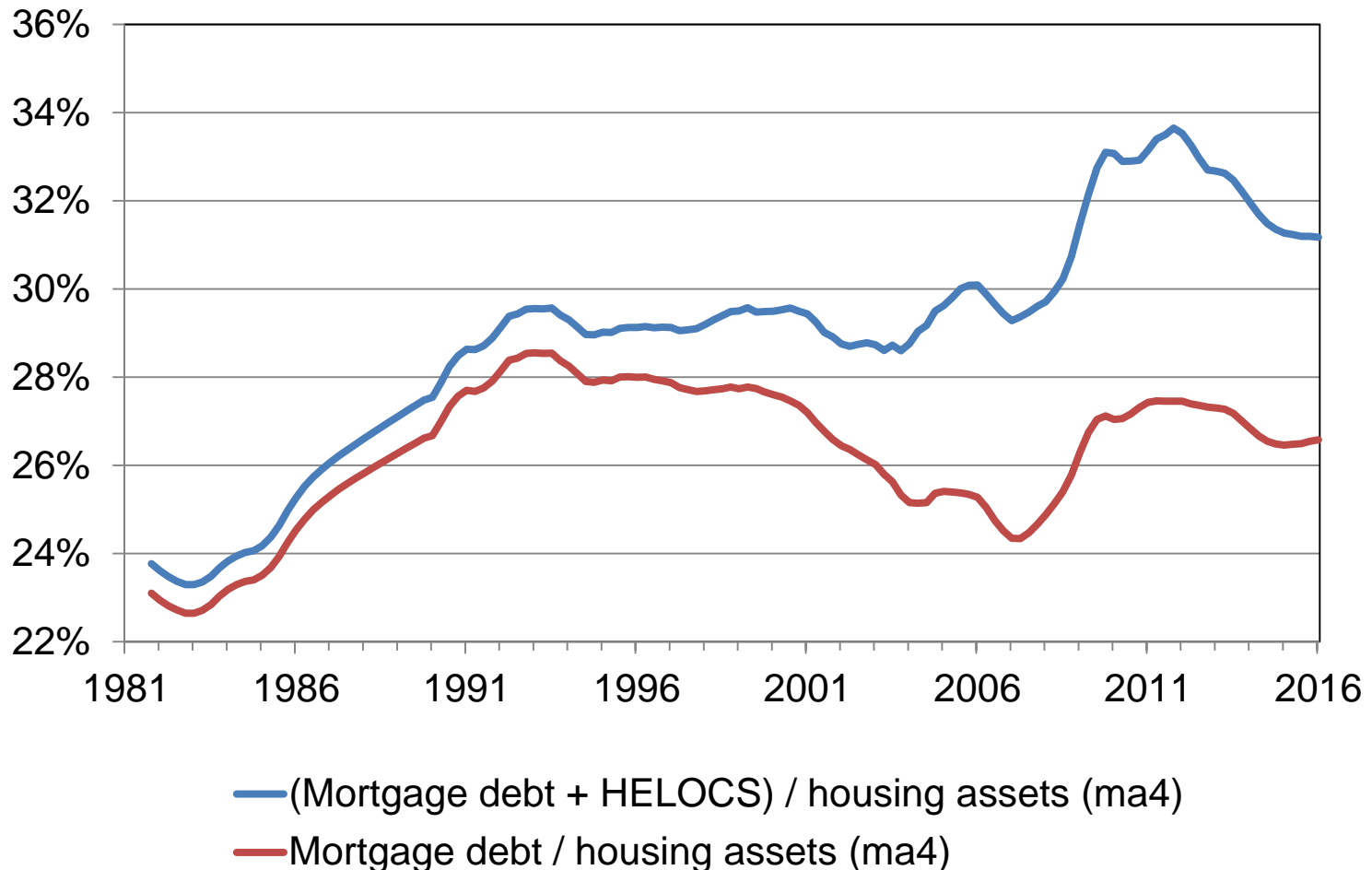
## ...consistent with data on household balance sheets

Ratio of wealth / annualised income



- (Liquid assets - household debt)(-1)/income
- Illiquid financial wealth(-1)/income
- Housing wealth(-1)/income

## ...consistent with increased gearing of housing assets



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## Solved-out consumption function

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$$\Delta \ln c_t \approx \varphi(\alpha_0 + \gamma A_{t-1}/y_t + \psi E_t \ln(y_t^p/y_t) + \ln(y_t/c_{t-1})) + \lambda \Delta \ln y_t$$

$$\Delta \ln c_t \approx \varphi(\acute{\alpha}_{0t} + \acute{\alpha}_{1t} r_{t-1} + \gamma_1 NLA_{t-1}/y_t + \gamma_2 IFA_{t-1}/y_t + \acute{\gamma}_{3t} HA_{t-1}/y_t + \acute{\alpha}_{2t} \ln hp/y + \acute{\psi}_t E_t \ln(y^p/y_t) + \ln y_t/c_{t-1}) + \acute{\lambda}_t \Delta \ln y_t + \acute{\beta}_{1t} \Delta ue_t$$

Reduces to “conventional” model under six **testable** restrictions:

- |       |                                                                |                                                         |
|-------|----------------------------------------------------------------|---------------------------------------------------------|
| (i)   | $\acute{\alpha}_{0t} = \alpha_0$ and $\acute{\alpha}_{2t} = 0$ | no role for credit                                      |
| (ii)  | $\acute{\alpha}_{1t} = 0$                                      |                                                         |
| (iii) | $\gamma = \gamma_1 = \gamma_2 = \acute{\gamma}_{3t}$           | homogenous assets, so identical MPC                     |
| (iv)  | $\acute{\psi}_t = \psi$                                        | textbook permanent income hypothesis                    |
| (v)   | $\acute{\lambda}_t = \lambda$                                  | constant proportion of liquidity-constrained households |
| (vi)  | $\acute{\beta}_{1t} = 0$                                       |                                                         |

# House prices (inverted housing demand)

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$$\ln hp_t \approx h_{0t} + h_2(h_1 \ln y_{t-1} - \ln hs_{t-1}) - h_3 \ln ucc_{t-1} - h_4 \ln i_{t-1} + \sum h_f D$$

- Income elasticity *given the stock* ( $h_1/h_2$ )  $\approx 1.5$  to  $2$ 
  - Income elasticity of housing demand ( $h_1$ )  $\approx 1$
  - Own-price elasticity ( $1/h_2$ )  $\approx -0.5$  to  $-0.67$
  
- User cost elasticity ( $h_3$ )  $\approx -0.3$
  
- Nominal interest rate elasticity ( $h_4$ )  $\approx -0.2$

# Mortgage debt

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$$\ln ms_t \approx m_{0t} + m_1 \ln y_t - m_2 \ln i_t + m_3 \ln(HA_{t-1}/y_t)$$

- Income elasticity ( $m_1$ )  $\approx 1$
- Nominal interest rate elasticity ( $m_2$ )  $\approx -0.15$
- Housing asset/income elasticity ( $m_3$ )  $\approx 0.45$

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# Consumption

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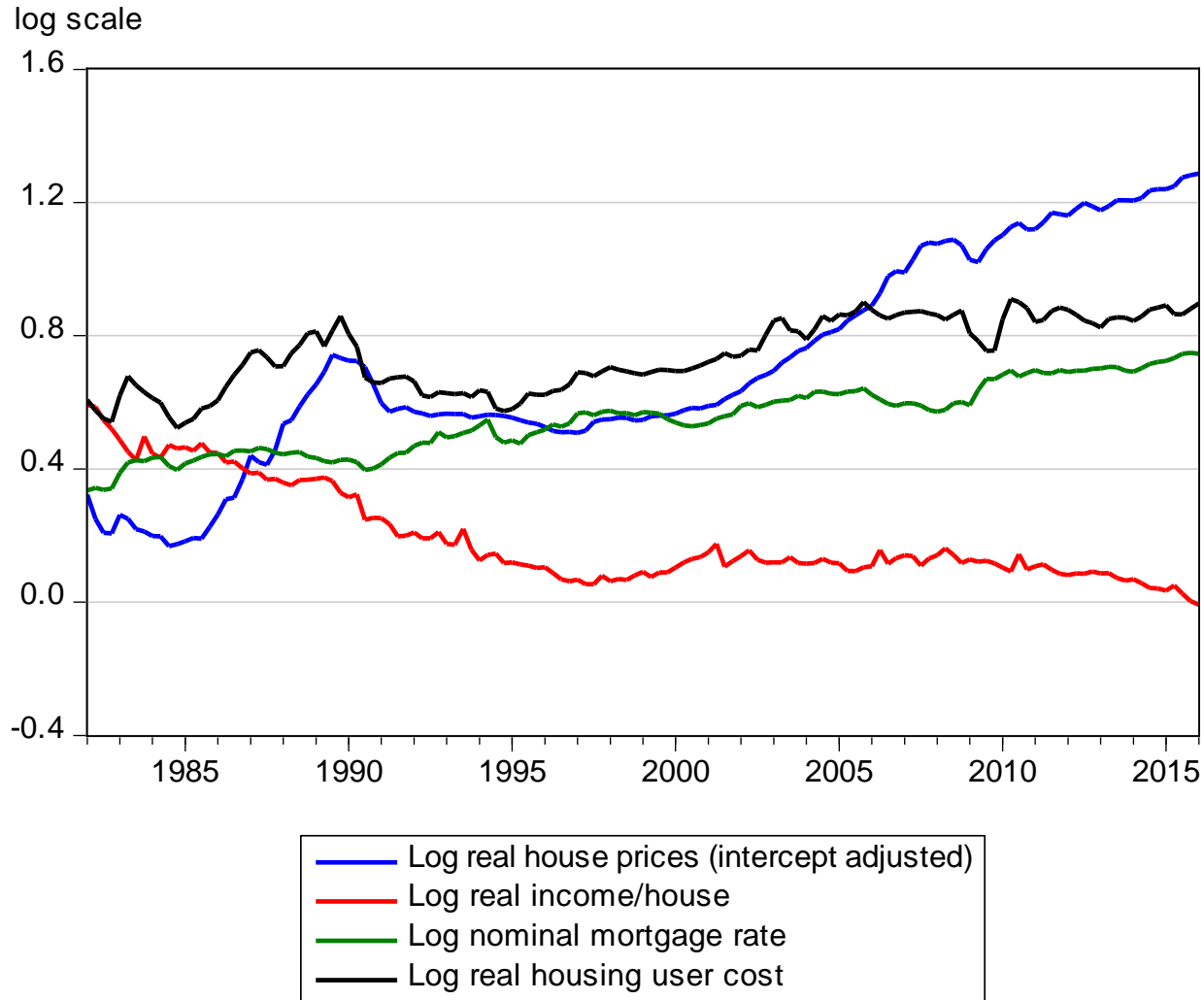
- Speed of adjustment is around 40% per quarter
  - Takes about 4-6 quarters to adjust to fundamentals
- Fundamentals are real interest rates, income expectations, components of household wealth/income, house prices/income, credit conditions
- No pure housing wealth effect
- Housing collateral effect is insignificant, unlike US, UK, Australia
- Negative house price/income effect (saving for a bigger deposit) attenuated by easier credit availability

# House prices

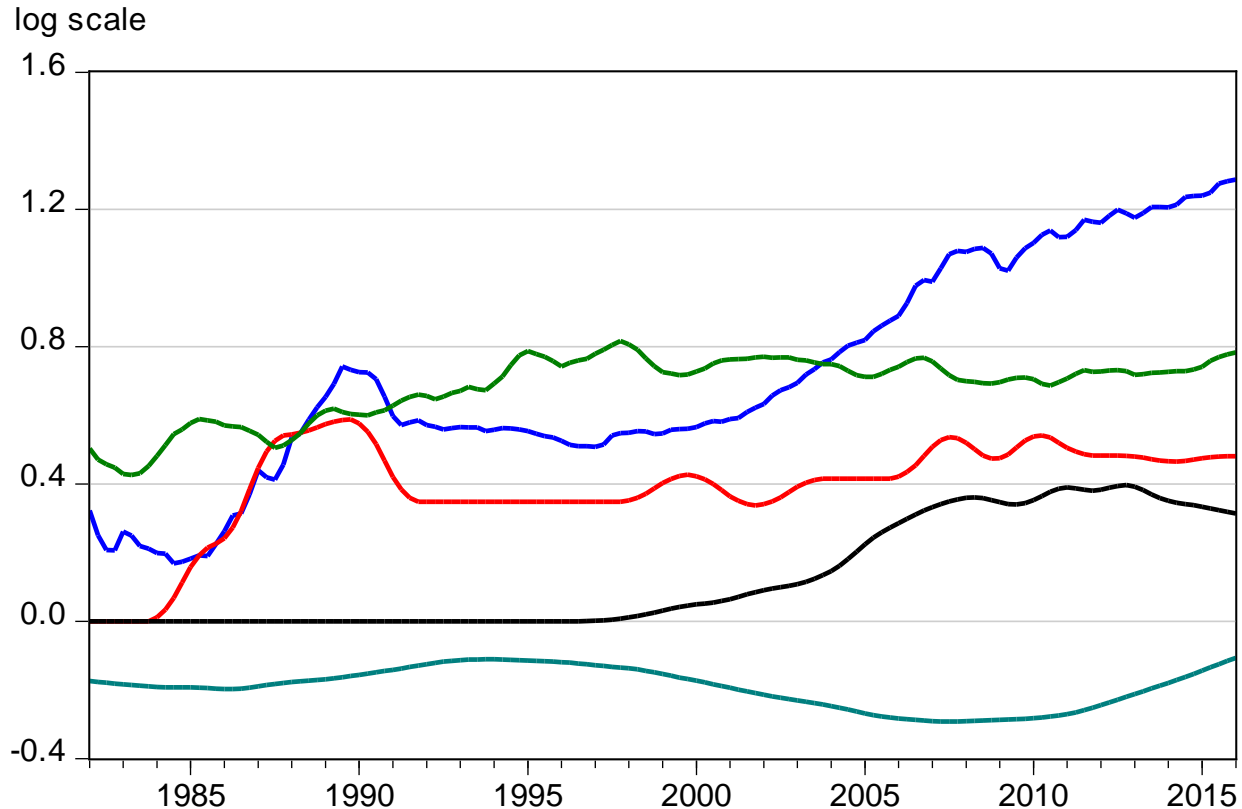
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- Speed of adjustment is around 10% per quarter
  - Takes around 5 years to adjust to fundamentals
  
- Fundamentals are
  - Income/pop, housing stock/pop, nominal mortgage rates, user cost (including capital gains expectations), immigration composition, CCI and 'housing liquidity index' (based on ratio of HELOCs)
  
- House prices are high **due to** fundamentals...not *relative to*
  - Historically low mortgage rates
  - Long-term easier mortgage credit availability and HELOCs
  - Little evidence of short run misalignment
  - Outlook depends on outlook for fundamentals

# Decomposing the long run solution for house prices (1)



# Decomposing the long run solution for house prices (2)



- Log real house prices (intercept adjusted)
- Credit conditions index
- Asia immigration/total immigration
- Housing liquidity index
- Working age/total population (intercept adjusted)



# Omission of CCI (and liquidity index) lowers adjustment speeds and worsens fit and interpretability

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- **Consumption**
  - Speed of adjustment drops from 40% to 14%, consumption exceeds expected income, net liquid assets and housing have negative effects, 9-13% liquidity constrained
  
- **House prices**
  - Speed of adjustment drops from 10% to 4%, interest rate effects double
  
- **Mortgage debt**
  - Speed of adjustment drops from 10% to 6%, mortgage rate has no effect, mortgage stock largely driven by housing wealth
  
- Liquidity index has main effect on house prices, not consumption; suggests HELOCs used for investment in housing rather than consumption

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# Monetary policy transmission

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1. Lower interest rates raise consumption/income in the short term ( $\approx 2$  years)
2. Lower interest rates raise house prices/income and debt/income in the medium term ( $\approx 5$  years)
3. In the medium term, higher house prices/income and debt/income begin to reduce consumption/income (i.e. induce higher saving)

## What if interest rates moved higher?

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- All else equal, a 100bp rise in mortgage rates from 2.5% to 3.5% would
  - decrease the level of house prices by about 10% over 5 years
  - decrease the level of mortgage debt by about 4% over 5 years, given housing wealth, hence about 9% including indirect effect via house prices
  
- Potentially mitigated by stronger income, but exacerbated if
  - Credit conditions tighten
  - Expectations about future housing capital gains become pessimistic

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# Conclusions

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- CCI fits history of Canada's credit institutions & data
  - Omission lowers adjustment speed, worsens fit & interpretability
- Canada is unlike US, UK, Australia: housing collateral not used for consumption
- Policy has negative indirect feedbacks on the real economy via higher debt and house prices that materialise in the medium term
- High house prices and debt
  - Mainly reflect low interest rates + trend easing in household credit access
  - Outlook depends on outlook for fundamentals

Thank you