FOR AGENDA

SM/09/106
Correction 1

May 7, 2009

To: Members of the Executive Board

From: The Acting Secretary

Subject: **Canada—Selected Issues**

The attached corrections to SM/09/106 (4/23/09) have been provided by the staff:

Factual Errors Not Affecting the Presentation of Staff's Analysis or Views

Page 2, para. 1, line 3: for "Banks have retained access to money and capital markets, public capital injections have not been needed, and government funding guarantees (put in place for precautionary reasons) have not been drawn upon."
read "Interbank money markets remained functional. No injections of public capital into banks were necessary."

Page 3, para. 5, line 2: Footnote 2 added to read: "During the crisis, Canadian banks have also had access to official funding programs such as the Insured Mortgage Purchase Program (IMPP), where the Department of Finance purchased already government-insured mortgages from banks to ease liquidity strains."
para. 7, line 10: for "include high franchise values, a conservative mortgage market, and an overall prudent and conservative culture in the financial"
read "include high franchise values, a mortgage market characterized by prudent underwriting, and an overall prudent and conservative culture in the financial"

Page 6, para. 4, line 3: for "prepayment penalty (at three months of interest) for most mortgages with a term to maturity greater than five years."
read "prepayment penalty for most mortgages with a term to maturity greater than five years at three-months of interest, which is likely less than the penalty charged during the first five years of mortgage terms. Offsetting this to some degree is the portability of Canadian mortgages.[2]"

footnote 1: for "Prepared by J. Kiff."
read "Prepared by J. Kiff, based on a forthcoming IMF working paper."
footnote 2: added to read: "U.S. homeowners that relocate must prepay their existing mortgages and take on a new one at prevailing rates." (subsequent footnotes have been renumbered).

Page 7, para. 7, line 1: for "The non-interest costs of originating and refinancing mortgage loans is clearly cheaper in Canada, also contributing to close any apparent gap"
read "Anecdotal evidence suggests that the non-interest costs of originating and refinancing mortgage loans is significantly cheaper in Canada, which would also contribute to closing any apparent gap"

para. 9, line 2: for "based on the highest fixed rates inside of the five-year term (typically at the three-year term),"
read "based on the three-year fixed-term rate, which is usually the highest fixed rate inside of the five-year term,"

para. 11, line 1: for **"**There are no limits to the loans that the Canada Mortgage and Housing Corporation (CMHC) and other mortgage insurers will insure, which minimize risks to"
read "There are no limits to the size of individual loans that the Canada Mortgage and Housing Corporation (CMHC) and other mortgage insurers will insure, which minimize risks to"

footnote 5 *(renumbered from 4)*: for "[4] In fact, until recently, it was U.S. practice to use a fixed "teaser rate" that applied to the first two or three years of many adjustable-rate mortgages (ARMs), for affordability calculations (Kiff and Mills, 2007)."
read "[5] In fact, until recently, it was U.S. practice to use a fixed "teaser rate" that applied to the first two or three years of many adjustable-rate mortgages (ARMs), for affordability calculations (Kiff and Mills, 2007). However, some Canadian lenders have started to qualify adjustable-rate loans on the basis of current floating-rate loan rates."

Page 8, para. 12, line 7: for "prepayment penalty fixed in the *Interest Act*. Longer fixed-rate terms would help households to better manage financial risks."
read "prepayment penalty fixed in the *Interest Act*. Until that happens, rates on fixed-term residential mortgages beyond the five year term will remain uneconomical for most borrowers. The opening up of longer fixed-rate terms would help households to better manage financial risks."

Page 12, footnote 2, line 5: for "an upper limit in terms of any overvaluation."
read "an upper limit in terms of any overvaluation. For example, the quality-adjusting Teranet-National Bank house price index (data starting in 1999) records that house prices in Canada's six metropolitan areas of Ottawa, Toronto, Calgary, Vancouver, Montreal, and Halifa have risen on average by 48 percent from 2003 to their peak, versus around 60 percent using CREA's estimates."

Page 14, para. 5, line 7: for "mortgages are originated by banks,[5] this could also impact"
read "mortgages are originated by banks (55 percent of which do not carry mortgage insurance but have a loan-to-value ratio below 80 percent), [5] this could also somewhat impact"

Typographical Errors

Page 6, para. 1, line 3: for "in particular in the mortgage area."
read "in particular in the residential mortgage area."

line 5: for "Klyuev (2008) concluded, though, that this is"
read "However, Klyuev (2008) concluded that this is"

Page 12, para. 2, line 3: for "the existing home prices index from the Canadian Real Estate Association's Multiple Listing Service (MLS) database,"
read "the existing home price from the Canadian Real Estate Association's Multiple Listing Service (MLS) database,"

Questions may be referred to Mr. Kramer (ext. 38491) and Mr. Estevão (ext. 36038) in WHD.

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INTERNATIONAL MONETARY FUND

CANADA

Selected Issues

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Approved by Western Hemisphere Department

April 22, 2009

Contents Page

I. Canadian Banks and the Credit Turmoil[1]

1. **Canadian banks have been relatively resilient to the ongoing credit turmoil.** The effect of the turmoil on the Canadian financial system is, so far, milder than in other G7 economies. Interbank money markets remained functional. No injections of public capital into banks were necessary. The resilience appears particularly striking given the close economic and financial links between Canada and the United States.

2. **To shed light on this resilience, this chapter searches for key variables explaining Canadian bank performance during the crisis.** It considers a sample of large OECD banks and studies how pre-crisis balance-sheet structure affected bank performance during the crisis. The sample includes all large OECD commercial banks (72 institutions with assets in excess of 100 billion euros at the end of 2006). We consider three main fundamentals: the equity-to-assets ratio, the balance-sheet liquidity-to-debt liabilities ratio, and the depository-funding-to-assets ratio. Measures of performance are: equity price decline from January 2007 to January 2009, two binary variables for particularly large equity declines (greater than 70 or 85 percent), and two binary variables for government intervention (undertaken to alleviate significant financial distress).

3. **Capital ratios before the crisis were a key determinant of bank performance during the turmoil; and Canadian banks had ample capital.** Specifically, most banks with critically low capital at end-2006 later experienced dramatic equity value declines, and many had to be rescued (Table 1). Prior to the crisis, all Canadian banks had capital ratios (equity over assets, a leverage measure) above 4 percent, which has assured their resilience to asset shocks. Interestingly, a large number of currently distressed U.S. banks had relatively high pre-crisis capital, which was nevertheless quickly exhausted through troubled asset exposures and (in some instances) problematic acquisitions.

4. **Compared to OECD peers, Canadian banks had slightly above-average balance sheet liquidity.** Buffers of highly liquid assets allow banks to bridge temporary cash flow shortfalls, which proved critical during the rush for liquidity. Interestingly, some U.S. banks were shown to have particularly low measures of high-quality liquidity, as they were using assets such as tradable mortgage-backed securities as part of their liquidity buffers.

5. **During a liquidity crisis, access to stable funding is key to survival; Canadian banks had a high ratio of retail to wholesale deposits.** Retail deposits are insured and hence "sticky," and provide a stable source of long-term funds for banks. In contrast, wholesale funds can withdraw rapidly upon minor negative news, and were a major source of

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[1] Prepared by L. Ratnovski and R. Huang.

vulnerability during the turmoil. The relative abundance of retail deposits seems to have been key for the resilience of Canadian banks.[2] Easy access to retail deposits in Canada is explained by limited competition for household savings from non-banks, and by restrained bank asset growth that limited overall demand for funding.

6. **Multivariate regression analysis confirms and extends these preliminary findings** (Table 2). A high share of depository funding and a capital ratio above a critical minimum (although not the capital ratio per se) appear to be the most significant and robust determinants of bank resilience during the turmoil. Balance-sheet liquidity is less robust: it correlates with major failures, but not equity value declines (except very large ones). By considering interactions, the regressions also identify substitution between bank funding structure and capital, where, for a given risk profile, a bank with more depository funding can operate with lower capital, and a bank with higher capital can use less depository funding. In addition, larger banks have a higher probability of government intervention. However, rapid balance sheet expansion before the crisis appears irrelevant for performance during the crisis.

7. **Regulatory and structural factors contributed to the resilience of Canadian banks by reducing their incentives to take risks**. Canadian capital requirements are significantly more stringent than Basel minima (national targets of 7 percent for tier 1 capital and 10 percent for total capital, versus 4 and 8 percent prescribed by the Basel Accord). Banks are also subject to a maximum assets-to-total-capital multiple of 20 (corresponding to a leverage ratio of 5 percent). Besides providing an enhanced cushion, stringent capital requirements have beneficial incentive effects: they impede rapid balance sheet growth, restrict wholesale activities, and limit foreign expansion to niches where banks have clear competitive advantage not related to low cost of capital. Notable structural factors in Canada include high franchise values, a mortgage market characterized by prudent underwriting, and an overall prudent and conservative culture in the financial sector. Limited exposure to U.S. assets was a key additional factor behind the resilience of Canadian banks to the crisis.

Conclusions and policy implications

8. **Canadian banks appear well positioned to weather the turmoil**. A combination of strong capital and robust funding, in the context of sound regulation and supervision, has lent resilience to the banking system. With a severe recession underway, credit losses are likely to continue to climb, particularly on exposures to highly-leveraged households. But with banks stable and macroeconomic policies supportive, financial instability appears to be a tail risk.

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[2] During the crisis, Canadian banks have also had access to official funding programs such as the Insured Mortgage Purchase Program (IMPP), where the Department of Finance purchased already government-insured mortgages from banks to ease liquidity strains.

Table 1. Bank Fundamentals and Performance during Turmoil

	Bank	Country	Pre-crisis (end-2006) Capital 1/	Bank performance during the turmoil (Jan 2007-Jan 2009) Equity decline	Government intervention
	Ten most vulnerable				
1	Hypo Real Estate Holding AG	GERMANY	2.1	97	Asset guarantees and public loans
2	Deutsche Bank AG	GERMANY	2.1	81	
3	UBS AG	SWITZERLAN	2.3	79	Asset guarantees
4	Commerzbank AG	GERMANY	2.5	89	Capital injection
5	ABN Amro Holding NV	NETHERLAND	2.6	...	Nationalized (carved out from Fortis)
6	Barclays Plc	UNITED	2.7	85	
7	Fortis	BELGIUM	2.8	94	Broken up, part nationalized
8	Dresdner Bank AG	GERMANY	3.0	...	Capital injection
9	Northern Rock Plc	UNITED	3.2	100	Nationalized
10	Dexia	BELGIUM	3.3	89	Nationalized
	Selected banks				
20	***Canadian Imperial Bank of Commerce***	***CANADA***	***4.1***	54	
21	***Royal Bank of Canada RBC***	***CANADA***	***4.3***	44	
28	***Banque de Montreal-Bank of Montreal***	***CANADA***	***4.8***	53	
29	***Bank of Nova Scotia (The) - SCOTIABANK***	***CANADA***	***4.9***	42	
35	Royal Bank of Scotland Group Plc (The)	UNITED	5.2	96	Capital injection, asset guarantees
42	***Toronto Dominion Bank***	***CANADA***	***5.7***	43	
50	Citigroup Inc	USA	6.4	94	Recapitalized, asset guarantees
63	Washington Mutual Inc.	USA	8.5	100	Failed, taken over by FDIC
64	JP Morgan Chase & Co.	USA	8.6	50	
65	Bank of America Corporation	USA	9.3	87	Capital injection, asset guarantees
	Bank	**Country**	**Liquidity 2/**	**Equity decline**	**Government intervention**
	Ten most vulnerable				
1	Capital One Financial Corporation	USA	3.7	80	
2	National City Corporation	USA	4.0	100	Acquired by PNC Bank
3	Citizens Financial Group Inc.	USA	4.3	...	Not available (owned by RBS)
4	SunTrust Banks, Inc.	USA	4.3	85	
5	US Bancorp	USA	4.4	58	
6	Washington Mutual Inc.	USA	4.8	100	Failed, taken over by FDIC
7	Regions Financial Corporation	USA	5.0	90	
8	Nomura Holdings Inc	JAPAN	5.6	76	
9	Wells Fargo & Company	USA	6.0	47	
10	Northern Rock Plc	UNITED	6.7	100	Nationalized
	Selected banks				
41	***Banque de Montreal-Bank of Montreal***	***CANADA***	***23.99***	53	
44	***Toronto Dominion Bank***	***CANADA***	***24.37***	43	
45	***Bank of Nova Scotia (The) - SCOTIABANK***	***CANADA***	***24.43***	42	
47	Royal Bank of Scotland Group Plc (The)	UNITED	25.11	96	Capital injection, asset guarantees
49	Bank of America Corporation	USA	25.59	87	Capital injection, asset guarantees
50	***Canadian Imperial Bank of Commerce***	***CANADA***	***26.00***	54	
56	***Royal Bank of Canada RBC***	***CANADA***	***32.11***	44	
63	Citigroup Inc	USA	39.46	94	Capital injection, asset guarantees
68	JP Morgan Chase & Co.	USA	46.80	50	
	Bank	**Country**	**Depository funding 3/**	**Equity decline**	**Government intervention**
	Ten most vulnerable				
1	Hypo Real Estate Holding AG	GERMANY	24.0	97	Asset guarantees and public loans
2	Northern Rock Plc	UNITED	28.7	100	Nationalized
3	Deutsche Bank AG	GERMANY	34.1	81	
4	BNP Paribas	FRANCE	36.7	65	
5	Citigroup Inc	USA	37.8	94	Capital injection, asset guarantees
6	HBOS Plc	UNITED	41.0	100	Capital injection (part of Lloyds)
7	Société Générale	FRANCE	42.0	74	
8	Banca Monte dei Paschi di Siena SpA	ITALY	44.1	68	
9	Dexia	BELGIUM	44.9	89	Nationalized
10	DnB Nor ASA	NORWAY	45.4	74	
	Selected banks				
13	JP Morgan Chase & Co.	USA	47.3	50	
15	Bank of America Corporation	USA	47.9	87	Capital injection, asset guarantees
33	Royal Bank of Scotland Group Plc (The)	UNITED	59.3	96	Capital injection, asset guarantees
51	***Royal Bank of Canada RBC***	***CANADA***	***65.1***	44	
52	***Banque de Montreal-Bank of Montreal***	***CANADA***	***65.2***	53	
57	***Toronto Dominion Bank***	***CANADA***	***67.9***	43	
60	***Canadian Imperial Bank of Commerce***	***CANADA***	***68.2***	54	
64	***Bank of Nova Scotia (The) - SCOTIABANK***	***CANADA***	***71.4***	42	
69	Washington Mutual Inc.	USA	74.6	100	Failed, taken over by FDIC

Sources: BankScope and staff calculations.

1/ Equity over total assets

2/ Liquid assets over total debt liabilities

3/ Depository funding over total assets

>85%	Due to an imminent failure
>70%	Due to a severe deterioration

Table 2: Bank Fundamentals and Performance: Multivariate Regression Results

	Imminent failure			Value Decline>85%			Value decline>70%			Value decline (%)		
Capital Ratio	-0.18	0.26	-3.04	1.24	3.58	-31.80	-0.91	3.68	-51.03	11.88	190.64	-1447.58
	(-0.42)	(0.99)	(-1.62)	(0.54)	(1.39)	(-2.10)**	(-0.33)	(1.31)	(-2.30)**	(0.13)	(2.31)**	(-3.70)***
Capital Ratio <4%		0.08			0.36			0.56			22.20	
		(1.58)			(1.71)*			(2.80)***			(3.85)***	
Balance Sheet Liquidity	-0.54	-0.43	-0.38	-1.53	-1.69	-1.19	-0.89	-1.15	-0.40	-33.20	-25.77	-17.73
	(-2.86)***	(-3.04)***	(-2.55)**	(-2.40)**	(-2.32)**	(-1.76)*	(-1.35)	(-1.31)	(-0.55)	(-1.72)*	(-1.32)	(-0.99)
Depository funding	-0.33	-0.28	-0.48	-1.13	0.54	-3.84	-1.16	1.78	-5.54	-51.68	17.66	-167.95
	(-2.34)**	(-1.77)*	(-2.80)***	(-2.37)**	(0.76)	(-2.87)***	(-2.03)**	(2.03)**	(-2.48)**	(-3.16)***	(0.71)	(-5.43)***
Depository funding <50%		-0.01			0.47			0.58			13.07	
		(-0.54)			(2.03)**			(2.95)***			(2.12)**	
Capital Ratio * Depository Funding			5.21			58.15			87.42			2545.14
			(1.72)*			(2.24)**			(2.25)**			(3.91)***
Log (Asset)	0.06	0.05	0.05	0.14	0.14	0.17	0.12	0.09	0.13	4.02	2.35	4.99
	(2.96)***	(3.09)***	(2.72)***	(1.55)	(1.35)	(1.73)*	(1.23)	(0.77)	(1.25)	(1.30)	(0.70)	(1.60)
N	72	72	72	62	62	62	62	62	62	62	62	62
R-Squared	0.39	0.44	0.45	0.14	0.24	0.23	0.08	0.28	0.17	0.15	0.32	0.27

Source: Staff calculations.

Notes: A sample of large OECD banks (assets above 100 billion euro at end-2006). The dependent variables are three dummy variables for imminent bank failure, stock market value decline by >85%, and stock market decine by >70%, as well as the absolute value of stock market decline (stock decline measured January 2007 to January 2009). Capital ratio is the equity-to-assets ratio; balance sheet liquidity is the liquid assets-to-debt-liabilities ratio; depository funding is the deposits-to-assets ratio; all taken at end-2006. The regressions involving dummy variables are estimated based on Probit, with coefficients transformed to be interpreted as probability change (0 to 1). T-statistics are reported in parenthesis. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level.

II. Canadian Residential Mortgage Markets: Boring But Effective?[1]

1. **Canada's financial system has often been criticized for being "too conservative" or "not dynamic enough".** Indeed, when compared to the United States, Canadian banks seem to offer fewer loan options, in particular in the residential mortgage area. This could mean that households are underserved and that there is wide room for welfare improvements via increased financial innovation. However, Klyuev (2008) concluded that this is not the case and housing finance is highly advanced and sophisticated in Canada. Nevertheless, the same paper finds that financing options were somewhat limited, particularly at terms longer than five years.

2. **This chapter concurs with previous research documenting the sophistication of Canada's financial system, but suggests that regulations have limited the supply of some products.** In particular, the paucity of longer-term loans is caused by a five-year maturity cap on government-guaranteed deposit insurance, and a prepayment penalty limit on residential mortgage loans in the *Interest Act*. The chapter also argues that for prime borrowers, the availability and cost of residential mortgages are comparable to those in the United States.

3. **The Canadian predominance of shorter terms is driven by the more important role (versus in the United States) of retail deposits to fund mortgages, a feature driven by regulation.** Deposits longer than five years are not popular because Canadian Deposit Insurance Corporation (CDIC) guarantees do not cover longer terms. Hence, Canadian banks have no natural funding for cost effective longer-term mortgages.

4. **Also, regulations cause lenders to pass on the higher cost of hedging prepayment risk for longer mortgages in the form of higher interest rates** (Figure 1). Section 10 of Canada's *Interest Act* effectively fixes the prepayment penalty for most mortgages with a term to maturity greater than five years at three-months of interest, which is likely less than the penalty charged during the first five years of mortgage terms. Offsetting this to some degree is the portability of Canadian mortgages.[2]

5. **Despite different regulations, mortgage costs are broadly similar in the United States and Canada.** Even though at first sight mortgage rates are higher in Canada than in the United States, "posted" rates overstate actual transacted rates in Canada. Canadian five-year conventional rates have averaged about 100 basis points above the U.S. thirty-year conforming rate (Figure 2, in which both rates are normalized by their respective interest rate swap comparators).[3] However, the Canadian rates are "posted" rates that overstate actual

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[1] Prepared by J. Kiff, based on a forthcoming IMF working paper.

[2] U.S. homeowners that relocate must prepay their existing mortgages and take on a new one at prevailing rates.

[3] Direct comparisons of fixed-rate mortgage costs are complicated by the fact that the term of "long-term" mortgage in Canada is five years, while it is thirty years or more in the United States. Comparing variable- or adjustable-rate mortgage (VRM or ARM) costs is complicated by the fact that U.S. ARMs embed numerous bells and whistles, such as "teaser rates" (see Kiff and Mills, 2007).

transacted rates, typically by more than 100 basis points. The Canadian Association of Accredited Mortgage Professionals (CAAMP) estimates that, on average, recent posted rates have exceeded transacted rates by 159 basis points (CAAMP, 2008).

6. **In addition, the apparently lower U.S. thirty-year conforming rates reflect the payment of upfront points, which effectively prepay interest.** For example, on February 19, 2009, the posted conforming rate was 5.04 percent with 0.7 points upfront, which is equivalent to 5.34 percent (plus 30 bps) with zero points. Moreover, there is an incremental term premium embedded in U.S. rates, which reflect the longer term of U.S. loans.

7. **Anecdotal evidence suggests that the non-interest costs of originating and refinancing mortgage loans is significantly cheaper in Canada, which would also contribute to closing any apparent gap between the costs in both countries.** Canadian borrowers pay about C$2,000 in upfront fees and taxes for a new loan, and on a refinancing about C$1,000 plus a prepayment penalty of about C$3,000 on the old mortgage.[4] On the same loans (new loans and refinancings), U.S. borrowers pay origination fees of $1,000 to $3,000, plus about $1,000 of costs and fees, and local government taxes of about $1,000.

8. **Payment affordability criteria for prime borrowers are broadly similar in both countries.** For example, in order to qualify for mortgage insurance in Canada, gross debt service should usually not exceed 32 percent of gross household income, and total debt service cost should usually not exceed 40 percent (versus 28 and 36 percent to qualify for Fannie Mae and Freddie Mac insurance).

9. **However, the approval criteria for adjustable-rate loans in Canada are usually based on the three-year fixed-term rate, which is usually the highest fixed rate inside of the five-year term**, whereas U.S. practice is to use the current floating rate.[5] Canada also has a small "Alt-A" market aimed mainly at self-employed people who have difficulty documenting their stated income.

10. **Down payment requirements are roughly in line with those in the United States.** Canadian federally-regulated deposit-taking institutions have been able to underwrite insured mortgages with loan-to-value ratios as high as 95 percent since 1992, and occasionally before then.

11. **There are no limits to the size of individual loans that the Canada Mortgage and Housing Corporation (CMHC) and other mortgage insurers will insure, which minimize risks to banks' balance sheets.** In the United States, Fannie Mae and Freddie Mac

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[4] Cost calculations are based on a $240,000, five-percent loan and based on transactions in Ottawa, Ontario (provided by Steven Sheppard of BrazeauSeller LLP) and McLean, Virginia (AimLoan.com).

[5] In fact, until recently, it was U.S. practice to use a fixed "teaser rate" that applied to the first two or three years of many adjustable-rate mortgages (ARMs), for affordability calculations (Kiff and Mills, 2007). However, some Canadian lenders have started to qualify adjustable-rate loans on the basis of current floating-rate loan rates.

insurance is only available on loans up to the "conforming limit", which vary by geographic areas, but in 2009 is $625,500 for loans on single-family homes in "high-cost" areas.

Conclusions and Policy Implications

12. **The availability and costs of Canadian residential mortgage loans to prime borrowers are comparable to those in the United States.** Moreover, even though there are clear institutional differences, homeownership in both countries is virtually identical at about 68 percent of all households. This said, some aspects of Canada's mortgage market can be improved. To encourage the development of longer-term mortgage markets, the government might consider dropping the five-year cap on CDIC deposit insurance and the five-year prepayment penalty fixed in the *Interest Act*. Until that happens, rates on fixed-term residential mortgages beyond the five year term will remain uneconomical for most borrowers. The opening up of longer fixed-rate terms would help households to better manage financial risks.

Figure 1: Canadian Bank Mortgage Rates (February 20, 2009)
(percent)

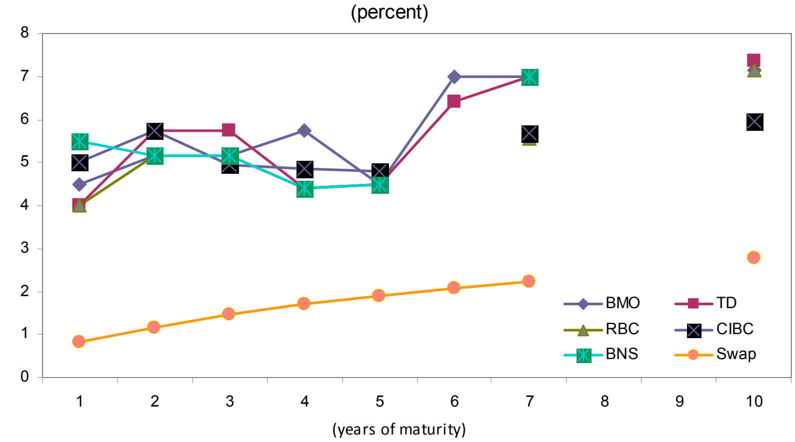
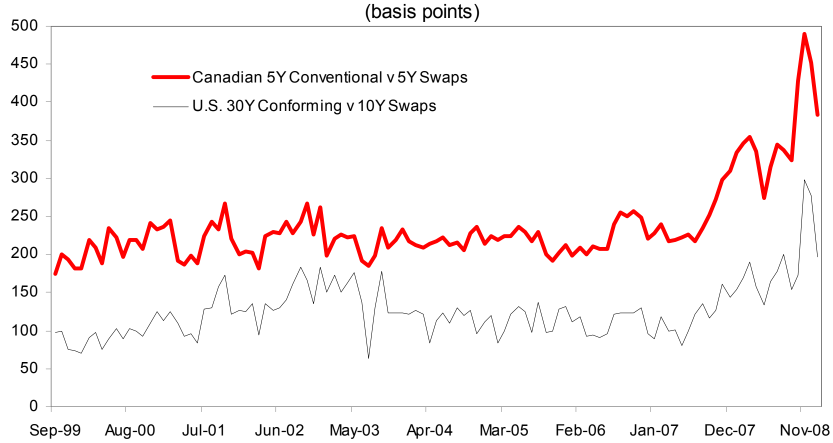
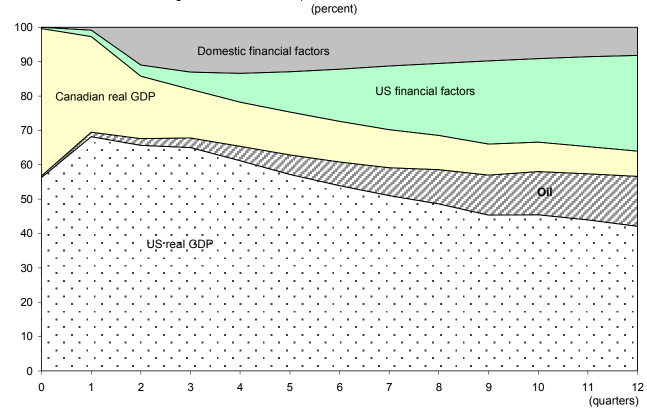


Figure 2: Residential Mortgage versus Interest Rate Swap Rates
(basis points)



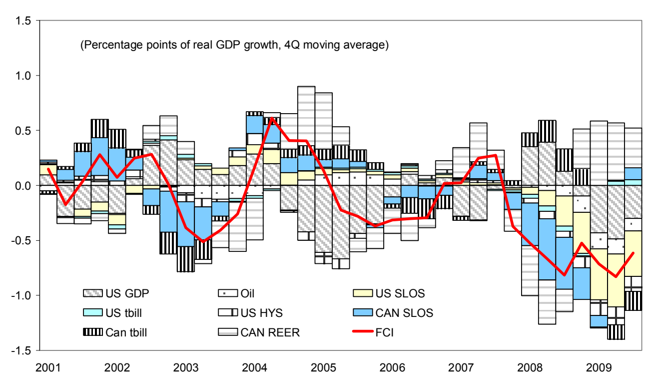
7. **The variance decompositions for Canada's real GDP growth confirm that foreign shocks are the most important source of variation in Canada's growth over the long run**, with U.S. growth accounting for close to 42 percent, U.S. financial shocks another 28 percent, and oil prices 14 percent (Figure 5). The contribution of domestic financial conditions to Canadian growth increases from 0 percent in the short-term to over 8 percent in 12 quarters. Oddly enough, the contribution of Canadian growth to its own variance declines from 43 percent to a little over 7 percent in the long run—this could reflect the fact that the model is based on a recent sample period (since 1999), when the openness of the Canadian economy to external volatilities, especially vis-à-vis the United States has increased markedly. Indeed, a simple monetary BVAR model estimated starting in the early 1990s (which excludes data on financial market indicators, i.e., lending standards and high yield spreads) attributes a larger role to domestic growth shocks.

Figure 5. Variance Decomposition of Canadian Real GDP Growth
(percent)



8. **A macro-financial condition index built from the coefficients of the baseline model tracks real GDP growth well,** and shows that tightening in the Canadian SLOS and effects of past real appreciation have played a key role in the deceleration of the Canadian growth rate in the run up to the recent crisis. However, U.S. economic and financial conditions will increasingly bear on growth in the near term.

Figure 6. Contribution to the Macro-Financial Conditions Index



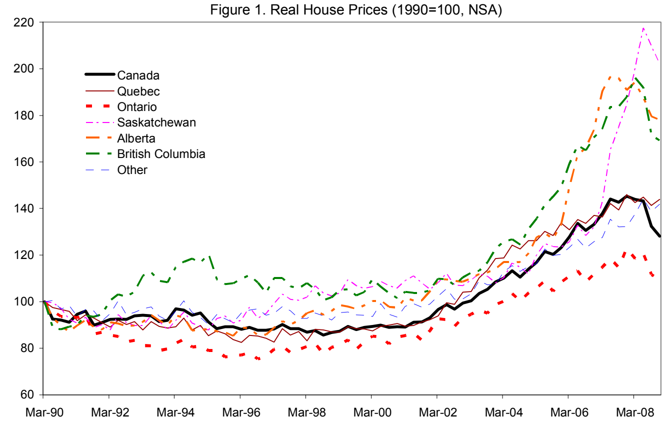
Conclusions and policy implications

9. **The paper underscores the need for a normalization of U.S. and domestic financial strains for Canada's recovery.** Tight U.S. and domestic financial conditions depress Canada's growth by intensifying credit strains for businesses, although monetary easing helps ameliorate these strains somewhat. Thus, stability in U.S. financial conditions would be critical for a sustained pick up in Canadian economic activity.

IV. Is the Canadian Housing Market Overvalued? A Tale of Two Regions[1]

1. **Canadian house prices have increased significantly between 2003 and early 2008, with a marked downward trend since mid-2008** (Figure 1). House prices rose by around 60 percent in nominal terms (45 percent in real terms) from 2003 to the peak, before falling by around 10 percent (both in real and nominal terms) in the latter part of 2008. The decline is particularly acute in the west given the collapse in commodity prices, although modest declines are occuring elsewhere.

Figure 1. Real House Prices (1990=100, NSA)



Source: CREA, Finance Canada, and Haver Analytics.

2. **This chapter summarizes estimates of the gap between actual house prices and their equilibrium levels for five large Canadian provinces** (Alberta, British Columbia, Ontario, Quebec, and Saskatchewan). The price measure used is the existing home price from the Canadian Real Estate Association's Multiple Listing Service (MLS) database, and is deflated by each province's CPI.[2] We examine current valuations against economic fundamentals using quarterly regional data—such as disposable income, demographic developments, and mortgage credit. The analysis is based on an error correction model, which combines the long-run, cointegrating relationship among the levels variables and the short-run relationships among the first differences of the variables.

3. **The error correction model postulates that the growth rate of real houses is explained by a combination of the following factors (depending on the province considered)** (Table 1):[3]

- *Past growth rates of real house prices*. For most provinces, we find that the current growth rate is positively correlated with the past growth rate.

[1] Prepared by E. Tsounta.

[2] While private banks and other forecasters have recently developed new indices on house prices (e.g., adjusting for quality), CREA's sales weighted index remains the most widely used, including by Canada's Mortgage and Housing Corporation and Finance Canada, as a major economic indicator given its larger sample size (all provinces, more years, all sales by realtors). This measure exhibits the largest volatility, including large upswings, and in that respect it should represent an upper limit in terms of any overvaluation. For example, the quality-adjusting Teranet-National Bank house price index (data starting in 1999) records that house prices in Canada's six metropolitan areas of Ottawa, Toronto, Calgary, Vancouver, Montreal, and Halifa have risen on average by 48 percent from 2003 to their peak, versus around 60 percent using CREA's estimates.

[3] There is considerable uncertainty about the right technique to model equilibrium house prices. Papers that cite limitations in identifying the determinants of home prices include Allen, J. et al. (2006), Klyuev (2008), and IMF (2004).

- *Reversion to fundamentals implied by the long-run equation.* We find that only for Ontario, the growth rate of house prices shows long-run reversion to the equilibrium prices derived from the model, implying that prices would tend to fall when they are out of line with fundamentals.
- *Economic fundamentals.* For most provinces, we find that the growth rate of house prices is positively affected by (per capita) real income growth—as this increases households' purchasing power and borrowing capacity—and positively affected by mortgage credit growth (higher rates indicate that households are less credit rationed), and population growth (as a proxy for the growth rate of households).

Table 1. Determinants of House Prices in Selected Canadian Provinces
(Summary of Empirical Results, 1992-2008)
Dependent Variable: Real House Price (growth)

	Alberta	British Columbia	Ontario	Quebec	Saskatchewan
Explanatory Variables					
Lagged dependent variable	0.43	-0.08	-0.33	-0.64	0.03
Lagged real house price (growth)	[3.32]	[-0.6]	[-3.51]	[-4.1]	[0.22]
Reversion	-0.03	0.07	-0.64	0.02	-0.01
Error correction coefficient	[-0.87]	[1.8]	[-6.81]	[1.1]	[-0.07]
Fundamentals					
Real earnings (per capita, growth)	0.89	1.6	0.56	-0.07	0.96
	[2.96]	[3.4]	[1.38]	[-0.13]	[2.16]
Real credit (growth)	0.09		-0.05		
	[1.89]		[-1.16]		
Population (growth)		-5.9	-18.14		9.85
		[-1.7]	[-3.77]		[2.88]

Source: Staff estimates.
Note: T-statistics are listed within brackets.

Conclusions and policy implications

4. **Results reveal that prices in the west are above the levels implied by the model, although prices remain close to or slightly below equilibrium in the east** (Figure 2). Indeed, the econometric model indicates that most of the recent surge in Canadian home prices, even in the west, reflects a catch-up from stubbornly undervalued levels following the housing collapse in the early 1990s, rather than a housing bubble per se.[4] While resource-rich western provinces continue to have house prices above the model prediction, their prices have diminished significantly in the last year. In contrast, Quebec and Ontario appear to be close to equilibrium, or slightly below the prices implied by the model, indicating a divergence between western and eastern provinces in house price dynamics.

[4] IMF (2004, 2009) reaches similar conclusions in a cross-country analysis.

5. **While a crash in the national housing market appears unlikely, a correction in western housing markets could have national implications.** With the west accounting for 35 percent of Canada's GDP and around 30 percent of Canada's labor force, an abrupt correction in its housing market, could cause adverse spillovers to the rest of Canada; with housing assets and mortgage debt at record ratios of disposable income, household balance sheets are particularly exposed to house price dynamics. Similarly, given that most mortgages are originated by banks (55 percent of which do not carry mortgage insurance but have a loan-to-value ratio below 80 percent),[5] this could also somewhat impact the banking sector, affecting the future provision of mortgages and credit in general, imposing additional downward pressure on spending, incomes, wealth and thus house prices. Last but not least, house prices directly impact headline and core inflation, thus affecting inflationary expectations as well.

[5] Chapter II discusses Canadian mortgage markets.