

# International Transmission Channels of U.S. Quantitative Easing: Evidence from Canada \*

Tatjana Dahlhaus    Kristina Hess    Abeer Reza<sup>†</sup>

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## Abstract

The U.S. Federal Reserve responded to the great recession by reducing policy rates to the effective lower bound. In order to provide further monetary stimulus, they subsequently conducted large-scale asset purchases, quadrupling their balance sheet in the process. We assess the international spillover effects of this quantitative easing program on the Canadian economy in a FAVAR framework, by considering a counterfactual scenario in which the Federal Reserve's long-term asset holdings do not rise in response to the recession. We find that U.S. quantitative easing boosted Canadian output, mainly through the financial channel.

*Keywords:* quantitative easing, international policy transmission, unconventional monetary policy, factor-augmented VAR

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<sup>†</sup>Corresponding author. International Economic Analysis, Bank of Canada, 234 Laurier Avenue West, Ottawa, ON, K1A0G9 *Email:* [reza@bankofcanada.ca](mailto:reza@bankofcanada.ca) Phone: +1 613 782 8823

# 1 Introduction

In the aftermath of the global financial crisis, many central banks turned to quantitative easing (QE), or large scale purchases of long-term assets, as a means to provide monetary stimulus when their conventional policy interest rates became stuck at their respective effective lower bounds. The U.S. Federal Reserve, in particular, responded to the post-crisis recession by reducing its short-term policy rate to near zero, and subsequently attempting to bring down long-term interest rates by purchasing long-term assets in an unprecedented scale, effectively quadrupling the size of its balance sheet by the end of 2013 in the process (see figure 1).<sup>1</sup> Since then, the economic literature has focused on explaining the transmission mechanism of QE (Bernanke [2012]), and quantifying its impact on the domestic economies of countries implementing such policies (Lenza et al. [2010], Kapetanios et al. [2012], Baumeister and Benati [2013]). Given the globally interconnected markets in which the crisis unfolded, however, it is reasonable that the unprecedented policy reaction to the crisis may also have large international spillovers. Yet, there is a dearth of analysis on the international transmission of QE to the real economies of countries that did not adopt such programs. In this paper, we address this gap by assessing the spillover of the Fed’s QE program to the real economy of a non-QE country, namely, Canada.

Specifically, we (a) quantify the effect of the Fed’s long-term asset purchases on the Canadian economy, and (b) identify the principal channels of international transmission in a two-country Factor-Augmented Vector Auto-Regression (FAVAR) framework by considering a counterfactual scenario where the Fed’s long-term asset holdings do not rise in response to the recession.

Although the effect of QE on the U.S. domestic economy is thought to be stimulative under the zero lower bound, it is unclear whether its effect on foreign economies would be unambiguously expansionary. Whether by signaling the Fed’s intention to keep short-term rates low for an extended period (Woodford [2012]), or by re-balancing imperfectly substitutable financial assets in investor portfolios (Bernanke [2012]), large scale purchases of long-maturity assets by the Fed would increase asset prices and reduce bond yields. Higher asset prices would then boost consumption through wealth effects. At the same time, a rise in asset prices relative to the replacement cost of capital would boost investment, as would a reduction in the user cost of capital due to a drop in long-term interest rates.

Standard economic theory, however, provides ambiguous implications for the international spillover of monetary easing (Rogoff [2002]). Through the expenditure switching effect, a monetary expansion in the U.S. would depreciate the home currency and deteriorate its terms of trade, making home goods cheaper for foreigners. The resulting

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<sup>1</sup>Although the first wave of asset purchases were aimed at preventing the seizing up of credit markets and included short-term emergency lending to financial firms, purchases of agency debt and asset-backed securities, subsequent programs targeted long-term mortgage-backed securities and government bonds in an effort to reduce long-term interest rates. In this paper, we assess the effects of the latter aspect of QE. For a discussion on the difference between the two aspects of balance sheet expansion, see Lenza et al. [2010], and Kozicki et al. [2011].

increase in home country net exports would then detract from the real output of the foreign economy. The income-absorption effect, on the other hand, implies that as long as expansionary monetary policy in the home country drives up domestic income, home demand for imports would rise, boosting the economy of foreign exporters. Finally, in the presence of global financial market integration, any increase in asset prices and reductions in yields in the domestic financial market resulting from QE may be reflected by similar movements in corresponding foreign financial market variables,<sup>2</sup> which in turn would boost foreign consumption and investment through the same mechanism as it does in the domestic case. Therefore, whether Canada benefits from the U.S. expansion through QE depends on which of these effects dominate, and is an empirical question that we attempt to answer here.

Our interest on identifying the international transmission channels of QE makes FAVAR (Bernanke et al. [2005], Boivin and Giannoni [2007], Charnavoki and Dolado [2014]) the appropriate framework to consider, as it allows us to simultaneously assess the dynamic interactions between a large number of financial and real variables.

We choose Canada as an important case to highlight international transmission channels for a number of reasons. First, its strong trade and financial ties with the U.S. makes it reasonable to expect spillovers to be strong and easily observable. Second, the Bank of Canada did not implement QE, as the pre-crisis resilience of the Canadian financial sector prevented severe financial contagion during the crisis.<sup>3</sup> Figure 1 shows, however, that despite virtually no change in the amount of long-term assets in the Bank of Canada's balance sheet holdings,<sup>4</sup> long-term spreads in Canada fell at the same time as its U.S. counterpart. Third, Canada is a small open economy with a floating exchange rate, with a long tradition of independent monetary policy, and availability of quality data. The latter is of particular practical importance when considering a FAVAR analysis. Finally, Canada is also a commodity exporter, allowing for a richer exploration of possible spillover channels of QE. For example, even when the income absorption effect dominates in the U.S., higher import demand for Canadian energy products may drive up the Canadian exchange rate, putting the non-energy sectors at a disadvantage from an export price point of view.<sup>5</sup>

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<sup>2</sup>Indeed, Fratzscher et al. [2013] find that QE boosted equity prices worldwide, including in Canada, while Bauer and Neely [2012] show that long-term Canadian yields decreased following U.S. large scale asset purchase announcements.

<sup>3</sup>Note that Canada provided direct qualitative signals on the future path of short-term rates through forward guidance statements as did the U.S. (Fay and Gravelle [2008]). Moreover, the Bank of Canada provided term-liquidity facilities to financial market participants to stabilize the financial system and limit the repercussions of the crisis to the Canadian economy (Zorn et al. [2009]).

<sup>4</sup>The increase in the other-asset category seen from 2011 onwards reflects the Canadian Federal Government's debt management strategy. Specifically, in the 2011 Federal Budget, the government decided to hold prudential assets in the form of cash and short-term treasury that will allow it to operate for one month in case its regular access to financial markets is hindered. For details, see the government's Prudential Liquidity Management plan delineated in the budget document. <http://www.budget.gc.ca/2011/plan/anx2-eng.html>. Taking a purely monetarist approach, however, one might interpret the rise in the total asset of the Bank of Canada's balance sheet as a monetary expansion (Gambacorta et al. [2012]).

<sup>5</sup>Using a FAVAR approach, Charnavoki and Dolado [2014] find that a higher exchange due to high

Since the beginning of the foray into unconventional policy, a number of papers have attempted to quantify the effects of QE on domestic financial markets (Gagnon et al. [2011], Krishnamurthy and Vissing-Jorgensen [2011]), and domestic real economies of countries conducting such policies (cf. Lenza et al. [2010] for an analysis on the euro area, Kapetanios et al. [2012] for the U.K., Baumeister and Benati [2013] for the U.S. and U.K., Schenkelberg and Watzka [2013] for Japan, and Gambacorta et al. [2012] for an international comparison), as well as on the spillovers of QE to international financial markets (Fratzscher et al. [2013], Bauer and Neely [2012]). To the best of our knowledge, this is the only paper that attempts to assess the international spillovers of QE on the real economy. In this sense, it complements the literature on the real spillovers of conventional monetary policy (Kim [2001], Kazi et al. [2013]).

Our approach differs from existing studies on the effects of QE in two important ways. First, while earlier studies proxy U.S. policy through its intended, but unobserved, effects on long-term rates, we directly measure policy action through the observable expansion of the Fed's balance sheet. With limited information available at the onset of the implementation of QE, early papers on the topic take findings from event studies on financial market reactions to Fed announcements as given, and construct counter-factual scenarios where the absence of QE is proxied through higher long-term rates.<sup>6</sup> We, on the other hand, measure QE as the Fed's balance-sheet holdings of long-term assets, and construct a counterfactual scenario where these holdings are not increased in reaction to the great recession. Our measure takes advantage of 19 quarters of observable data, and is agnostic about the effect on long-term rates. Note, however, that we retain the focus on long-term asset purchases, rather than the increase in the monetary base or the total size of the Fed's balance sheet as considered by Gambacorta et al. [2012].<sup>7</sup>

Second, we estimate a two-country FAVAR with coefficient restrictions which allows us to study the transmission of U.S. policy through dynamic interactions between a large number of financial and real variables, while at the same time restricting U.S. policy from being influenced by movements in Canadian economic variables. We believe this is the appropriate framework for studying relationships between a large country such as the U.S., and a small open economy, such as Canada (Charnavoki and Dolado [2014]).

We find that the implementation of QE increases U.S. output by about 2.3 percent and Canadian output by 2.2 percent on average between 2008Q4 and 2013Q3, when compared

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energy prices negatively impact the non-energy sector output only after a negative energy supply shock, while it positively impacts non-energy sector output following a positive global demand shock. This finding is mirrored by Dorich et al. [2013], who use an estimated DSGE framework.

<sup>6</sup>Looking at financial market reaction within a short time-window of the Fed announcements regarding QE, Gagnon et al. [2011] and Krishnamurthy and Vissing-Jorgensen [2011] suggest that QE lowered long-term treasury yields by between 30 and 100 basis-points. Baumeister and Benati [2013] accordingly construct their counterfactual scenario of a world without QE as one where long-term yields are a 100 basis points higher. In a similar event study, Joyce et al. [2011] find that QE announcements in the UK reduced long-term government bond rates by a 100 basis points. This, in turn, serves as the basis for the counterfactual considered by Kapetanios et al. [2012].

<sup>7</sup>Interpreting QE as an increase in the total size of the Fed's balance sheet or monetary base espouses a purely monetarist view that relies on the structural stability of the money multiplier and the velocity of money (Woodford [2012]).

with the no-QE counterfactual scenario. Because of QE, U.S. long-term spreads decline, and asset prices rise, boosting both investment and consumption, though the latter is not statistically significant. The transmission to Canada occurs mostly through the financial market. Although Canada did not implement QE, long-term spreads in Canada fall, and asset prices in the Canadian stock market rise. QE also leads to higher oil prices, an improvement in the Canadian terms of trade, and an appreciation of the Canadian nominal exchange rate vis-à-vis the U.S., consistent with the commodity currency effect documented by [Charnavoki and Dolado \[2014\]](#) and [Dorich et al. \[2013\]](#).

In other words, financial market integration results in Canadian interest rates and asset prices moving in the same direction as those in the U.S. following the implementation of QE. Along with the effects of an improved terms of trade, spillovers from the financial channel bolster the domestic Canadian economy, driving up Canadian demand for imports, while the appreciation of the Canadian dollar make imports cheaper. As a consequence, net exports fall, despite the fact that Canadian exports increase in most product categories, consistent with a stronger U.S. economy. Our finding that the financial channel dominates the trade channel in transmitting positive spillovers from a U.S. monetary expansion is consistent with the transmission of conventional monetary policy documented by [Kim \[2001\]](#) using a small SVAR.

The rest of the paper is organized as follows. Section 2 describes the two-country FAVAR setup, as well as the data and estimation process. Section 3 describes the counterfactual setup and the results of the exercise for both aggregate real and financial variables, as well as some disaggregated variables. We provide some robustness analysis in section 4, including a qualitative look at the transmission mechanism for conventional monetary policy shock to the U.S. policy rate. Section 5 concludes.

## 2 Empirical Framework

We choose a FAVAR approach ([Bernanke et al. \[2005\]](#) and [Boivin and Giannoni \[2007\]](#)) to assess the different international transmission channels of QE. This is the appropriate framework to consider, as it allows us to simultaneously compare the effect of QE on a broad set of financial and real variables from Canada and the U.S., while taking into account the dynamic interactions between them. We explain our empirical setup, describe the data, and discuss the estimation method below.

### 2.1 Empirical Model

Our FAVAR specification contains two country-specific blocks. Following [Charnavoki and Dolado \[2014\]](#), we impose two restrictions to reflect the small-open economy nature of Canada. First, by imposing block-zero restrictions on the VAR coefficients, we ensure that movements in Canadian factors do not influence movements in U.S. factors. Second, by specifying that Canadian time series load on both U.S. and Canadian factors, we allow for a strong co-movement between real and financial variables of both countries, while keeping unobserved factors orthogonal to each other.

The one directional nature of the relationship between these two countries inherent in our modeling choice is motivated by the following observations from international trade and financial flow data. First, Canada is highly dependent on the U.S. for its international trade, while the reverse is not true. On average, 84% of total Canadian exports between 2000 and 2007 was destined for the U.S. However, this accounted for only 17% of total U.S. imports. Table 1 shows that this disparity is true for Canadian imports as well, and holds across all product categories. International financial flows between the two countries show a similar pattern. Table 2 shows that 47% of Canadian portfolio and direct investments abroad are in the U.S., while almost 60% of foreign direct and portfolio investments in Canada comes from the U.S. In particular, about 80% of foreign investments in Canadian equity is held by U.S. investors. Finally, table 3 shows that both financial markets and real economies of the two countries are strongly and persistently correlated in business cycle frequencies. This suggests that the Canadian economy is highly responsive to movements in U.S. economic and policy variables, while the reverse may not be true. This is reflected in our empirical framework described below.

The first block in our FAVAR model contains a vector of unobservable factors,  $\mathbf{F}_t^{US,F}$ , that summarizes information about the U.S. economy, and a vector of observable policy variables,  $\mathbf{Y}_t^{US}$ , that summarizes U.S. monetary policy stance.  $\mathbf{F}_t^{US} = (\mathbf{F}_t^{US,F}, \mathbf{Y}_t^{US})$ . In our case, the policy variables are the effective Federal funds rate and our measure of QE – total long-term asset holdings in the Fed’s balance sheet. The second block consists of Canada-specific unobservable factors,  $\mathbf{F}_t^{CA}$ , that are orthogonal to the U.S. factors.

The U.S. and Canadian data load on to the factors as follows:

$$\begin{bmatrix} \mathbf{X}_t^{US} \\ \mathbf{X}_t^{CA} \end{bmatrix} = \begin{bmatrix} \mathbf{\Lambda}_{US}^{US} & \mathbf{0} \\ \mathbf{\Lambda}_{US}^{CA} & \mathbf{\Lambda}_{CA}^{CA} \end{bmatrix} \begin{bmatrix} \mathbf{F}_t^{US} \\ \mathbf{F}_t^{CA} \end{bmatrix} + \begin{bmatrix} \mathbf{u}_t^{US} \\ \mathbf{u}_t^{CA} \end{bmatrix} \quad (1)$$

where  $\mathbf{X}_t^{US}$  and  $\mathbf{X}_t^{CA}$  are data for the U.S. and Canadian economies;  $\mathbf{\Lambda}_{US}^j = (\mathbf{\Lambda}_{US,F}^j, \mathbf{\Lambda}_{US,Y}^j)$  are the loading matrices corresponding to the unobservable and observable U.S. factors, and  $\mathbf{\Lambda}_{CA}^{CA}$  denotes the loading matrix for the Canadian factors that are orthogonal to the U.S. ones. As we can see, the Canadian data load on both U.S. and Canada-specific factors.  $\mathbf{u}_t^{US}$  and  $\mathbf{u}_t^{CA}$  are vectors of idiosyncratic disturbances.

We model the dynamics of the factors as a restricted VAR (see e.g. [Charnavoki and Dolado \[2014\]](#)):

$$\begin{bmatrix} \mathbf{F}_t^{US} \\ \mathbf{F}_t^{CA} \end{bmatrix} = \begin{bmatrix} \mathbf{b}_{11}(L) & \mathbf{0} \\ \mathbf{b}_{21}(L) & \mathbf{b}_{22}(L) \end{bmatrix} \begin{bmatrix} \mathbf{F}_{t-1}^{US} \\ \mathbf{F}_{t-1}^{CA} \end{bmatrix} + \mathbf{e}_t, \quad (2)$$

where  $\mathbf{b}_{ij}(L)$  are lag polynomials of finite order  $p$  and  $\mathbf{e}_t$  denotes the reduced form residuals. The block of zeros in the coefficient matrix prevents movements in Canadian factors to influence those in the U.S. As argued above, we believe this restriction adequately captures the small open economy nature of Canada. Relaxing this restriction, however, does not alter our main findings presented below.

## 2.2 Data

We use quarterly data from 122 U.S. and 149 Canadian series ranging from 1983Q1 through 2013Q3. The start date is restricted by the availability of Canadian disaggre-



gated data. The U.S. series includes real data from national income, industrial production, employment by industry, as well as data on housing starts and sales, manufacturers' orders and inventory, and a number of different price indexes. Movements in the financial sector are captured through stock prices, nominal and real exchange rates, interest rates of varying maturity, bond prices, monetary aggregates, and commercial bank balance sheet and lending conditions. We also include confidence indexes from the Conference Board and University of Michigan surveys on business sentiment. The QE variable represents the Federal Reserve's balance-sheet holding of mortgage-backed securities and treasury bonds with maturities of more than 5 years. A more detailed discussion on the choice of this variable is provided in section 3 while describing the counterfactual setup.

The Canadian series include real data on national accounts, Canadian exports and imports by product, and by regional destination, flows from the balance of payments account, and industry-level GDP and employment. We also include Canadian house prices and housing starts, and a number of relative price and oil price indexes. Movement in the financial sector is captured through the Toronto Stock Exchange (TSX) price index, nominal and trade-weighted real exchange rates, interest rates of various maturities, as well as balance-sheet conditions from commercial banks and private industry. We capture Canadian business confidence by the Conference Board confidence index.

Most of our data series, both U.S. and Canadian, are downloaded via HAVER analytics. We construct the industry-level GDP for Canada by combining information from tables 379-0027 and 379-0031 from the Canadian Socioeconomic Information Management (CANSIM) database maintained by Statistics Canada.<sup>8</sup> The series are transformed to induce stationarity, and standardized before estimation. For the benchmark case presented in section 3.2, we transform our measure of QE by taking differences in levels, and consider differences in logs in section 4. Table 4 in the appendix provides detailed descriptions, sources, and transformation codes for all series considered.

## 2.3 Estimation

Following [Bernanke et al. \[2005\]](#), we estimate the FAVAR in two steps. First, the unobserved factors  $\mathbf{F}_t^{US,F}$  and  $\mathbf{F}_t^{CA}$  are estimated through principal components from our datasets  $\mathbf{X}_t^{US}$  and  $\mathbf{X}_t^{CA}$ . Second, both unobserved and observed policy variables are then cast into a restricted VAR model.

The unobservable U.S. factors are rotated to be orthogonal to the observed policy variables as follows. First, we start by extracting  $K^{US}$  factors from the U.S. dataset  $\mathbf{X}_t^{US}$  as the largest  $K^{US}$  principal components. We then extract the same number of factors from a subset of our dataset that contain variables which do not respond to policy changes contemporaneously, i.e., slow-moving variables. The full set of factors are then regressed on the set of slow-moving factors and the set of fast-moving policy variables,  $\mathbf{Y}_t^{US}$ . The

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<sup>8</sup>Statistics Canada discontinued table 379-0027 in 2012Q4, where real industry-level GDP is measured in 2002 Canadian dollars, and replaced it with table 379-0031, where data is measured in 2007 dollars and starts in 1997Q1. We construct our GDP series by taking data from the latter table, and growing them out backwards using the growth rate of corresponding variables from the former table.

final set of factors,  $\hat{\mathbf{F}}_t^{US,F}$ , are estimated as a rotation of the original factors that are orthogonal to  $\mathbf{Y}_t^{US}$ .<sup>9</sup>

We allow Canadian data,  $\mathbf{X}_t^{CA}$ , to load on both U.S. and Canadian factors, with loading matrices  $\mathbf{\Lambda}_{US}^{CA}$  and  $\mathbf{\Lambda}_{CA}^{CA}$ , respectively. We estimate the Canadian factors following the iterative procedure employed by [Charnavoki and Dolado \[2014\]](#) in order to control for the effect of the U.S. factors in the Canadian block. Again, we start by extracting  $K^{CA}$  factors from the Canadian dataset as the largest  $K^{CA}$  principal components. Given this initial estimate of the Canadian factors,  $\hat{\mathbf{F}}_t^{CA(0)}$ , we iterate through the following steps until convergence is achieved:

1. Regress  $\mathbf{X}_t^{CA}$  on  $\hat{\mathbf{F}}_t^{CA(j)}$  and the estimates of the U.S. factors,  $\hat{\mathbf{F}}_t^{US} = \left[ \hat{\mathbf{F}}_t^{US,F}, \mathbf{Y}_t^{US} \right]$ , to obtain  $\hat{\mathbf{\Lambda}}_{US}^{CA(j)}$ .
2. Calculate  $\tilde{\mathbf{X}}_t^{CA(j)} = \mathbf{X}_t^{CA} - \hat{\mathbf{\Lambda}}_{US}^{CA(j)} \hat{\mathbf{F}}_t^{US}$ .
3. Obtain  $\hat{\mathbf{F}}_t^{CA(j+1)}$  as the first  $K^{CA}$  principal components of  $\tilde{\mathbf{X}}_t^{CA(j)}$ .
4. Back to step 1. The algorithm stops when the difference between  $\hat{\mathbf{F}}_t^{CA(j+1)}$  and  $\hat{\mathbf{F}}_t^{CA(j)}$  is sufficiently small.

Different versions of the [Bai and Ng \[2002\]](#) criteria suggest between 6 and 10 factors for the U.S. block and 4 to 8 factors for the Canadian block. We chose 6 factors for the U.S. (including the policy variables) and 4 factors for the Canadian block. Our main message below, however, is robust to any combination of 4 to 10 factors. Using these factors, we estimate equation 2 via restricted OLS to incorporate the block zero restriction. We chose only 1 lag for the VAR to take into account our relatively small sample size.

### 3 International Transmission of QE

Using the empirical setup described above, we estimate the effect of QE as the difference between two conditional forecasts: one, corresponding to the policy scenario, where the Fed’s long-term asset holdings follow the path observed in data, and the other, the counterfactual no-policy scenario, where the Fed’s holding of long-term assets does not increase in response to the great recession. In this section, we first describe our counterfactual setup, then discuss the results of our analysis.

#### 3.1 Counterfactual setup

Although the Federal Reserve announced purchases of mortgage-backed and long-term treasury securities in a staggered manner since the beginning of the financial crisis,<sup>10</sup>

<sup>9</sup>See [Bernanke et al. \[2005\]](#) for details.

<sup>10</sup>In November 2008, the Federal Reserve announced purchases of \$600 billion worth of mortgage-backed securities. By March 2009, the Fed’s holdings of bank debt, mortgage-backed securities, and



actual purchases occurred gradually. Figure 1 shows the rise in long-term asset holdings (holdings of mortgage-backed securities and treasury securities of maturity higher than 5 years) in the Fed balance sheet, along with the policy rate and the 10-year treasury yield.

For our counterfactual, we construct a no-policy scenario where this increase in long-term asset holdings does not occur. We therefore espouse a view that anticipated increases in long-term asset holdings have an effect on the economy. We believe that this view is somewhere between [Gambacorta et al. \[2012\]](#) who focus on an unanticipated increase in the Fed’s balance-sheet, and [Woodford \[2012\]](#) who considers that the announcements themselves contain all relevant information about the Fed’s policy actions. In our benchmark case, we generate an unconditional forecast of the Fed’s long-term asset holdings from equation 2 using pre-recession values of the factors. This gives us a path for the QE variable that is consistent with pre-recession dynamics, but one that does not increase in response to the recession. Our no-policy counterfactual is then generated as the expected value of our variables of interest conditional upon this counterfactual path of the Fed’s asset holdings. This approach is similar to [Lenza et al. \[2010\]](#).<sup>11</sup> We also consider an alternative scenario where the QE variable is projected using its pre-recession trend growth rate, and find similar results as our benchmark case. The benchmark conditional forecasts for the policy, and the no-policy scenarios are calculated as follows.

1. **Policy scenario:** Using a full sample estimate of equation 2, produce a forecast from 2008Q4 until 2013Q3, conditional on the actual path of both the QE variable  $x_t^{*,QE}$  and the effective federal funds rate,  $x_t^{*,FF}$

$$\hat{\mathbf{X}}_{T+h} = E_T \left( \mathbf{X}_{T+h} | \mathbf{B}(L), \mathbf{F}_0 \dots \mathbf{F}_T, x_{T+h}^{*,QE}, x_{T+h}^{*,FF} \right)$$

for  $T + h = 2008Q4 \dots 2013Q3$ . This is the policy scenario.

2. **No-policy scenario:**

- (a) To generate the counterfactual path of the QE variable, estimate the restricted regression using estimated factors through 2008Q3:

$$\begin{aligned} \mathbf{F}_t &= \mathbf{B}^1(L)\mathbf{F}_{t-1} + \mathbf{e}_t \\ t &= 1983Q1 \dots 2008Q3 \end{aligned}$$

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treasury notes reached \$1.75 trillion. Purchases of long-term treasury securities worth \$600 billion were announced in November 2010, and a rebalancing of the Fed’s portfolio away from short-term and towards long-term treasury securities worth \$400 billion was announced in September 2011. In September 2012, the Fed announced purchases of mortgage-back securities worth \$40 billion per month, and renewal of the portfolio rebalancing scheme towards long-term securities. In december 2012, the Fed increased purchases of mortgage-backed securities from \$40 to \$85 billion per month. Finally, in June 2013, the Fed announced a ”tapering” of the Fed’s asset purchases.

<sup>11</sup>In contrast, [Kapetanios et al. \[2012\]](#) and [Baumeister and Benati \[2013\]](#) consider a counterfactual set of coincident structural shocks, identified through sign restrictions, that move spreads a certain amount higher than observed, while keeping the Fed funds rate at the zero lower bound. By conditioning on a particular path of a policy variable, we are spared from imposing a structural interpretation on the set of shocks that represent the Fed’s observed policy action.

Produce an unconditional forecast for the remainder of the sample, and save the path of the QE variable  $\tilde{x}_{T+h}^{QE} \in \tilde{\mathbf{X}}_{T+h} = E_T(\mathbf{X}_{T+h} | \mathbf{B}^1(L), \mathbf{F}_0 \dots \mathbf{F}_T)$  for  $T+h = 2008Q4 \dots 2013Q3$ .

- (b) Construct a counter-factual forecast from 2008Q4 until 2013Q3, conditional on the actual path of the effective federal funds rate,  $x_{T+h}^{*,FF}$ , and the counterfactual path of the QE variable,  $\tilde{x}_{T+h}^{QE}$ , constructed above.

$$\tilde{\mathbf{X}}_{T+h} = E_T(\mathbf{X}_t | \mathbf{B}, \mathbf{F}_0 \dots \mathbf{F}_T, \tilde{x}_t^{QE} \dots \tilde{x}_{T+h}^{QE}, x_t^{*,FF} \dots x_{T+h}^{*,FF})$$

for  $T+h = 2008Q4 \dots 2013Q3$ . This is the no-policy counter-factual scenario.

3. The difference between  $\hat{\mathbf{X}}_t$  and  $\tilde{\mathbf{X}}_t$  is then the effect of QE.

Note that, while we directly measure policy action through 19 quarters of observable expansion of the Fed’s balance sheet, we remain agnostic about the quantitative effect (or, even, the direction of change) of QE on long-term rates. In contrast, early studies estimating the effect of QE proxy central bank policy through its intended, but unobserved, effect on long-term rates. [Gagnon et al. \[2011\]](#) and [Krishnamurthy and Vissing-Jorgensen \[2011\]](#) use event study methods on financial markets to estimate that early Fed announcements related to QE reduced long-term yields by 30 to 107 basis points. With limited information available at the onset of the implementation of this novel policy paradigm, early studies on the effect of QE take these estimates of announcement effects on long-term yields as given, and construct counter-factual scenarios where, in the absence of QE, long-term spreads are higher by the same amount ([Baumeister and Benati \[2013\]](#) and [Kapetanios et al. \[2012\]](#)).

## 3.2 Results

Figures 2 and 3 show the effect of QE for a key set of variables for the U.S. and Canada, respectively. The solid line represents the difference between the two conditional point forecasts, and the dashed lines show the 68 percent residual bootstrap bands from the counterfactual exercise described above. Note that although the appearance of these figures resembles traditional impulse responses, they are not so. Instead, they represent the difference between the policy scenario and the no-policy scenario at each quarter of the forecast horizon. When noted, results are expressed in percentage deviation from the no-policy scenario.

A number of key results emerge from our exercise. First, as figure 2 suggests, QE boosts domestic U.S. GDP by lowering long-term spreads. Compared to the counterfactual scenario, on average between 2008Q4 and 2013Q3, the increase in long-term asset holdings in the Fed balance sheet reduces the 10-year treasury spread by 82 bps, and increases GDP by 2.3 percent, and the personal consumption expenditure price index by 0.5 percent. Note that our result of a positive impact of QE on U.S. GDP is not derived from an explicit assumption of a reduced long-term spreads. Rather, the latter arises as

an endogenous response to an increase in the Fed’s long-term asset holdings. The magnitude of decline in long-term spreads is comparable to [Neely \[2010\]](#), [Krishnamurthy and Vissing-Jorgensen \[2011\]](#), and [Bauer and Neely \[2012\]](#) who find, using different empirical techniques, that long-term treasury yields fell by 88, 107, and 123 bps, respectively, due to the Fed’s 2009 asset purchases, and to [Gagnon et al. \[2011\]](#), who find that the same purchases resulted in a reduction in the 10-year term premium by 30 to 100 bps. Our effect on GDP is also in the same order of magnitude as [Chung et al. \[2012\]](#), who find that a cumulative 70 bps drop in the term premium due to QE resulted in real GDP being higher by 3 percentage points by early 2012. Moreover, the higher personal consumption price under the QE scenario than under the no-policy scenario suggests that our counterfactual exercise does not generate a price puzzle for QE that is often found in the literature on conventional monetary policy shocks.

The domestic transmission of QE occurs largely along the lines explained by [Bernanke \[2012\]](#). Asset prices (the S&P 500 index), consumer confidence (Conference Board indicator), the banking sectors’ willingness to lend (Federal Reserve’s senior loan officer survey), and commercial and industrial loans all increase, while corporate spreads (BAA - AAA) decline. This raises U.S. investment, and, to a lesser extent, consumption.<sup>12</sup>

Second, figure 3 shows that the spillover effect of QE on Canada is positive, and of the same order of magnitude as in the U.S. In the financial market, the increase in the Fed’s long-term asset holdings reduces the 10-year Canadian government bond spread by 30 bps on average between 2008Q4 and 2013Q3, compared to the counterfactual. In the goods market, Canadian GDP increases by 2.2 percent, and the consumer price index by 0.5 percent, on average in the same period. In comparison, [Bauer and Neely \[2012\]](#) find that the 2009 asset purchases by the Fed reduced Canadian 10-year yields by 66 bps.

Third, the transmission of QE to Canada occurs mainly through financial channels. Due to strong financial integration, the Canadian corporate spread (Canadian 3-month corporate bond yield - Canadian 3-month government bond yield) fell, while both Canadian asset prices (TSX index), and consumer confidence (Conference Board index) rise alongside their U.S. counterparts. Consequently, both Canadian consumption and investment increase. Our finding that QE in the U.S. transmits to Canada through the financial, rather than the trade channel, complements a similar result found by [Kim \[2001\]](#) for a conventional monetary policy shock.

Importantly, compared with the no-policy scenario, QE leads to higher oil prices (Brent prices are shown in figure 3), an improvement in the Canadian terms of trade, and an appreciation of the Canadian nominal exchange rate vis-à-vis the U.S. This is consistent with the commodity currency effect documented by [Charnavoki and Dolado \[2014\]](#) and [Dorich et al. \[2013\]](#). Positive spillovers from an improved terms of trade bolsters Canadian income and wealth, and works in the same direction as the spillovers from the financial channel in raising Canadian consumption and investment.

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<sup>12</sup>To put our quantitative results further in perspective, consider the following two examples: in 2013Q3, real investment and the S&P price index in our QE-scenario are estimated to be 38 and 162 percent higher than our no-policy scenario, respectively. Data shows that in 2013Q3, investment was 45.6 percent and the S&P index was 107 percent higher than their recessionary troughs, which occurred in 2009Q3 and 2009Q1, respectively.

Finally, net exports fall. However, this is due to higher imports from a comparatively stronger Canadian domestic demand, rather than due to lower exports to the U.S. Looking closer at net exports, however, we find two important trends that contradict a purely expenditure-switching view. First, as we see in figure 3, although Canadian global net exports decline compared to the counterfactual, net exports destined to the U.S increase, or at least, stay the same, during that period, suggesting that the decline in net exports are due to trade with the rest of the world. Second, figures 4 and 5 show that the decline in Canadian net exports are due not to a fall in exports, but rather to stronger imports in almost all product categories.

In other words, financial market integration results in Canadian interest rates and asset prices moving in the same direction as those in the U.S. following the implementation of QE. Along with the effects of an improved terms of trade, spillovers from the financial channel bolster the domestic Canadian economy, driving up Canadian demand for imports, while the appreciation of the Canadian dollar make imports cheaper. As a consequence, net exports fall, despite the fact that Canadian exports increase in most product categories, consistent with a stronger U.S. economy.

Finally, figure 6 shows the impact of QE on Canadian GDP by industry. As a commodity exporting country, Canada generally benefits from a rise in global oil prices. At the same time, the commodity currency effect implies that increased demand for oil also appreciates the Canadian exchange rate, which may make other industries non-competitive. Thus, the gains in the oil-producing industry might come at the expense of other industries. This trade-off is often referred to as the Dutch-disease phenomenon. As figure 6 shows, however, GDP in all industries, except in arts, entertainment and recreation, increase due to the implementation of QE. As such, we do not find any evidence of a Dutch-disease effect due to U.S. unconventional monetary policy.

To summarize, we find that the implementation of QE in the U.S. benefits Canada almost to the same extent as it does the U.S. domestic economy. This spillover into Canada occurs mainly through the financial channel, as integrated financial markets make Canadian asset prices and interest rates move in the same direction as their U.S. counterparts. This effect is also bolstered through a stronger Canadian terms of trade. The Canadian exchange rate appreciates, generating leakages through reduced net exports. However, these leakages were a consequence of stronger Canadian demand for imports, and not due to a decline in exports. Despite the coincident rise in oil prices and the Canadian exchange rate, we find no evidence of Dutch-disease-type phenomenon as a consequence of QE, as GDP in almost all industries shows gains.

## 4 Robustness

The qualitative findings documented in section 3.2 are robust to changes in the number of factors between 4 and 10, relaxing the coefficient restriction in the VAR from equation 2, a log-difference transformation of the QE variable, or minor changes in the way the counterfactual path for the QE variable is calculated.

In this section, we first provide an alternative specification that includes a combination

of changes. Specifically, we include 8 U.S. factors and 6 Canadian factors (instead of 6 and 4, respectively), and remove any coefficient restriction in equation 2, so that Canadian factors can now influence movements in U.S. factors and policy variables. Furthermore, we take the log difference of the QE variable instead of the level difference, as in the benchmark case, and consider a counterfactual path where the QE variable grows according to a linear and quadratic time trend. The results are provided in figure 7.

Although the point estimates of the quantitative effect of QE on the two economies have changed slightly, qualitatively, the story remains the same. Namely, the effect of QE on the U.S. domestic economy is expansionary, and brought forth by a reduction in long-term yields. The spillover effect on Canada is also stimulative, and of the same order of magnitude as the domestic effect. The international transmission of QE occurs through the financial channel with lower spreads and higher asset prices, as net trade provides a source of leakage for Canada.

Second, we ask whether the transmission of U.S. monetary easing occurs through different channels for the case of QE than conventional monetary policy. To this end, we estimate Cholesky-ordered impulse response functions for a 100 bps reduction in the effective Fed funds rate in our benchmark FAVAR specification with pre-crisis data, to avoid including the period of the zero-lower bound, which is uninformative for shocks to the effective funds rate. We present these results in figure 8. Note that the exercise so far has been to generate the difference between two conditional forecasts – one reflecting the presence of QE, and the other without. As such, they cannot be directly compared with the impulse responses provided in figure 8. Our purpose here is to check for the direction of responses to see whether a consistent story regarding the transmission channel of U.S. monetary easing shines through.

Following a reduction in the Federal funds rate, U.S. GDP increases, while the trade-weighted nominal exchange rate depreciates.<sup>13</sup> The transmission of the U.S. monetary easing to Canada again occurs through financial channels, as the short-term Canadian rate declines, and Canadian asset prices (TSX index) increase. The trade channel, however, provides a source of leakage to Canada, as the Canadian nominal exchange rate vis-à-vis the U.S. appreciates, and Canadian net exports fall. This result is consistent with Kim [2001] who explores the transmission of conventional U.S. monetary policy shocks to Canada using a small-scale structural VAR, and finds that the financial channel is the main source of spillovers.

## 5 Conclusion

In the aftermath of the global financial crisis, the U.S. Federal Reserve provided unprecedented monetary stimulus to an ailing domestic economy by reducing long-term interest rates through quantitative easing, or large scale purchases of long-term assets, when their conventional short-term policy rate became ineffective at the zero lower bound.

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<sup>13</sup>Note, however, that U.S. prices decline, albeit statistically insignificantly, suggesting that considering a FAVAR setup for our specific sample does not rid us completely of the price-puzzle first documented by Sims [1992].

Although the domestic effect of QE is largely understood to be expansionary, its international spillover effect is complicated, from a theoretical stand-point, by the countervailing effects of expenditure-switching, income absorption, and global financial integration.

In this paper, we empirically assess the international transmission of the Fed's QE program by looking at spillovers to Canada. We estimate the effect of QE on the Canadian economy in a two-country FAVAR framework by comparing conditional forecasts of two scenarios – one where the Fed's long-term asset holdings follow its observed path, and a counterfactual, where they do not increase in response to the great recession.

We find that the implementation of QE increases U.S. GDP by about 2.3 percent, and Canadian GDP by 2.2 percent through reductions in long-term spreads for both countries. The positive spillover of QE to Canada occurs mainly through the financial channel through synchronized asset prices and yield spreads across the two countries, while the trade channel provides a leakage through a higher Canadian exchange rate and reduced net exports. However, we find evidence that these leakages are a consequence of a stronger Canadian demand for imports, rather than due to a reduction in exports. Moreover, despite the joint rise in oil prices and the Canadian exchange rate, we find no evidence of Dutch-disease type phenomena as a consequence of QE, since GDP in almost all industries show gains.

Our results are robust to reasonable changes in our empirical framework and counterfactual assumptions, and are consistent with the existing literature on the effect of QE on the U.S. domestic economy and global financial markets, as well as the literature on the international transmission of conventional U.S. monetary stimulus.

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Table 1: Goods trade between Canada and the United States (2000-2007 averages)

	% of country's total exports or imports			
	Can exports to U.S.	U.S. imports from Can	Can imports from U.S.	U.S. exports to Can
All goods	83.9	17.3	58.9	22.7
Agriculture	45.1	19.2	64.1	13.5
Forestry	84.9	55.1	71.7	33.6
Oil and gas	98.9	22.8	20.6	22.3
Mining (ex. oil and gas)	35.4	25.6	53.4	29.5
Consumer goods	77.7	14.7	50.0	25.0
Chemicals	85.1	16.5	69.4	20.4
Metals and minerals	80.6	20.3	61.0	32.2
Machinery	77.7	11.9	61.8	22.5
Electronics	76.4	5.0	46.2	15.7
Autos	97.3	29.9	77.3	56.0
Other transportation	71.9	23.1	56.9	8.7
Other goods	82.6	2.5	44.2	15.0

Note: Calculated based on nominal annual series in CAD (industry breakdown of Canadian exports and imports) and USD (all other values). Percentages of total goods exports may not sum to 100 due to some omitted categories.

Source: Calculations based on data from IMF Direction of Trade Statistics, WDI, US Census Bureau, Industry Canada

Table 2: U.S. share of total Canadian international investment position

	2000-2007	2008-2013
Total assets	47.4	46.3
Canadian direct investment abroad	45.8	41.4
Canadian portfolio investment	54.1	51.0
Foreign debt securities	63.8	68.0
Foreign equity and investment fund shares	50.5	42.5
Total liabilities	58.9	57.7
Foreign direct investment	63.4	52.6
Foreign portfolio investment	60.8	62.1
Canadian debt securities	55.9	59.6
Canadian equity and investment fund shares	80.8	71.2

Note: Calculated using quarterly nominal data in CAD.

Source: Calculations based on data from Statistics Canada (Table 376-0142).

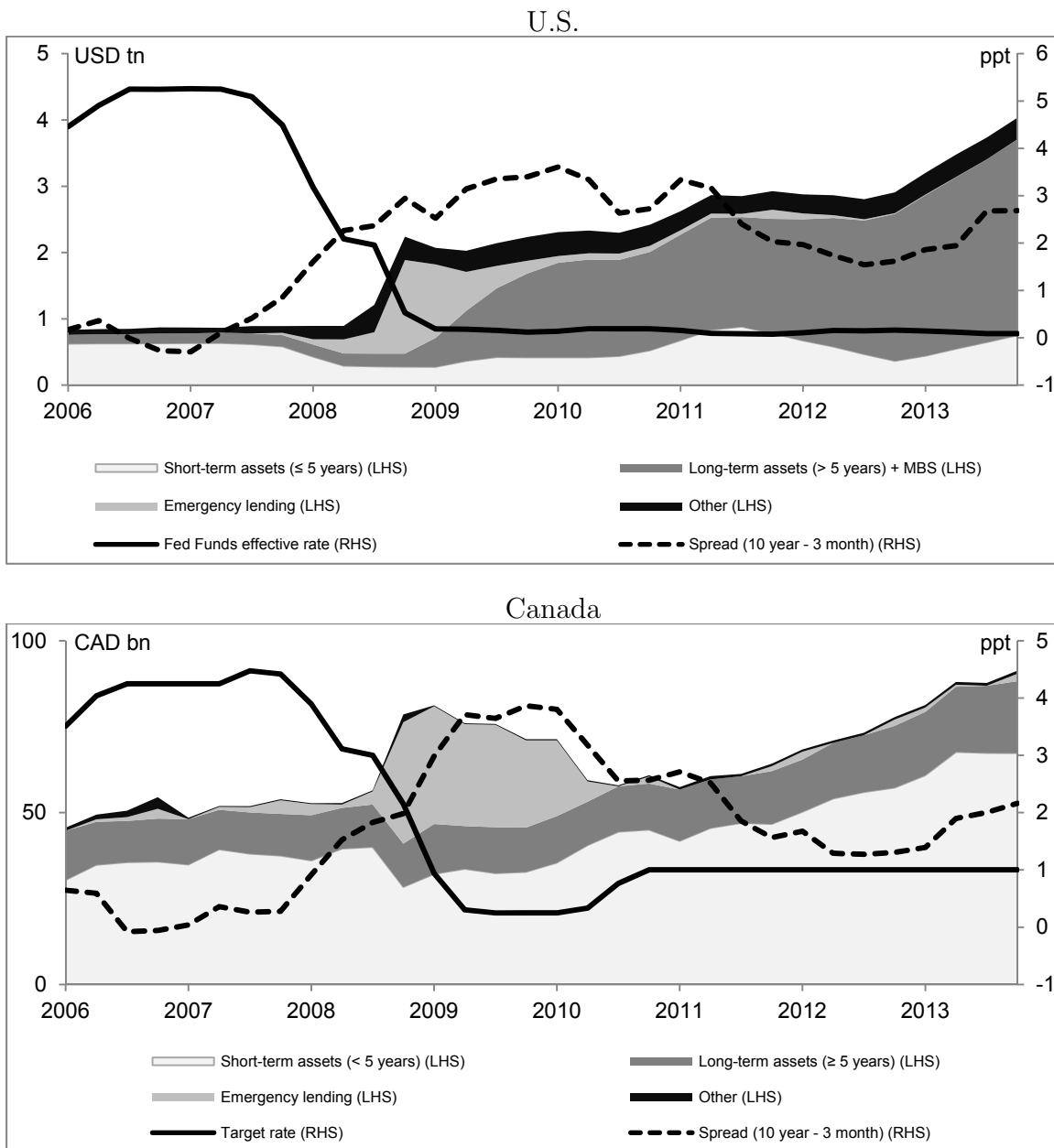
Table 3: Cross-correlations of Canadian variables with US counterparts (1983Q1 - 2007Q4)

	Cross-correlations with (leads/lags of) US variables						
					leads		
	-4	-2	-1	0	1	2	4
Real economy							
GDP	0.352	0.640	0.721	0.737	0.641	0.481	0.095
Consumption	0.339	0.451	0.498	0.532	0.466	0.354	0.108
Investment	0.173	0.236	0.304	0.345	0.391	0.366	0.110
Financial markets							
TSX/ S&P 500	0.184	0.440	0.549	0.724	0.621	0.405	0.108
3-m Treasury yields	0.364	0.694	0.795	0.800	0.660	0.481	0.135
10-y Spreads	0.058	0.457	0.639	0.773	0.697	0.484	0.051

Note: All variables except yields and spreads are in logarithms. All variables are filtered with HP-filter ( $\lambda = 1600$ ).

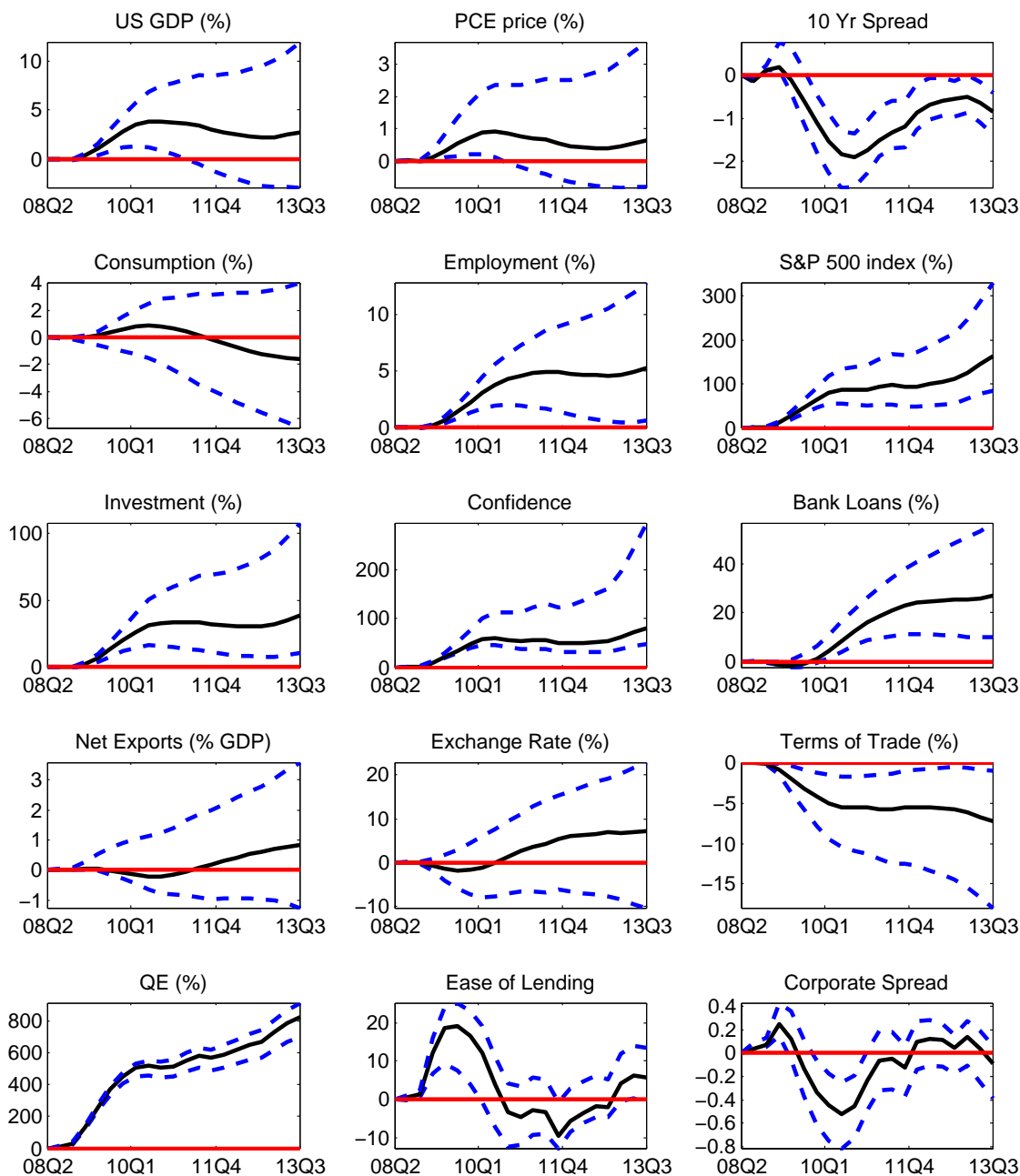
Source: Calculated with data from Statistics Canada, Bank of Canada, US Bureau of Economic Analysis, Wall Street Journal, Federal Reserve Board

Figure 1: Central bank assets, policy rate, and long-term spreads (2006Q1-2013Q4)



Note: U.S. Figure reports quarterly averages. Canadian figure reports end of period data or balance sheet assets, and quarterly averages for remaining series.  
 Source: Calculated with data from US Federal Reserve Board, US Treasury, Bank of Canada

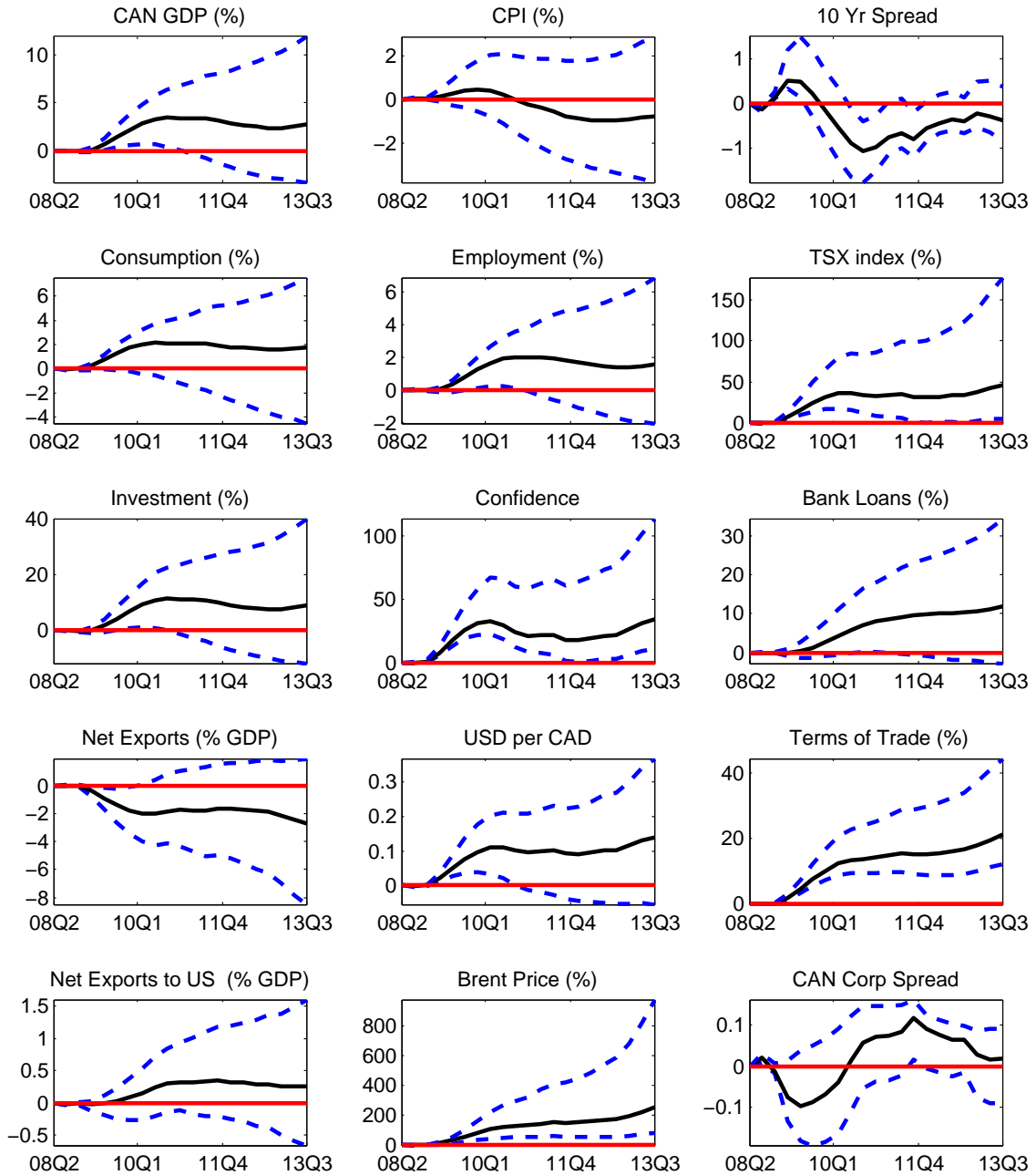
Figure 2: Impact of QE on the U.S. economy



*Note:* Difference between the policy scenario and the counterfactual scenario without QE. Point estimate of counterfactual difference along with 68% confidence intervals. Results in percentage difference from the no-QE scenario when noted, and in level differences otherwise.

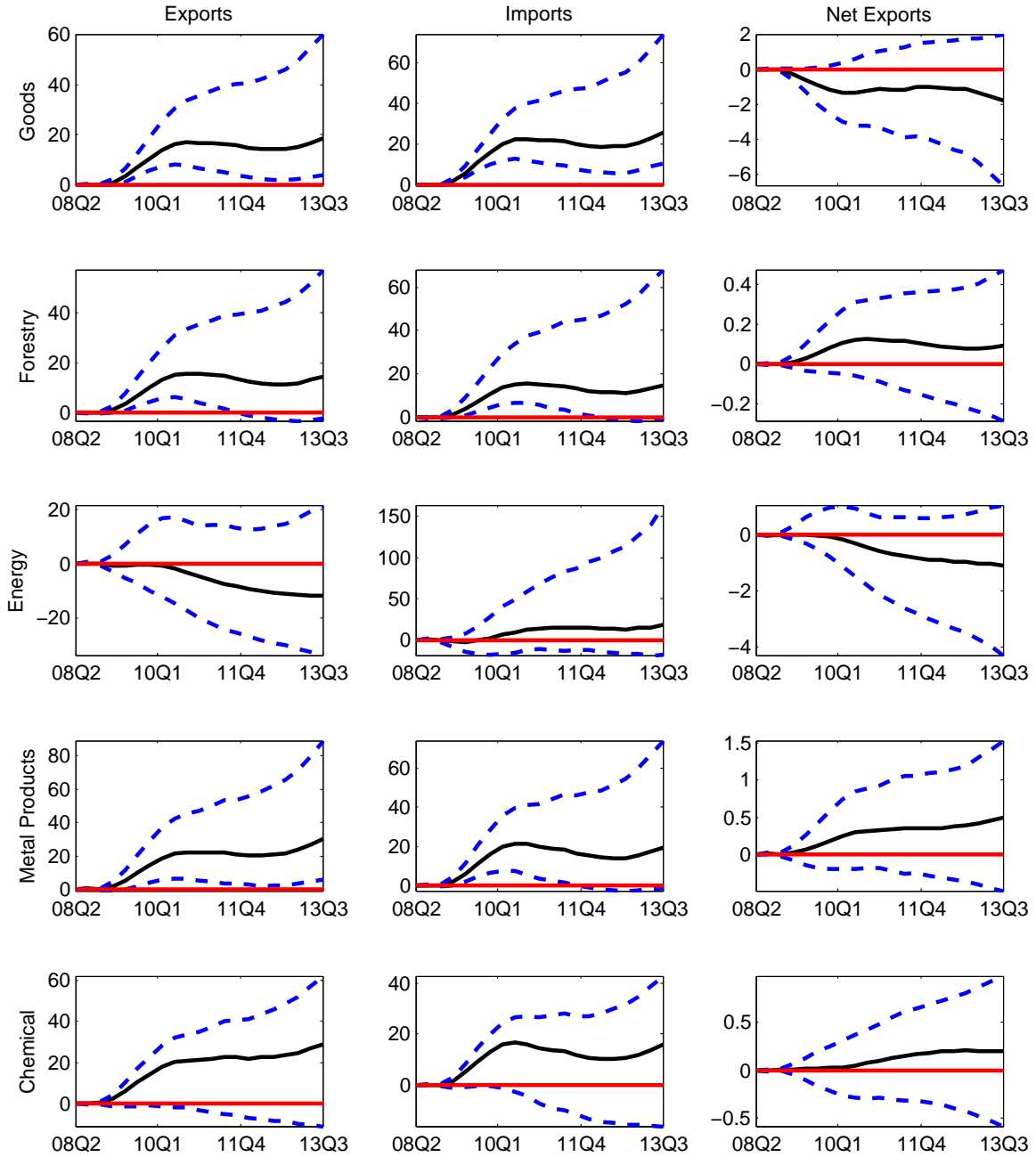


Figure 3: Impact of QE on the Canadian economy



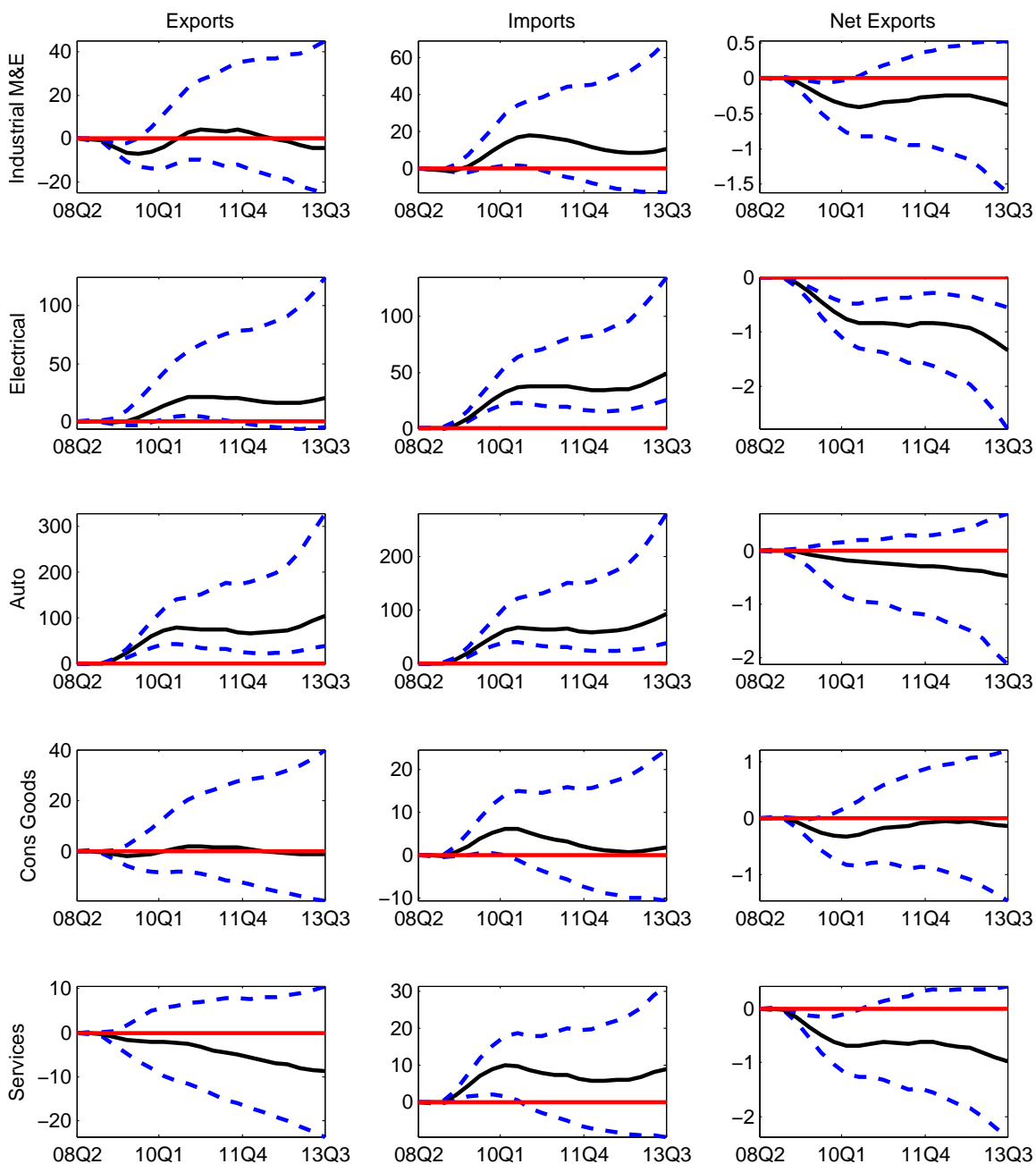
*Note:* Difference between the policy scenario and the counterfactual scenario without QE. Point estimate of counterfactual difference along with 68% confidence intervals. Results in percentage difference from the no-QE scenario when noted, and in level differences otherwise.

Figure 4: Impact of QE on Canadian global trade by product



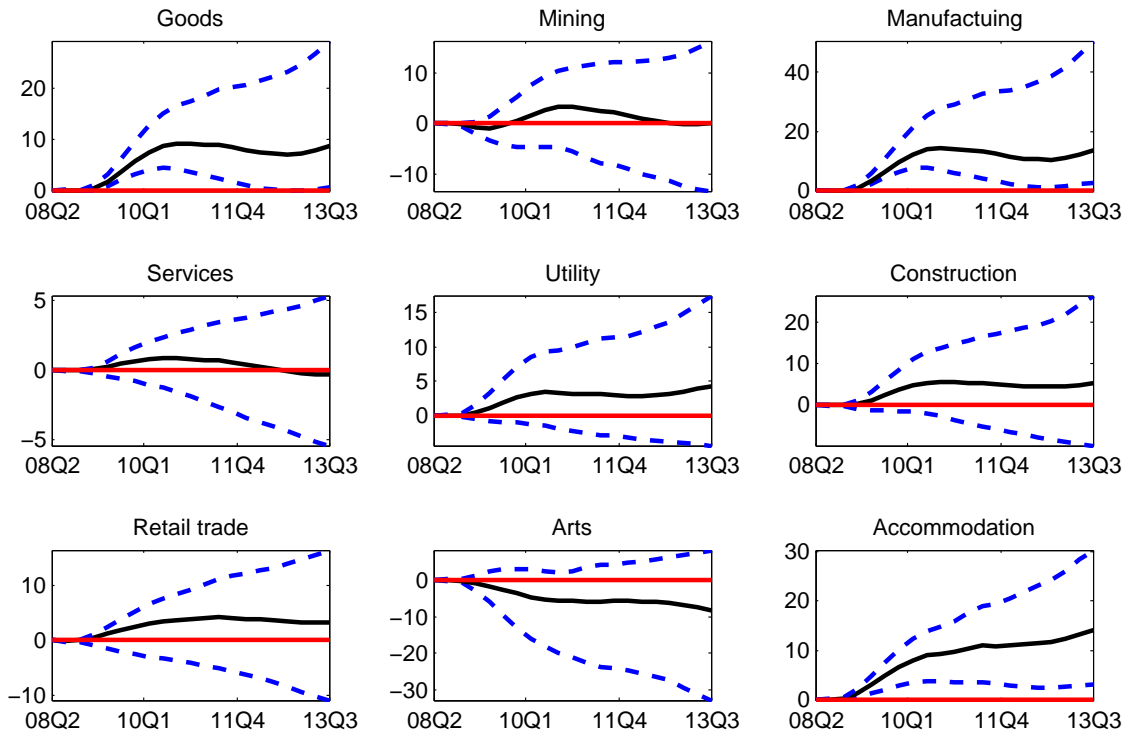
*Note:* Difference between the policy scenario and the counterfactual scenario without QE. Point estimate of counterfactual difference along with 68% confidence intervals. Results in percentage difference from the no-QE scenario when noted, and in level differences otherwise.

Figure 5: Impact of QE on Canadian global trade by product (cont.)



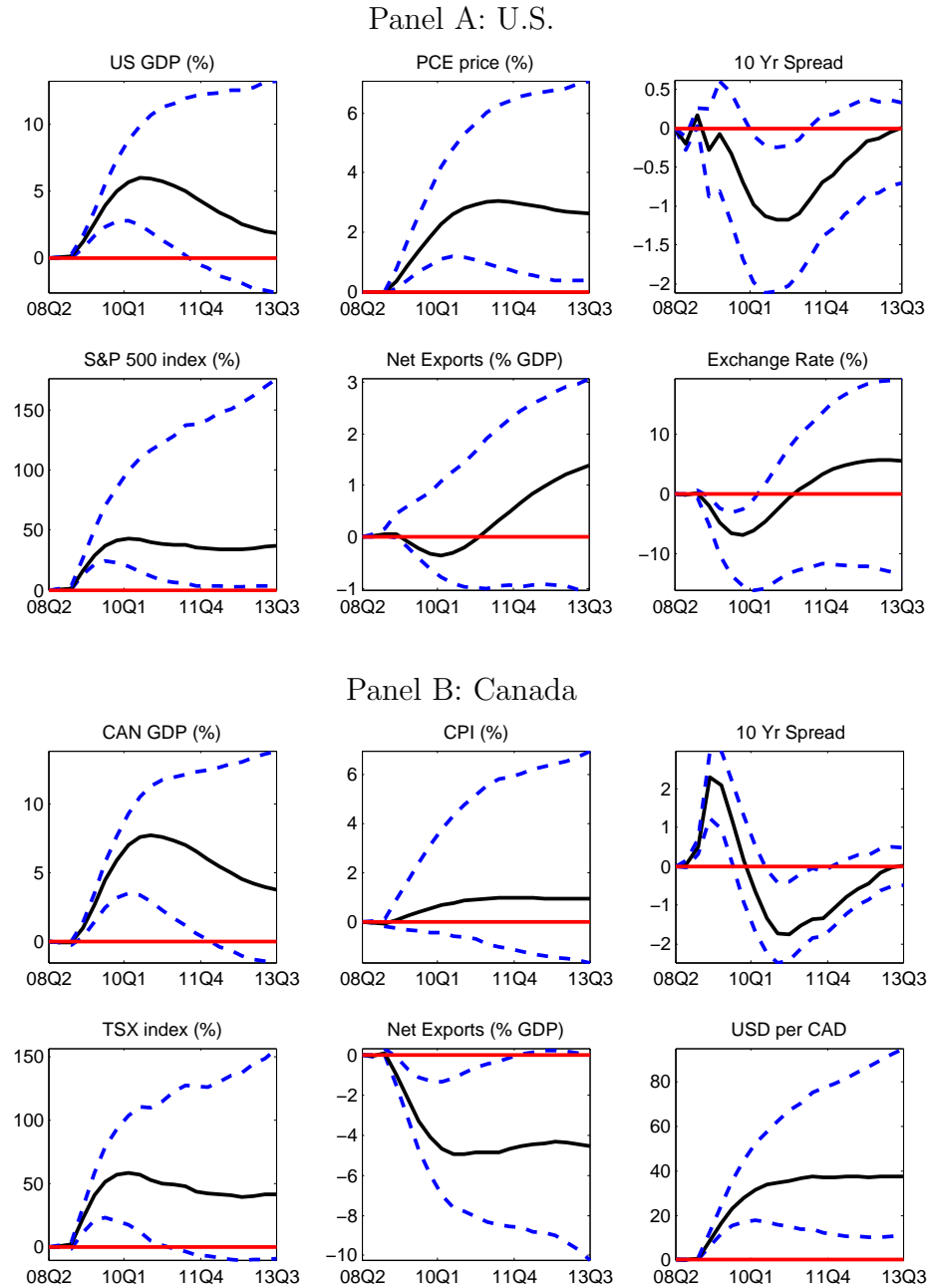
*Note:* Difference between the policy scenario and the counterfactual scenario without QE. Point estimate of counterfactual difference along with 68% confidence intervals. Results in percentage difference from the no-QE scenario when noted, and in level differences otherwise.

Figure 6: Impact of QE on the Canadian GDP by industry



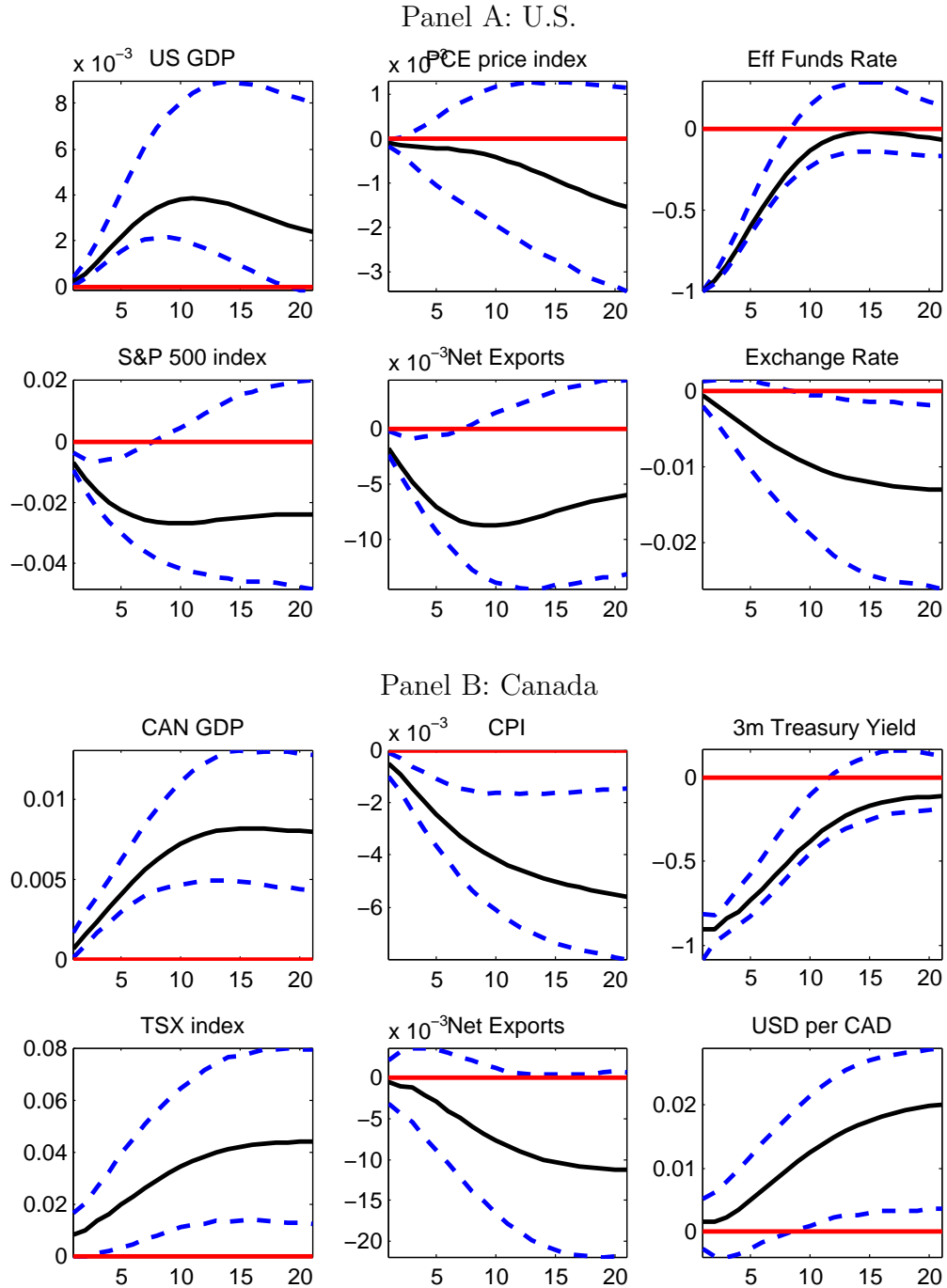
*Note:* Difference between the policy scenario and the counterfactual scenario without QE. Point estimate of counterfactual difference along with 68% confidence intervals. Results in percentage difference from the no-QE scenario when noted, and in level differences otherwise.

Figure 7: Impact of QE on the U.S. and Canadian economy – alternative case



*Note:* Difference between the policy scenario and the counterfactual scenario without QE. Point estimate of counterfactual difference along with 68% confidence intervals. Results in percentage difference from the no-QE scenario when noted, and in level differences otherwise.

Figure 8: Impulse responses of a 100 bps reduction in the effective Fed funds rate



*Note:* Impulse response functions along with 68% confidence bands. Data spans from 1983Q1 through 2008Q2.



Table 4: Data Description

Format is: series number, series mnemonic, transformation code, series description, source, and the degree to which factors included in the baseline specification explain the variation of the variable (R-squared). All data available from 1983Q1 - 2013Q3. The transformation codes are: 1 - no transformation; 2 - first difference; 4 - logarithm; 5 - first difference of logarithm. The majority of series were taken from Haver Analytics.

Sources: FRB - Federal Reserve Board, UST - U.S. Treasury, BEA - Bureau of Economic Analysis, JPM - JP Morgan, BLS - Bureau of Labor Statistics, ISM - Institute for Supply Management, CB - Census Bureau, S&P - Standard and Poor's, FRB-C - Federal Reserve Bank of Chicago, GZ - Gilchrist and Zakrajsek 2012, BoC - Bank of Canada, Statcan - Statistics Canada, TSX - Toronto Stock Exchange, IMF - International Monetary Fund, CMHC - Canada Mortgage and Housing Corporation, BIS - Bank for International Settlements

US Variables					
<b>Monetary policy</b>					
1	USEffFedFundsRate	1	Federal Funds [Effective] Rate (% p.a.)	FRB	1.00
2	QE2	2	Fed Res Banks: UST Security Holdings: Over 5 Yrs + Mortgage-Backed Securities Held Outright (EOP, Mil.\$)	FRB	1.00
<b>National income and products accounts</b>					
3	USrGDP	5	Real Gross Domestic Product (SAAR, Bil.Chn.2009\$)	BEA	0.69
4	USrC	5	Real Personal Consumption Expenditures (SAAR, Bil.Chn.2009\$)	BEA	0.53
5	USrI	5	Real Gross Private Domestic Investment (SAAR, Bil.Chn.2009\$)	BEA	0.62
6	USrExports	5	Real Exports of Goods & Services (SAAR, Bil.Chn.2009\$)	BEA	0.52
7	USrImports	5	Real Imports of Goods & Services (SAAR, Bil.Chn.2009\$)	BEA	0.66
8	USrG	5	Real Government Consumption Expenditures & Gross Investment (SAAR, Bil.Chn.2009\$)	BEA	0.34
9	USnExports	5	Exports of Goods and Services (SAAR, Bil.\$)	BEA	0.69
10	USnExportsReceipts	5	Exports: Income Receipts from ROW (SAAR, Bil.\$)	BEA	0.61
11	USnImports	5	Imports of Goods and Services (SAAR, Bil.\$)	BEA	0.8
12	USnImportsPayments	5	Imports: Income Payments to ROW (SAAR, Bil.\$)	BEA	0.42
13	USnGDP	5	Gross Domestic Product (SAAR, Bil.\$)	BEA	0.75
<b>Real output and income</b>					
14	USIPFfinalNonind	5	Industrial Production: Final Products and Nonindustrial Supplies (SA, 2007=100)	FRB	0.88
15	USIPFinal	5	Industrial Production: Final Products (SA, 2007=100)	FRB	0.84
16	USIPCons	5	Industrial Production: Consumer Goods (SA, 2007=100)	FRB	0.62
17	USIPConsDur	5	Industrial Production: Durable Consumer Goods (SA, 2007=100)	FRB	0.63
18	USIPConsNonDur	5	Industrial Production: Nondurable Consumer Goods (SA, 2007=100)	FRB	0.23
19	USIPBusi	5	Industrial Production: Business Equipment (SA, 2007=100)	FRB	0.81
20	USIPMat	5	Industrial Production: Materials (SA, 2007=100)	FRB	0.86
21	USIPMatDur	5	Industrial Production: Durable Goods Materials (SA, 2007=100)	FRB	0.88
22	USIPMatNonDur	5	Industrial Production: Nondurable Goods Materials (SA, 2007=100)	FRB	0.61
23	USIPMan	5	Industrial Production: Manufacturing [NAICS] (SA, 2007=100)	FRB	0.91
24	USIPMin	5	Industrial Production: Mining (SA, 2007=100)	FRB	0.27
25	USIPUtl	5	Industrial Production: Electric and Gas Utilities (SA, 2007=100)	FRB	0.06
26	USIPindex	5	Industrial Production Index (SA, 2007=100)	FRB	0.91
<b>Employment</b>					
27	USLabourForce	5	Civilian Labor Force: 16 yr + (SA, Thous)	BLS	0.31
28	USUnempRate	5	Civilian Unemployment Rate: 16 yr + (SA, %)	BLS	0.83
29	USUnempLess5w	5	Civilians Unemployed for Less Than 5 Weeks (SA, Thous.)	BLS	0.35
30	USUnemp5to14w	5	Civilians Unemployed for 5-14 Weeks (SA, Thous.)	BLS	0.61

31	USUnemp15to26w	5	Civilians Unemployed for 15-26 Weeks (SA, Thous.)	BLS	0.55
32	USEmpNonfarm	5	All Employees: Total Nonfarm (SA, Thous)	BLS	0.89
33	USEmpIndustry	5	All Employees: Total Private Industries (SA, Thous)	BLS	0.89
34	USEmpGoodsIndustry	5	All Employees: Goods-producing Industries (SA, Thous)	BLS	0.89
35	USEmpLog	5	All Employees: Logging (SA, Thous)	BLS	0.34
36	USEmpMin	5	All Employees: Mining (SA, Thous)	BLS	0.54
37	USEmpUtl	5	All Employees: Utilities (SA, Thous)	BLS	0.2
38	USEmpCon	5	All Employees: Construction (SA, Thous)	BLS	0.82
39	USEmpMan	5	All Employees: Manufacturing (SA, Thous)	BLS	0.85
40	USEmpManDur	5	All Employees: Durable Goods Manufacturing (SA, Thous)	BLS	0.87
41	USEmpManNonDur	5	All Employees: Nondurable Goods Manufacturing (SA, Thous)	BLS	0.68
42	USEmpSvc	5	All Employees: Private Service-providing Industries (SA, Thous)	BLS	0.85
43	USEmpTrn	5	All Employees: Transportation & Warehousing (SA, Thous)	BLS	0.68
44	USEmpRet	5	All Employees: Retail Trade (SA, Thous)	BLS	0.74
45	USEmpWht	5	All Employees: Wholesale Trade (SA, Thous)	BLS	0.77
46	USEmpFin	5	All Employees: Financial Activities (SA, Thous)	BLS	0.55
47	USEmpInf	5	All Employees: Information Services (SA, Thous)	BLS	0.25
48	USEmpGov	5	All Employees: Government (SA, Thous)	BLS	0.33
49	USEmpIndex	1	ISM Mfg: Employment Index (SA, 50+ = Econ Expand)	ISM	0.76
<b>Housing starts and sales</b>					
50	USHousingStarts	4	Housing Starts (SAAR, Thous.Units)	CB	0.84
51	USHousingStartsNE	4	Housing Starts: Northeast (SAAR, Thous.Units)	CB	0.81
52	USHousingStartsMidwest	4	Housing Starts: Midwest (SAAR, Thous.Units)	CB	0.69
53	USHousingStartsSouth	4	Housing Starts: South (SAAR, Thous.Units)	CB	0.77
54	USHousingStartsWest	4	Housing Starts: West (SAAR, Thous.Units)	CB	0.84
55	USNewHousingPermits	4	New Pvt Housing Units Authorized by Building Permit (SAAR, Thous.Units)	CB	0.82
<b>ISM (NAPM) manufacturing survey</b>					
56	USInventories	1	ISM Mfg: Inventories Index (SA, 50+ = Econ Expand)	ISM	0.49
57	USNewOrders	1	ISM Mfg: New Orders Index (SA, 50+ = Econ Expand)	ISM	0.8
58	USDeliveries	1	ISM Mfg: Supplier Deliveries Index (SA, 50+ = Slower)	ISM	0.39
<b>Stock prices</b>					
59	USSP500index	5	S&P 500 Stock Price Index (1941-43=10)	WSJ	0.26
60	USSP500IndusIndex	5	S&P 500 Industrial Stock Price Index (1941-43=10)	S&P	0.24
<b>Exchange rates</b>					
61	USNEER	5	JP Morgan Narrow Nominal Effective Exchange Rate Index: U.S. (2000=100)	JP Morgan	0.27
62	CHFzUSD	5	Foreign Exchange Rate: Switzerland (Swiss Franc/US\$)	FRB	0.12
63	JPYzUSD	5	Foreign Exchange Rate: Japan (Yen/US\$)	FRB	0.09
64	USDzGBP	5	Foreign Exchange Rate: United Kingdom (US\$/Pound)	FRB	0.21
<b>Interest rates</b>					
65	US3mYield	1	3-Month Treasury Bills, Secondary Market (% p.a.)	FRB	0.99
66	US6mYield	1	6-Month Treasury Bills, Secondary Market (% p.a.)	FRB	0.99
67	US1yYield	1	1-Year Treasury Bill Yield at Constant Maturity (%)	UST	0.99
68	US5yYield	1	5-Year Treasury Note Yield at Constant Maturity (%)	UST	0.96
69	US10yYield	1	10-Year Treasury Bond Yield at Constant Maturity (%)	UST	0.93
70	USAAAYield	1	Moody's Seasoned Aaa Corporate Bond Yield (% p.a.)	FRB	0.91
71	USBAAyield	1	Moody's Seasoned Baa Corporate Bond Yield (% p.a.)	FRB	0.89
72	ShadowRate	1	Shadow rate	Wu and Xia 2013	0.99
73	US6mSpread	1	US6mYield - US3mYield	FRB	0.16
74	US1ySpread	1	US1yYield - US3mYield	UST, FRB	0.54
75	US5ySpread	1	US5yYield - US3mYield	UST, FRB	0.65
76	US10ySpread	1	US10yYield - US3mYield	UST, FRB	0.65
77	USCorporateSpread	1	USBAAyield - USAAAYield	FRB	0.5
<b>Balance of payments</b>					
78	USCurrAcctBal	2	BOP: Balance on Current Account (SA, Mil.\$)	BEA	0.38
79	USKInflows	2	BOP: For Assets in the U.S., Net: Cap Inflow Ex Fin Derivatives + (SA, Mil.\$)	BEA	0.05
80	USKOutflows	2	BOP: U.S. Assets Abroad, Net: Outflow Excl Financial Derivatives (-) (SA, Mil.\$)	BEA	0.03
<b>Price indexes</b>					
81	USGDPprices	5	Gross Domestic Product: Chain Price Index (SA, 2009=100)	BEA	0.48
82	USPCEprices	5	Personal Consumption Expenditures: Chain Price Index (SA, 2009=100)	BEA	0.88

83	USGPDPrices	5	Gross Private Domestic Investment: Chain Price Index (SA, 2009=100)	BEA	0.36
84	USExportPrices	5	Exports of Goods & Services: Chain Price Index (SA, 2009=100)	BEA	0.76
85	USImportPrices	5	Imports of Goods & Services: Chain Price Index (SA, 2009=100)	BEA	0.88
86	USGprices	5	Govt Consumption Expenditures & Gross Investment: Chain Price Index(SA,2009=100)	BEA	0.63
87	USPPIFinGoods	5	PPI: Finished Goods (SA, 1982=100)	BLS	0.89
88	USPPIFinConsGoods	5	PPI: Finished Consumer Goods (SA, 1982=100)	BLS	0.89
89	USPPIIntGoods	5	PPI: Intermediate Materials, Supplies and Components (SA, 1982=100)	BLS	0.89
90	USPPICrude	5	PPI: Crude Materials for Further Processing (SA, 1982=100)	BLS	0.7
91	USCPIindex	5	CPI-U: All Items (SA, 1982-84=100)	BLS	0.9
92	USCPIapparel	5	CPI-U: Apparel (SA, 1982-84=100)	BLS	0.19
93	USCPIhealth	5	CPI-U: Medical Care Commodities (SA, 1982-84=100)	BLS	0.63
94	USCPIxFood	5	CPI-U: All Items Less Food (SA, 1982-84=100)	BLS	0.89
95	USCPIxHouse	5	CPI-U: All Items Less Shelter (SA, 1982-84=100)	BLS	0.89
96	USCPIxHealth	5	CPI-U: All Items Less Medical Care (SA, 1982-84=100)	BLS	0.89
97	USToT	2	Terms of trade index (exports/imports; ratio of chain price indexes for goods and services, SA 2009=100)	BEA	0.65
<b>Monetary aggregates</b>					
98	USM1	5	Money Stock: M1 (SA, Bil.\$)	FRB	0.34
99	USM2	5	Money Stock: M2 (SA, Bil.\$)	FRB	0.27
100	USMonBase	5	Monetary Base (NSA, Mil.\$)	FRB	0.4
<b>Bank credit (FRB)</b>					
101	USCommCredit	5	Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.61
102	USCommSecurities	5	Securities in Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.2
103	USCommLoans	5	Loans & Leases in Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.71
104	USCommCIloans	5	C & I Loans in Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.61
105	USCommRELoans	5	Real Estate Loans in Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.61
106	USCommConsLoans	5	Consumer Loans in Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.07
107	USCommOtherLoans	5	Other Loans & Leases in Bank Credit: All Commercial Banks (SA, Bil.\$)	FRB	0.36
<b>Other FRB indicators</b>					
108	USWillingnessToLend	1	FRB Sr Officers Survey: Banks Willingness to Lend to Consumers (%)	FRB	0.51
109	USNatActIndex	1	Chicago Fed National Activity Index (+=Growth Above Trend)	FRB Chicago	0.96
110	USConsAndHousing	1	CFNAI: Personal Consumption & Housing (+=Growth Above Trend)	FRB Chicago	0.83
111	USEmpUnempHours	1	CFNAI: Employment, Unemployment, & Hours (+=Growth Above Trend)	FRB Chicago	0.93
112	USProdAndIncome	1	Chicago Fed National Activity Index: Production & Income (+=Growth Above Trend)	FRB Chicago	0.86
113	USSalesOrdersInventories	1	CFNAI: Sales, Orders, & Inventories (+=Growth Above Trend)	FRB Chicago	0.78
<b>Confidence, expectations and uncertainty</b>					
114	USConfidence	5	Conference Board: Consumer Confidence (SA, 1985=100)	Conference Board	0.39
115	USConfidencePresent	5	Conference Board: Consumer Confidence Present Situation (SA, 1985=100)	Conference Board	0.62
116	USConfidenceExpectations	5	Conference Board: Consumer Expectations (SA, 1985=100)	Conference Board	0.26
117	USMichConfidence	1	U Michigan: Consumer Sentiment (NSA, Q1-66=100)	U Michigan	0.66
118	USMichConfidenceCurr	1	U Michigan: Current Economic Conditions (NSA, Q1-66=100)	U Michigan	0.73
119	USUMichConfidenceExp	1	U Michigan: Consumer Expectations (NSA, Q1-66=100)	U Michigan	0.58
120	USVIX	5	CBOE Market Volatility Index, VIX; extended with standard deviation of SP index	WSJ	0.18
121	USVXO	5	CBOE Market Volatility Index, VXO; extended with Bloom uncertainty measure	WSJ	0.19
<b>Other</b>					
122	GZLT	1	Excess Bond Premium (values after Sep-10 are forecast by us)	GZ	0.56

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### Canada Variables

#### National accounts

123	CANrGDP	5	Canada: Gross Domestic Product at Market Prices (SAAR, Mil.Chn.2007.C\$)	Statcan	0.76
124	CANrExports	5	Canada: GDP: Exports of Goods and Services: Total (SAAR, Mil.Chn.2007.C\$)	Statcan	0.67
125	CANrImports	5	Canada: GDP: Imports of Goods and Services: Total (SAAR, Mil.Chn.2007.C\$)	Statcan	0.65
126	CANrC	5	Canada:GDP: Household Final Consumption Exp: Total (SAAR, Mil.Chn.2007.C\$)	Statcan	0.44
127	CANrI	5	Canada: GDP: Business Gross Fixed Capital Formation (SAAR, Mil.Chn.2007.C\$)	Statcan	0.57
128	CANrGC	5	Canada:GDP: General Govt Final Consumption Expenditure (SAAR,Mil.Chn.2007.C\$)	Statcan	0.22
129	CANrGI	5	Canada: GDP: Gross Fixed Capital Form: General Government(SAAR, Mil.Chn.2007.C\$)	Statcan	0.28
<b>GDP by NAICS</b>					
130	CANryGoods	5	Canada: GDP: Goods-Producing Industries (SAAR, Mil.2007.C\$)	Statcan	0.77
131	CANryAgr	5	Canada: GDP: Agriculture, Forestry, Fishing and Hunting (SAAR, Mil.2007.C\$)	Statcan	0.1
132	CANryMin	5	Canada: GDP: Mining, Quarrying, and Oil and Gas Extraction (SAAR, Mil.2007.C\$)	Statcan	0.27
133	CANryUtl	5	Canada: GDP: Utilities (SAAR, Mil.2007.C\$)	Statcan	0.11
134	CANryCon	5	Canada: GDP: Construction (SAAR, Mil.2007.C\$)	Statcan	0.41
135	CANryMan	5	Canada: GDP: Manufacturing (SAAR, Mil.2007.C\$)	Statcan	0.79
136	CANrySvc	5	Canada: GDP: Service-Producing Industries (SAAR, Mil.2007.C\$)	Statcan	0.54
137	CCANryWht	5	Canada: GDP: Wholesale Trade (SAAR, Mil.2007.C\$)	Statcan	
138	CANryRet	5	Canada: GDP: Retail Trade (SAAR, Mil.2007.C\$)	Statcan	0.16
139	CANryTrn	5	Canada: GDP: Transportation and Warehousing (SAAR, Mil.2007.C\$)	Statcan	0.48
140	CANryInf	5	Canada: GDP: Information and Cultural Industries (SAAR, Mil.2007.C\$)	Statcan	0.32
141	CANryPro	5	Canada: GDP: Professional, Scientific and Technical Services(SAAR, Mil.2007.C\$)	Statcan	0.31
142	CANryAdm	5	Can:GDP:Admin\Support, Waste Management & Remediation Service(SAAR,Mil.2007.C\$)	Statcan	0.16
143	CANryEdu	5	Canada: GDP: Educational Services (SAAR, Mil.2007.C\$)	Statcan	0.1
144	CANryHlt	5	Canada: GDP: Health Care and Social Assistance (SAAR, Mil.2007.C\$)	Statcan	0.18
145	CANryArt	5	Canada: GDP: Arts, Entertainment and Recreation (SAAR, Mil.2007.C\$)	Statcan	0.1
146	CANryAcc	5	Canada: GDP: Accommodation and Food Services (SAAR, Mil.2007.C\$)	Statcan	0.19
147	CANryOth	5	Canada: GDP: Other Services (Except Public Administration) (SAAR, Mil.2007.C\$)	Statcan	0.28
148	CANryPub	5	Canada: GDP: Public Administration (SAAR, Mil.2007.C\$)	Statcan	0.25
<b>Trade flows by NAPCS</b>					
149	CANrGoodsExports	5	Canada: Total Exports of Goods (SAAR, Mil.Chn.2007.C\$)	Statcan	0.64
150	CANrAgrExports	5	Canada: Exports of Farm, Fishing & Intermed Food Products(SAAR, Mil.Chn.2007.C\$)	Statcan	0.07
151	CANrEnergyExports	5	Canada: Exports of Energy Products (SAAR, Mil.Chn.2007.C\$)	Statcan	0.09
152	CANrOreExports	5	Canada: Exports of Metal Ores and Nonmetallic Minerals (SAAR, Mil.Chn.2007.C\$)	Statcan	0.17
153	CANrMetalExports	5	Canada: Exports of Metal and Nonmetallic Mineral Products(SAAR, Mil.Chn.2007.C\$)	Statcan	0.17
154	CANrChemExports	5	Canada: Exp of Basic & Ind Chem, Plastics & Rubber Prods(SAAR, Mil.Chn.2007.C\$)	Statcan	0.28
155	CANrForExports	5	Canada: Exports of Forestry Prods & Bldg & Packaging Mtls(SAAR, Mil.Chn.2007.C\$)	Statcan	0.32
156	CANrIndExports	5	Canada: Exports of Industrial Machinery, Equip & Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.47
157	CANrElecExports	5	Canada: Exports of Electronic & Electrical Equip & Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.42
158	CANrAutoExports	5	Canada: Exports of Motor Vehicles and Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.46
159	CANrTranspExports	5	Canada: Exports of Aircraft & Other Transp Eqpt & Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.19

160	CANrConsGoodsExports	5	Canada: Exports of Consumer Goods (SAAR, Mil.Chn.2007.C\$)	Statcan	0.35
161	CANrSpExports	5	Canada: Exports of Special Transactions (SAAR, Mil.Chn.2007.C\$)	Statcan	0.14
162	CANrServiceExports	5	Canada: Total Exports of Services (SAAR, Mil.Chn.2007.C\$)	Statcan	0.21
163	CANrGoodsImports	5	Canada: Total Imports of Goods (SAAR, Mil.Chn.2007.C\$)	Statcan	0.62
164	CANrFoodImports	5	Canada: Imports of Farm, Fishing & Intermed Food Products(SAAR, Mil.Chn.2007.C\$)	Statcan	0.02
165	CANrEnergyImports	5	Canada: Imports of Energy Products (SAAR, Mil.Chn.2007.C\$)	Statcan	0.21
166	CANrOreImports	5	Canada: Imports of Metal Ores and Nonmetallic Minerals (SAAR, Mil.Chn.2007.C\$)	Statcan	0.09
167	CANrMetalImports	5	Canada: Imports of Metal and Nonmetallic Mineral Products(SAAR, Mil.Chn.2007.C\$)	Statcan	0.37
168	CANrChemImports	5	Canada: Imp of Basic & Ind Chem, Plastics & Rubber Prods(SAAR, Mil.Chn.2007.C\$)	Statcan	0.27
169	CANrBldgImports	5	Canada: Imports of Forestry Prods & Bldg & Packaging Mtls(SAAR, Mil.Chn.2007.C\$)	Statcan	0.2
170	CANrIndImports	5	Canada: Imports of Industrial Machinery, Equip & Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.42
171	CANrElecImports	5	Canada: Imports of Electronic & Electrical Equip & Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.43
172	CANrAutoImports	5	Canada: Imports of Motor Vehicles and Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.45
173	CANrTranspImports	5	Canada: Imports of Aircraft & Other Transp Eqpt & Parts (SAAR, Mil.Chn.2007.C\$)	Statcan	0.11
174	CANrConsGoodsImports	5	Canada: Imports of Consumer Goods (SAAR, Mil.Chn.2007.C\$)	Statcan	0.42
175	CANrSpImports	5	Canada: Imports of Special Transactions (SAAR, Mil.Chn.2007.C\$)	Statcan	0.1
176	CANrServiceImports	5	Canada: Total Imports of Services (SAAR, Mil.Chn.2007.C\$)	Statcan	0.4
<b>Trade flows by partner country</b>					
177	CANrExportstoUS	5	Canada: Total Merchandise Exports: United States (NSA, Mn. 2007 C\$)	Statcan	0.87
178	CANrDomExportstoUS	5	Canada: Domestic Merchandise Exports to the U.S. (NSA, Mn. 2007 C\$)	Statcan	0.85
179	CANrReexportsToUS	5	Canada: Merchandise Re-Exports to the U.S. (NSA, Mn. 2007 C\$)	Statcan	0.42
180	CANrExportstoChina	5	Total merch. exports to China (NSA, Mn.C\$ 2007)	Statcan	0.27
181	CANrExportstoJapan	5	Total merch. exports to Japan (NSA, Mn.C\$ 2007)	Statcan	0.26
182	CANrExportstoLatAm	5	Total merch. exports to Latin America (NSA, Mn.C\$ 2007)	Statcan	0.15
183	CANrExportstoEurope	5	Total merch. exports to Europe (NSA, Mn.C\$ 2007)	Statcan	0.4
184	CANrExportstoEmAsia	5	Total merch. exports to Emerging Asia ex. China (NSA, Mn.C\$ 2007)	Statcan	0.41
185	CANrImportsFromUS	5	Total merch. imports from the US (NSA, Mn.C\$ 2007)	Statcan	0.73
186	CANrImportsFromChina	5	Total merch. imports from China (NSA, Mn.C\$ 2007)	Statcan	0.59
187	CANrImportsFromJapan	5	Total merch. imports from Japan (NSA, Mn.C\$ 2007)	Statcan	0.19
188	CANrImportsFromLatAm	5	Total merch. imports from Latin America (NSA, Mn.C\$ 2007)	Statcan	0.36
189	CANrImportsFromEurope	5	Total merch. imports from Europe (NSA, Mn.C\$ 2007)	Statcan	0.28
190	CANrImportsFromEmAsia	5	Total merch. imports from Emerging Asia ex. China (NSA, Mn.C\$ 2007)	Statcan	0.34
<b>Real output and income</b>					
191	CANIP	5	Canada: GDP: Industrial Production (SAAR, Mil.2007.C\$)	Statcan	0.77
<b>Employment</b>					
192	CANEmp	5	Canada: Employment: Both Sexes, 15 Years and Over (SA, Thous)	Statcan	0.75
193	CANEmpGoods	5	Canada: Employment: Goods Producing Sector (SA, Thous)	Statcan	0.68
194	CANEmpAgr	5	Canada: Employment: Agriculture (SA, Thous)	Statcan	0.14
195	CANEmpMinFor	5	Canada: Employment: Forestry, Fishing, Mining, Oil & Gas (SA, Thous)	Statcan	0.22
196	CANEmpCon	5	Canada: Employment: Construction (SA, Thous)	Statcan	0.52
197	CANEmpMan	5	Canada: Employment: Manufacturing (SA, Thous)	Statcan	0.55
198	CANEmpUtl	5	Canada: Employment: Utilities (SA, Thous)	Statcan	0.16
199	CANEmpSvc	5	Canada: Employment: Service Producing Sector (SA, Thous)	Statcan	0.52
200	CANEmpTrade	5	Canada: Employment: Trade (SA, Thous)	Statcan	0.31
201	CANEmpTrn	5	Canada: Employment: Transport and Warehousing (SA, Thous)	Statcan	0.23
202	CANEmpFin	5	Canada: Employment: Finance, Insurance, Real Estate (SA, Thous)	Statcan	0.12

203	CANEmpPro	5	Canada: Employment: Professional, Scientific & Technical (SA, Thous)	Statcan	0.22
204	CANEmpAdm	5	Canada: Employment: Business, Building & Other Support Services (SA, Thous)	Statcan	0.15
205	CANEmpEdu	5	Canada: Employment: Educational Services (SA, Thous)	Statcan	0.19
206	CANEmpHlt	5	Canada: Employment: Health Care and Social Assistance (SA, Thous)	Statcan	0.11
207	CANEmpInf	5	Canada: Employment: Information, Culture and Recreation (SA, Thous)	Statcan	0.11
208	CANEmpAcc	5	Canada: Employment: Accommodation and Food Services (SA, Thous)	Statcan	0.08
209	CANEmpOth	5	Canada: Employment: Other Services (SA, Thous)	Statcan	0.09
210	CANEmpPub	5	Canada: Employment: Public Administration (SA, Thous)	Statcan	0.13
<b>Housing</b>					
211	CANNewHousePrice	5	Canada: New Housing Price, Total House & Land (NSA, 2007=100)	Statcan	0.53
212	CANHousingStarts	4	Canada: Housing Starts: All Areas (NSA, Units)	CMHC	0.35
<b>Stock prices</b>					
213	CANTSXindex	5	Canada: S&P/TSX: Composite, Close (EOP, 1975=1000)	BoC	0.24
214	CANTSXDivYield	1	Canada: S&P/TSX Composite Index, Dividend Yield (EOP, %)	TSX	0.61
<b>Exchange rates</b>					
215	CANNEER	5	Canada: Nominal Narrow Effective Exch Rate (Avg, 2010=100)	BIS	0.78
216	USDzCAD	5	Canada: US Dollar Exchange Rate: Close (AVG, US\$/C\$)	BoC	0.86
<b>Interest rates</b>					
217	CAN3mYield	1	Canada: Treasury Bills: 3-Months (AVG, %)	BoC	0.94
218	CAN6mYield	1	Canada: Treasury Bills: 6-Months (AVG, %)	BoC	0.94
219	CAN1to3yYield	1	Canada: 1 to 3 Year Bond Yield Average (Last Wednesday, %)	BoC	0.94
220	CAN3to5yYield	1	Canada: 3 to 5 Year Bond Yield Average (Last Wednesday, %)	BoC	0.94
221	CAN5to10yYield	1	Canada: 5 to 10 Year Bond Yield Average (Last Wednesday, %)	BoC	0.93
222	CAN10yYield	1	Canada: 10-Year & Over Bond Yield Average (Last Wednesday, %)	BoC	0.92
223	CAN3mCorpYield	1	Canada: Prime Corporate Paper: 3-Months (AVG, %)	BoC	0.94
224	CAN6mSpread	1	CAN6mYield - CAN3mYield	BoC	0.45
225	CAN1to3ySpread	1	CAN1to3yYield - CAN3mYield	BoC	0.6
226	CAN3to5ySpread	1	CAN3to5yYield - CAN3mYield	BoC	0.68
227	CAN5to10ySpread	1	CAN5to10yYield - CAN3mYield	BoC	0.71
228	CAN10ySpread	1	CAN10yYield - CAN3mYield	BoC	0.71
229	CAN3mCorpSpread	1	CAN3mCorpSpread - CAN3mYield	BoC	0.51
<b>Balance of payments</b>					
230	CANCurrAcctBal	2	Canada: BOP: Balances: Total Current Account: All Countries (NSA, Mil.C\$)	Statcan	0.16
231	CANFDIassets	2	Canada: BOP: Canadian Direct Investment Abroad: Total (NSA, Mil.C\$)	Statcan	0.07
232	CANPortfolioAssets	2	Canada: BOP: Canadian Portfolio Investment: Total (NSA, Mil.C\$)	Statcan	0.11
233	CANFDIliabilities	2	Canada: BOP: Foreign Direct Investment in Canada: Total (NSA, Mil.C\$)	Statcan	0.05
234	CANPortfolioLiabilities	2	Canada: BOP: Foreign Portfolio Investment: Total (NSA, Mil.C\$)	Statcan	0.06
235	CANFDIassetsUS	2	Canada: BOP: Canadian Direct Investment Abroad: United States (NSA, Mil.C\$)	Statcan	0.08
236	CANPortfolioAssetsUS	2	Canada: BOP: Canadian Portfolio Investment: United States (NSA, Mil.C\$)	Statcan	0.07
237	CANFDIliabilitiesUS	2	Canada: BOP: Foreign Direct Investment in Canada: United States (NSA, Mil.C\$)	Statcan	0.06
238	CANPortfolioLiabilitiesUS	2	Canada: BOP: Foreign Portfolio Investment: United States (NSA, Mil.C\$)	Statcan	0.07
<b>Price indexes</b>					
239	CANIndPriceIndex	5	Canada: Industrial Product Price Index: Total (NSA, 2010=100)	Statcan	0.76
240	CANIntGoodsPriceIndex	5	Canada: Industrial Price Index: Intermediate Goods (NSA, 2002=100)	Statcan	0.71
241	CANFinGoodsPriceIndex	5	Canada: Industrial Price Index: Finished Goods (NSA, 2002=100)	Statcan	0.74
242	CANBCPI	5	Canada: Chain Fisher BoC Commodity Price Index (NSA, Jan-72=100)	BoC	0.74
243	CANCPI	5	Canada: Consumer Prices (2005=100, NSA)	IMF	0.46
244	CANcoreCPI	5	Canada: BoC Core CPI [V41690925] (SA,2002=100)	Statcan	0.47

245	CANExportPrices	5	Canada: Implicit Price Index: Exports of Goods and Svcs(SA, 2007=100)	Statcan	0.8
246	CANExportPricesGoods	5	Canada: Implicit Price Index: Exports of Goods (SA, 2007=100)	Statcan	0.79
247	CANExportPricesServices	5	Canada: Implicit Price Index: Exports of Services (SA, 2007=100)	Statcan	0.46
248	CANToT	5	Canada: Terms of Trade Index (SA, 2007=100)	Statcan	0.67
<b>Monetary aggregates</b>					
249	CANM1Plus	5	Canada: M1+ (SA, Mil.C\$)	BoC	0.23
250	CANM2Gross	5	Canada: M2 Gross [V41552796] (SA, Avg, Mil.C\$)	BoC	0.53
251	CANM3Gross	5	Canada: M3 Gross [V41552794] (SA, Avg, Mil.C\$)	BoC	0.63
252	CANMonBase	5	Canada: Monetary Base (SA, Mil.C\$)	BoC	0.16
253	CANMonBaseExRR	5	Canada: Monetary Base Excluding Required Reserves (SA, Mil.C\$)	BoC	0.12
<b>Chartered banks</b>					
254	CANBankAssets	5	Canada: Chartered Banks: Major Assets (Avg, SA, Mil.C\$)	BoC	0.35
255	CANBankLiquidAssets	5	Canada: Chartered Banks: Canadian Dollar Assets, Liquid Assets (Avg, SA, Mil.C\$)	BoC	0.22
256	CANBankLessLiquidAssets	5	Canada: Canadian Dollar Assets, Less Liquid Assets (Mil.C\$)	BoC	0.47
257	CANBankResidMtgLoans	5	Canada: Chartered Bank Assets: Residential Mortgage Loans (SA, Mil.C\$)	BoC	0.35
258	CANBankLoans	5	Canada: Chartered Bank Assets: Bank Loans (SA, Mil.C\$)	BoC	0.43
259	CANBankGeneralLoans	5	Canada: Genl Loans incl Grain Dealers/Installment Finance Companies (Mil.C\$)	BoC	0.42
260	CANBankBusinessLoans	5	Canada: Chartered Bank Assets: Business Loans (SA, Avg Weds, Mil.C\$)	BoC	0.36
261	CANBankPersonalLoans	5	Canada: Chartered Bank Assets: Total Personal Loans (SA, Avg Weds, Mil.C\$)	BoC	0.36
<b>Private credit</b>					
262	CANPrivateCredit	5	Canada: Business and Household Credit (SA, Mil.C\$)	BoC	0.71
263	CANHHCredit	5	Canada: Household Credit (SA, Mil.C\$)	BoC	0.71
264	CANConsCredit	5	Canada: Consumer Credit at Month-End (EOP, SA, Mil.C\$)	BoC	0.51
265	CANMtgCredit	5	Canada: Residential Mortgage Credit at Month-End (EOP, SA, Mil.C\$)	BoC	0.63
266	CANBusCredit	5	Canada: Business Credit (SA, Mil.C\$)	BoC	0.57
267	CANBusCreditST	5	Canada: Short-Term Business Credit (SA, Mil.C\$)	BoC	0.65
268	CANBusCreditLT	5	Canada: Long-Term Business Credit (SA, Mil.C\$)	BoC	0.34
<b>Confidence and uncertainty</b>					
269	CANConfidence	5	Conference Board Consumer Confidence Index	BoC	0.34
270	CANVIX	5	standard deviation of TSX index	BoC	0.08
<b>Oil prices</b>					
271	Brent	5	Brent (backcast with WTI), dollar/barrel	BoC	0.58