

Monetary Transmission in a Small Open Economy: More Data, Fewer Puzzles*

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Abstract

This paper analyzes the monetary transmission mechanism in Canada using a factor-augmented vector autoregression (FAVAR) model. For small open economies like Canada, uncovering the transmission mechanism of monetary policy using VARs has proven to be an especially challenging task. Such studies on Canadian data have often documented the presence of anomalies such as price, exchange rate, delayed overshooting and uncovered interest rate parity puzzles. We estimate a FAVAR model using large sets of monthly and quarterly macroeconomic time series. We find that the information summarized by the factors is important to properly identify the monetary transmission mechanism and contributes to mitigate the puzzles mentioned above, suggesting that more information does help. Finally, the FAVAR framework allows us to check impulse responses for all series in the informational data set, and thus provides the most comprehensive picture to date of the effect of Canadian monetary policy.

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1 Introduction

Conclusions about the role that monetary policy plays in the economy and how it should be conducted in practice depend crucially on the way monetary policy affects the economy. This is why a large empirical literature has attempted to measure the transmission of monetary policy.

A standard approach to uncover the transmission of monetary policy is to use structural vector autoregressions (VAR). This method is particularly appealing since it does not require to specify a complete model of the economy. Some key examples of early and successful implementation on US data are Bernanke and Blinder (1992), Sims (1992), and Bernanke and Mihov (1998). Even if the identification strategy has been a source of disagreement [see Christiano, Eichenbaum and Evans (2000) for a survey], this simple method is still largely used, and delivers some useful information about the effects and the transmission of monetary policy shocks on economy.

However, for small open economies like Canada, uncovering the transmission mechanism of monetary policy through this type of approach has proven to be an especially challenging task. In particular, initial VAR analysis on Canadian data have often documented the presence of anomalies such as price, exchange rate, delayed overshooting and uncovered interest rate parity puzzles [e.g. Eichenbaum and Evans (1995), Grilli and Roubini (1996), and Kim and Roubini (2000)]. The usual explanations for these puzzles are that some important variables are missing and that a simple recursive identification scheme might not adequately identify these shocks [see Cushman and Zha (1997), Fung and Kasumovich (1998) and Bhuiyan and Lucas (2007)].

Hence, it is particularly interesting to see if a more systematic use of the relevant information available could yield a more coherent and accurate picture of the effect of monetary policy in a small open economy. In this paper, we use a factor augmented vector autoregression (FAVAR) approach to assess the effect and transmission mechanism of monetary policy shocks on economic activity in Canada¹. Given that a common potential explanation of all the anomalies reported above is the lack of information in small-scale VAR models, the FAVAR approach is appealing since it incorporates a huge amount of information in a parsimonious way. Moreover, the application to U.S. data by Bernanke, Boivin and Elias (2005) was a success story.

¹In independent research projects, Mumtaz and Surico (2009), and Forni and Gambetti (2010), obtain similar results for some of the puzzles that we study in this paper.

In our implementation, we estimate the FAVAR model using an unbalanced dataset of 348 monthly and 87 quarterly macroeconomic Canadian time series. We find that the information summarized by the factors is important to properly identify the monetary transmission mechanism in both monthly and quarterly frequencies. Overall, our benchmark FAVAR specification, that includes only the monetary policy instrument as observed factor, leads to broadly plausible estimates of the effects of monetary policy shocks on many macroeconomic variables of interest and contributes to mitigate puzzles mentioned above. Indeed, all price indexes decline after an unexpected increase in short rate while the exchange rates appreciate on impact.

When comparing to standard small open economy VAR model results, we find that adding information through factors into this VAR corrects for price and exchange rate puzzles, and for inconsistent response of industrial production with respect to long-run money neutrality. Also, the maximum response of exchange rates is on impact which corrects for delayed overshooting puzzle. Finally, we find no evidence of the uncovered interest rate parity puzzle, meaning that there is no systematic carry trade conditional on a domestic monetary policy shock that rises the domestic interest rate.

Relative to the existing literature, our approach is able to uncover reasonably the monetary policy transmission in a small open economy without searching to include agents' expectations measures or other theoretical concepts proxies, and with using the simplest recursive identification scheme. Moreover, the FAVAR framework allows us to check impulse responses for all series in the informational data set, and thus provide, to our knowledge, the most comprehensive picture to date of the effect of Canadian monetary policy.

The rest of the paper is organized as follows. We discuss previous contributions in Section 2. The FAVAR methodology is presented in the following section. In Section 4 we explain our application by presenting data and the identification strategy. The main results are presented and discussed in Section 5, and we conclude in Section 6.

2 Background

Some historical puzzles in the monetary policy transmission empirical literature within the structural VARs framework, that our approach tries to mitigate, are presented in Grilli and Roubini (1996):

- *The price puzzle.* When monetary policy shocks are identified with innovations in interest rates, the output and money supply responses are correct as a contractionary increase in interest rate is associated with a fall in the money supply and the level of economic activity. However, the response of the price level is a persistent increase rather than a decrease.
- *The exchange rate puzzle.* While a positive innovation in interest rates in the US is associated with an impact appreciation of the US dollar relative to the other G-7 countries, such monetary contractions in other G-7 countries are often associated with an impact depreciation of their currency value relative to the US dollar.
- *The forward discount bias puzzle* If uncovered interest parity holds, a positive innovation in domestic interest rates relative to a foreign ones should be associated with a persistent depreciation of the domestic currency after the impact appreciation, as the positive interest rate differential leads to an expected depreciation of the currency. However, the data show that a positive interest differential is associated with a persistent appreciation of the domestic currency for periods up to two years after the initial monetary policy shock.

Using the standard VAR model and different identification strategies, Eichenbaum and Evans (1995) found that a contractionary monetary policy shock in U.S. leads to significant and persistent deviations from uncovered interest rate parity, in favor of national interest rates. The results in Grilli and Roubini (1996) show strong evidence of several puzzles for most of non-U.S. countries. To solve some of these anomalies the authors replaced the short-term interest rate by the differential between short- and long-term interest rates in order to capture agents' inflation expectations.

The same anomalies are reported and resolved in Kim and Roubini (2000) who used structural VAR setup with non-recursive contemporaneous restrictions where the monetary policy shocks are identified by modeling the monetary authority reaction function and the structure of the economy.

Another alternative to simple recursive identification structure is to use some long-run propositions of economic theory. For instance, Fung and Kasumovich (1998) estimate cointegrated VAR models for G-6 countries and then identify monetary shocks by imposing the long-term money neutrality (a permanent change in the nominal stock of money has a proportionate effect on the price level with no long-run effect on real economic activity).

In Cushman and Zha (1997) authors argue that puzzles found when estimating the effect of monetary policy shocks in small open countries are due to inappropriate identification schemes of monetary policy in such economies. Using Canada as benchmark case, they estimate standard VAR model that contains two types of variables, domestic (CAN) and foreign (US), and impose block exogeneity condition on the latter. The monetary policy shock is identified by supposing that monetary authority observe immediately the exchange rate, interest rates, stock of money and world commodity price level.

Using this nonrecursive identification they obtain impulse responses that are consistent with standard theory and highlight the exchange rate as a transmission mechanism. Finally, Bhuiyan and Lucas (2007) consider an alternative resolution of these puzzles based on an explicit account of inflation expectations. They first estimate ex-ante real interest rate and inflationary expectations by decomposing the nominal interest rate, and then include these into a fully recursive VAR model to evaluate the effects of monetary policy shocks. Their findings suggest more broadly, that the anomalies reported above might be the result of omitted information from small-scale VARs.

3 FAVAR: Motivation, Methodology and Estimation

3.1 Motivation

Since Bernanke and Blinder (1992) and Sims (1992), the structural analysis applied macroeconomics employs vector autoregressive models to identify and measure the effects of different shocks on macroeconomic variables of interest. Typically, central banks are interested in the behavior of macroeconomic aggregates after a monetary policy shock, and their analysts use widely structural VARs in order to identify the innovation. Several criticisms of the VAR approach are worth of noting. The most important is that it uses only a small number of variables to conserve degrees

of freedom. This small number of variables is unlikely to span the information sets used by actual central banks that follow a large number of data series.

Hence, the lack of information in small-scale VAR models may result in the omitted variable problem and lead to biased estimates of VAR coefficients. As a result, the structural analysis through impulse response functions and variance decomposition could be worthless. The typical example in the literature is the omission of commodity prices in structural VAR analysis attempting to measure monetary policy in U.S. [see Sims (1992) for details]. Another implication of missing information is discussed in Forni et al. (2009) who argue that the non-fundamentalness is generic of small scale models, but is unlikely to occur within the large dimensional factor models². In addition, a potential problem in a small-scale VAR model relates to the choice of a specific data series to represent a general economic concept, which may be arbitrary. Finally, even if the two previous problems do not occur, i.e. a small scale VAR is well defined and the shock is well identified, we can produce impulse responses only for variables included in the VAR.

On the other side, a factor-augmented VAR is a way to introduce additional information and potentially overcome issues from the previous discussion. The importance of large data sets, exploited within factor models, is now well documented in forecasting literature [see Bai and Ng (2008) for the review]. In the case of the monetary policy studies, Bernanke, Boivin and Eliasch (2005) show that including factors corrects for the price puzzle while keeping a low-dimensional VAR and the simple recursive identification scheme. Finally, the factor model and large data sets make possible to compute the impulse response functions for any variable in the informational panel, which can be very important if the central bank is interested for example into the behavior of several price indices instead in a total consumer price index only.

3.2 Methodology

We apply the Factor Augmented Vector Autoregressive (FAVAR) approach as in Bernanke, Boivin and Eliasch (2005), or BBE for the rest of the paper. Consider a $T \times M$ matrix of observable economic series Y , where T is the time size (number of periods) and M is the cross-sectional size

²If the shocks in the VAR model are fundamental, then the dynamic effects implied by the moving average representation can have a meaningful interpretation, i.e. the structural shocks can be recovered from current and past values of observable series.

(number of series). In the standard VAR models used in monetary literature, Y include several variables assumed to drive the dynamics of the economy and the transmission of monetary policy shocks. The usual candidates are measures of economic activity (GDP, industrial production, employment, unemployment rate, etc.), price indicators (usually CPI), and a policy instrument (e.g. Federal Funds Rate (FFR) in US, Overnight rate in Canada, Monetary base, etc.). In the (S)VAR approach, Y_t is modeled alone assuming that all relevant information is contained in several lagged values of Y_t . However, additional information available in other economic series may be relevant to the dynamic relationships assumed in VAR model, and this lack of information can lead to some unanticipated implications from the estimated model.

Suppose this additional information can be summarized by a $K \times 1$ vector of factors F_t , where K is relatively small. Then, we can augment the standard VAR model by adding F_t . As illustrated by an example in BBE, the factors can be seen as proxies for the economic activity, price pressures, credit conditions or other theoretical concepts that are difficult to identify by one or two variables. More precisely, assume that the joint dynamics of $[F_t', Y_t']'$ can be represented by the following equation:

$$\begin{aligned} \begin{bmatrix} F_t \\ Y_t \end{bmatrix} &= \Phi(L) \begin{bmatrix} F_{t-1} \\ Y_{t-1} \end{bmatrix} + e_t \\ &= \begin{bmatrix} \phi_{ff}(L) & \phi_{fy}(L) \\ \phi_{yf}(L) & \phi_{yy}(L) \end{bmatrix} \begin{bmatrix} F_{t-1} \\ Y_{t-1} \end{bmatrix} + e_t \end{aligned} \tag{1}$$

where $\Phi(L)$ is the usual lag polynomial of finite order p , and e_t is the error term with mean zero and covariance matrix Q . It is easy to see that (1) becomes a standard VAR in Y_t if the matrix $\Phi(L)$ is diagonal, i.e. if all terms in $\phi_{fy}(L)$ and $\phi_{yf}(L)$ are zero (implying that there is no direct Granger causal relation between F_t and Y_t). Otherwise, the system (1) is defined as a factor augmented vector autoregression (FAVAR).

It is important to notice that since FAVAR nests VAR representation in Y_t , estimating the former allows us to evaluate the marginal contribution of factors by comparing the results to the

VAR analysis. If the best approximation of the true DGP is a FAVAR, then omitting F_t from (1) and estimating the VAR model will lead to biased estimates of the VAR coefficients. Thus, the structural interpretation of the impulse responses and variance decomposition may be worthless.

If the factors F_t were observed, the equation (1) would be a standard VAR model and we would use the standard structural VAR techniques to estimate the model and identify the structural shocks. Unfortunately, F_t are unobservable and we have to construct them from the relevant and available economic time series. Let X_t be an $N \times 1$ vector of observable economic indicators supposed informative about the underlying factors, where the number of series, N , is assumed to be much larger than the number of factors in F_t , K , and the number of elements in Y_t , M . The relation between the informational panel and the pervasive common latent and observable factors is presented in the following static factor representation:

$$X_t = \Lambda^F F_t + \Lambda^Y Y_t + u_t \quad (2)$$

where Λ^F is an $(N \times K)$ matrix of factor loadings, Λ^Y is an $(N \times M)$ matrix of loadings relating the observable factors in Y_t to X_t , and u_t is the $(N \times 1)$ vector of error terms assumed uncorrelated with $[F_t', Y_t']'$ at all leads and lags. The idiosyncratic errors are of mean zero and can display a small amount of time and cross-correlation³. Note that (2) states that both F_t and Y_t explain the dynamics of X_t . Thus, if we condition the statement on Y_t , we can interpret X_t as noisy measures of the underlying unobserved factors F_t .

3.3 Estimation

Recall from the previous section that the estimation of the model in (1) would be trivial if the factors F_t were observable. Since this is not the case, we have to estimate them from X_t .

The unknown coefficients in (1)-(2) can in principle be estimated by Gaussian maximum likelihood (or by Quasi ML) using the Kalman filter [see Engle and Watson (1981), Stock and Watson (1989), Sargent (1989)]. This method is computationally burdensome when N is very large, but

³Implicitly, we assume an approximate factor model with strong factor structure as in Stock and Watson (2002a), Bai and Ng (2006), such that the space spanned by the true factors can be estimated by principal components of X_t .

also the misspecification becomes very likely.⁴

Instead, we use the two-step Principal Component Analysis (PCA) estimation method.⁵ It is a non-parametric way to uncover the common space spanned by the factors of X_t , denoted by $C(F_t, Y_t)$. In the first step, the equation (2) is considered. The space spanned by the factors is estimated by the first $K+M$ principal components of X_t , denoted $\hat{C}(F_t, Y_t)$. One should note that estimating factors in this way is not the most efficient method since we do not exploit the fact that Y_t is observed. However, Stock and Watson (2002a) show that if N is large and the number of principal components is at least as large as the true number of factors, the principal components consistently recover the space spanned by both F_t and Y_t . In that case, we need to identify the part of $\hat{C}(F_t, Y_t)$ that is not spanned by Y_t in order to obtain the estimate of F_t , \hat{F}_t . This is discussed further in Section 4. In the second step, the VAR on $[\hat{F}_t', Y_t']'$ is estimated using standard techniques.

The principal components approach is easy to implement and do not require very strong distributional assumptions. However, since the unobserved factors are estimated and then included as regressors in the second stage, the two-step approach suffers from the “generated regressors” problem. In order to get the accurate statistical inference on the impulse response functions, we use a bootstrap procedure proposed by Kilian (1998) that accounts for the uncertainty in the factor estimation.

4 Application

The purpose of this paper is to study the dynamic effects of monetary policy shocks on a variety of economic variables in Canada. We previously pointed out some problems with (S)VAR models and we discuss in this section how FAVAR model can deal with some of them.

Since the FAVAR approach consists of adding to a standard VAR K common components from a large number of relevant economic variables, it should deal with the lack of information problem.

⁴However, there are some recent improvements: Kalman filter speedup by Jungbacker and Koopman (2008), using principal components as very good starting values then a single pass of the Kalman filter by Giannone, Reichlin, and Sala (2004), and principal components for starting values then use EM algorithm to convergence by Doz, Giannone, and Reichlin (2006).

⁵See Stock and Watson (2002a), and Bai and Ng (2006) for theoretical results concerning the PCA estimator.

Moreover, we showed above that the system (1)-(2) nests the VAR specification. Then, it is possible to discuss directly if the marginal information brought by the estimated factors is relevant or not. Another problem that FAVAR approach can avoid is to assume that theoretical concepts such as real economic activity or price pressure are observed. Furthermore, this approach allows us to study the dynamic responses to monetary policy shock of all variables in X_t , not only in Y_t . Finally, since the non-fundamentalness is unlikely to arise within a large dimensional factor model, we are confident to recover the structural monetary policy shock from the observables.

Let us state now the FAVAR and VAR models that will be used to assess the effect of monetary policy shocks in Canada. The benchmark model is a FAVAR where Y_t contains only one variable, the monetary policy instrument, and F_t contains K unobserved factors. The official monetary policy instrument of the Bank of Canada is the Overnight Rate. Since this variable is available only from 1975M01, and our application uses data from 1969M01, we take the 3-month Treasury Bill (T-bill) as a proxy⁶. In order to discuss the additional information brought by the factors, we will compare a standard VAR model, where Y_t contains Industrial production growth (IP), Consumer price index inflation (CPI), T-Bill and CAN/US Exchange rate (FX-CAN/US), with FAVAR models where Y_t is augmented by a number of estimated factors.

4.1 Data

We estimate the system (1)-(2) with Canadian data used in Gosselin and Tkacz (2001) and updated with some variables from Galbraith and Tkacz (2007). There are 348 monthly series starting from 1969M1 and ending on 2008M6, and 87 quarterly series covering 1969Q1-2008Q2 time period. These series are initially transformed to induce stationarity. The description of the variables in the data set and their transformation is given in Appendix. To use the two-step approach, we need a balanced panel. Then, if we wish to use all the available information, we have to mix both monthly and quarterly panels. Hence, we need to replace missing values when transforming the quarterly series to monthly indicators. Moreover, several monthly series contain missing values. To face these irregularities and obtain a balanced data set, we apply the EM algorithm proposed by Stock and

⁶Since 1975 the correlation coefficient between the two series is 0.97

Watson (2002b)⁷.

4.2 Identification in the two-step approach

Different sets of identification restrictions must be imposed before estimating the system (1)-(2). The first consists of normalization restrictions on the observation equation (2) because of what Anderson (1984,p.552) refers to as the fundamental indeterminacy of this model. Suppose that $\hat{\Lambda}$ and \hat{F}_t are a solution to the estimation problem. However, this solution is not unique since we could define $\tilde{\Lambda} = \hat{\Lambda}H$ and $\tilde{F}_t = H^{-1}\hat{F}_t$, where H is a $K \times K$ nonsingular matrix, which could also satisfy equation (2). Hence, observing X_t is not enough to distinguish between these two solutions. This is a problem of statistical identification. We use the standard normalization in the principal components approach, that is, we take $C' C/T = I$, where $C = [C(F_1, Y_1), \dots, C(F_T, Y_T)]$. Then, $\hat{C} = \sqrt{T}\hat{Z}$, where \hat{Z} are the eigenvectors corresponding to the K largest eigenvalues of XX' , sorted in descending order.

The second identification issue is to identify the structural shocks in equation (1). As in many VAR applications, we adopt a recursive structure where the monetary policy instrument is ordered last in Y_t , meaning that all the factors respond with a lag to a monetary policy shock. In that case, we don't need to identify the factors separately, but only the space spanned by the latent factors.

Recall that in the first step, relying on the fact that N is large, the principal components estimated from X_t , $\hat{C}(F_t, Y_t)$, consistently recover $K+M$ contemporaneously uncorrelated, but arbitrary, linear combinations of F_t and Y_t . Since Y_t is not explicitly imposed as a factor in the first step, any of the linear combinations underlying $\hat{C}(F_t, Y_t)$ could involve the monetary policy instrument, which is always ordered last in Y_t . Then, it would not be valid to simply estimate a VAR in factors estimated from the entire data set and Y_t , and use the recursive policy shock identification framework. In that case, we need to remove the direct dependence of $\hat{C}(F_t, Y_t)$ on Y_t ,

⁷The choice of data to include in X_t is not obvious. Theoretically, more data (and that means larger time size, $T \uparrow$, and more series, $N \uparrow$) is better because the estimators in two-step approach are asymptotically consistent and the asymptotic theory here has two dimensions, T and N . But in practice, T is maximized with data availability constraint while augmenting N could imply more data of the same type (e.g. CPI category has dozens of subcategories). Boivin and Ng (2006) provide examples where adding more data has perverse effects in forecasting. The idea is that while the two-step estimators are consistent even in presence of weak cross-correlation between the errors in (2), adding many data of the same type in the finite sample context could increase the amount of cross-correlations in the error term and alter the performance of the PCA estimator. However, the pre-screening proposed by Boivin and Ng (2003) is largely *ad hoc*, and the cost from using all series, if any, seems to be marginal in practice.

where Y_t is T-bill. If linear combinations of F_t and Y_t were known, this would involve subtracting Y_t times the associated coefficient from each of the elements of $\hat{C}(F_t, Y_t)$.

Since these are unknown, to impose Y_t as a factor in the first step we use the iterative principal components approach as in Boivin and Giannoni (2007). Starting from an initial estimate of F_t , \hat{F}_t which is the K first principal components of X_t :

1. Regress X_t on F_t and Y_t , to obtain $\hat{\Lambda}_t^{F,j}$ and $\hat{\Lambda}_t^{Y,j}$
2. Compute $\tilde{X}_t^j = X_t - \hat{\Lambda}_t^{Y,j} Y_t$
3. Update \hat{F}_t as the first K principal components of \tilde{X}_t

Contrary to BBE's strategy, it does not rely on any temporal assumption between the observed factors and the informational panel. By construction, \hat{F}_t is contemporaneously uncorrelated with Y_t . Hence it can be used for any set of observed factors without imposing any further assumptions⁸. The impulse response functions are calculated in two steps. First, after identifying the structural shocks from the Choleski decomposition of residuals in (1), the VAR representation is inverted to obtain the MA(∞) representation of $[\hat{F}_t, Y_t]'$:

$$\begin{pmatrix} \hat{F}_t \\ Y_t \end{pmatrix} = [I - \hat{\Phi}(L)]^{-1} A_0^{-1} \varepsilon_t,$$

where $\varepsilon_t = A_0 e_t$ is a $K \times 1$ vector of structural shocks. Then, the IRF coefficients for each variable in X_t can be obtained from the following expression:

$$X_t = (\Lambda^F \Lambda^Y) [I - \hat{\Phi}(L)]^{-1} A_0^{-1} \varepsilon_t + u_t.$$

⁸In BBE, the authors split the sample into a block of 'slow moving' series that do not respond immediately to a shock on FFR, and another consisting of 'fast moving' variables that are not restricted. The latent factors are obtained from the following steps: (i) Let $\hat{C}(F_t, Y_t)$ be the K principal components of X_t ; (ii) Let X_t^S be the subset of 'slow moving' variables. Let $C^*(F_t)$ be the K principal components of X_t^S ; (iii) Define $\hat{F}_t = \hat{C}(F_t, Y_t) - \hat{\beta}_Y Y_t$ where $\hat{\beta}_Y$ is obtained by least squares estimation of the regression $\hat{C}(F_t, Y_t) = \beta_C C^*(F_t) + \beta_Y Y_t + a_t$; (iv) Get the loadings by regressing X_t on \hat{F}_t and Y_t .

5 Results

An appealing interesting feature of the FAVAR approach is that the impulse response functions are easy to compute for all observable series in the informational panel and for all observed factors (in our case 436). Hence, one can explore the dynamic responses of economy to a structural shock on a much broader set of dimensions than in the case of a small-scale VAR model⁹. Given our mixed-frequencies approach, we can also conduct the exercise at both monthly and quarterly frequencies.

5.1 Effects of a monetary policy shock

The benchmark model contains 8 latent factors and one observed factor, T-Bill, and is estimated on a mixed-frequencies monthly panel. The number of latent factors is estimated using Bai and Ng (2002). The matrix polynomial $\Phi(L)$ in (1) is of order 6. The confidence intervals around impulse responses are computed after 5000 bootstrap replications. Figure 1 contains impulse responses of several economic indicators to a contractionary monetary policy shock. A positive shock on the T-Bill implies a persistent economic slowdown. The production indicators go down progressively, while the price measures present a very persistent decreasing reaction, without the presence of price puzzle behavior. The leading economic indicators such as housing index, new orders and retail trade, and money aggregates decline significantly. Overall, these results seem to provide a consistent measure of the effect of monetary policy in a small open economy.

The impulse responses of several exchange rates are presented in Figure 2. We can see that Canadian dollar appreciates in most of the cases, and especially with respect to the US dollar, meaning that there is no evidence of the exchange rate puzzle. Moreover, the maximum response is on the impact, so the delayed overshooting puzzle is corrected too. The impulse responses of interest rates are presented in Figure 10. As expected, they all jump initially and mimic the behavior of the monetary policy instrument.

Since we have constructed a mixed-frequencies monthly panel, we can produce monthly dynamic responses of economic indicators observed only quarterly. In Figure 11, we plot impulse responses of some of these constructed monthly indicators. We can see a significative decline in GDP, several

⁹An alternative is to use a large-dimensional Bayesian VAR framework.

consumption categories, investment and corporate profits. In order to check the dispersion of IRF across the country, we grouped the available series of interest in four regions: Atlantic, Center, Prairie and BC. In Figure 12 we plot their responses in deviation to the corresponding national response: Atlantic, Center and BC regions present quite similar patterns, while the Prairie provinces seem to diverge.

The Table 1 in Appendix presents the variance decomposition and R^2 results. The first column reports the contribution of the monetary policy shock to the variance of the forecast error at four year horizon, and the second column contains the R^2 of the common component for 80 variables of interest. As in BBE, we find that the monetary policy shock has a small effect on most of the variables, except for interest rates and money supply. From the R^2 results we conclude that the common component explains an important fraction of variability in observable series, meaning that extracted factors do capture important dimensions of the business cycle movements.

5.2 Uncovered interest rate parity puzzle

The UIRP puzzle has been a very challenging task in the standard VAR analysis. On the other hand, including the information through factors within the FAVAR framework seems to help in resolving this issue. We construct a measure of the forward discount premium following Scholl and Uhlig (2005). Let i_k and i_k^* be domestic and foreign interest rates impulse responses at horizon k . Define s_0 and s_k as impulse responses of the log of the exchange rate at the impact and at horizon k respectively. The UIRP measure (or the forward discount premium) is calculated as:

$$UIRP = (i_k - i_k^*) + (s_k - s_0).$$

In Figure 3, we plot the impulse response function for the UIRP between Canada and US, calculated for the 3-month Treasury bills. Surprisingly, conditional on the domestic monetary policy shock, there is no carry trade on the impact. The confidence intervals are quite large and the response do not appear significant. After a year, the point forecast of UIRP vanish to zero.

In Figure 4, we plot the impulse responses of the same measure but after the US monetary policy shock. It is identified recursively by including the US 3-month T-bill first in the VAR ordering.

In that case, the UIRP measure is significantly different from zero on impact. However, we do not interpret this as a violation of the uncovered interest parity hypothesis since the US monetary policy shock is understood as proxy for a global shock, to which both monetary authorities may respond simultaneously.

We also tried an alternative identification strategy of the US monetary policy shock by placing the US interest rate last in the factors' VAR. The idea is that the Canadian central bank does not respond immediately, in a month, to a shock in the US, since the comity meeting do not occur each period. The impulse response function of UIRP is plotted in Figure 5. We can see that there is no evidence of violation of the uncovered interest parity hypothesis.

Finally, we identified a credit shock following Boivin, Giannoni and Stevanovic (2010). The UIRP impulse response function is presented in Figure 6. The forward discount premium deviates largely from its steady state value for more than a year, but with very imprecise confidence intervals.

5.3 Comparison to SVAR

To see how incorporating more information contained in factors affects the standard VAR results we compare the impulse responses from our benchmark model to the impulse responses of the VAR model containing $[US - R_t, CPI_t, IP_t, R_t, FX - CAN/US_t]$, where $US - R_t$ stands for the US 3-month T-bill. Moreover, we augment this VAR with 1, 3, and 5 factors at the time. The results are presented in Figure 7. We can see that in case of the standard VAR (VAR + K=0 in the legend), there is an evidence of price, exchange rate, delayed overshooting and UIRP puzzles. The price level stays above its steady state value for more than a year, while the Canadian dollar depreciates on impact and its maximum response arrives several months after the shock. Finally, the last plot in the Figure 7 shows that SVAR implies a systematic carry trade. The UIRP responses are created from the impulse responses of interest rates and exchange rates [see Scholl and Uhlig (2005)].

On the other hand, when we start adding factors, several puzzles are reduced in magnitude. In case of the price index and the industrial production, including one factor suffices to produce more reasonable dynamic responses. When comparing the results for exchange rates, we conclude that only the benchmark model mitigates exchange rate, delayed overshooting and UIRP puzzle.

5.4 Monthly estimates of quarterly observed series

Some interesting byproducts of our approach are the monthly indicators obtained from the quarterly observed series when we constructed the mixed-frequencies monthly balanced panel. Many important macroeconomic aggregates, such as GDP and its components, are observed only quarterly and it can be of interest to have an idea about these indicators in monthly frequency or to have an estimate of the current economic conditions before statistical agencies make them available usually several months later. This problem is also known as nowcasting and there is a growing literature that uses several econometric techniques to estimate the current economic conditions (see Aruoba, Diebold, and Scotti (2008)).

In our case we construct mixed-frequencies monthly panel by applying the EM algorithm. The number of static factors when replacing the missing values is estimated at each iteration by the second information criteria (in log) in Bai and Ng (2002). In Figure 8 we present the standardized monthly estimates of some variables and in Figure 9 we plot the monthly estimate of the level of GDP and Consumption. We can see that our simple method gives plausible monthly estimates of quarterly observed variables.

6 Conclusion

The objective of this paper was to see if more information can help in assessing the monetary transmission mechanism in a small open economy. To do so, we used a factor augmented vector autoregression (FAVAR) approach to estimate the effects of monetary policy shocks on economic activity in Canada. We found that the information summarized by the factors, that have been extracted as principal components from a large data set, is important to properly identify the monetary transmission mechanism in both monthly and quarterly frequencies. Overall, our approach gave plausible estimates of the effects of monetary policy shocks on many macroeconomic variables of interest, and, in particular, contributed to mitigate puzzles reported in the literature.

We found that adding information through factors corrects for price and exchange rate puzzles, and for the inconsistent response of industrial production with respect to the long-run money neutrality. Also, the maximum response of exchange rates is on impact, which corrects for the

delayed overshooting puzzle. Finally, our results showed no evidence of the uncovered interest rate parity, meaning that there is no systematic carry trade conditional on a national monetary policy shock that rises the domestic interest rate.

Hence, relative to the existing VAR literature discussed in Section 2, we found that our approach is able to uncover the monetary policy transmission in a small open economy without searching to include agents' expectations or other theoretical concepts proxies, and still using the simplest recursive identification scheme. Finally, the FAVAR framework allowed us to check impulse responses for all series in the informational data set, and thus provided, to our knowledge, the most comprehensive picture to date of the effect of Canadian monetary policy.

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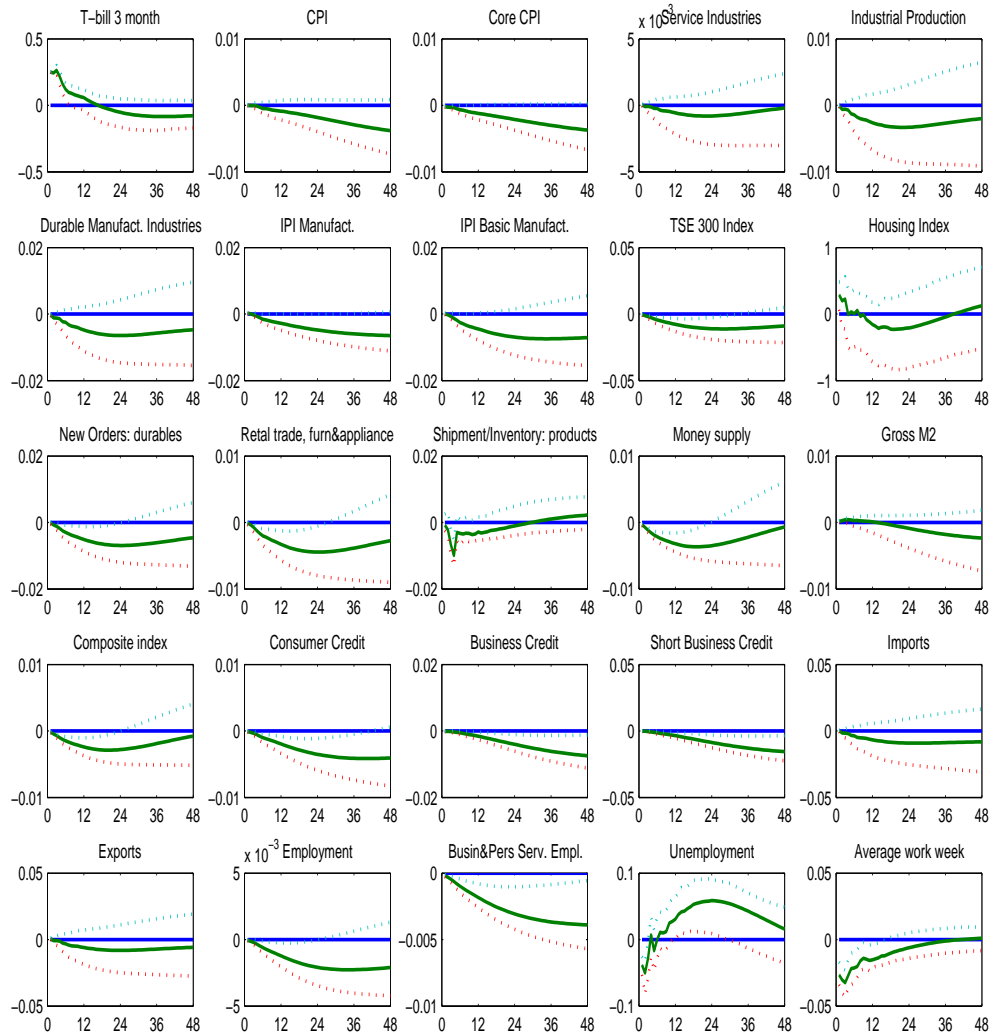


Figure 1: Impulse responses of some monthly indicators to a national monetary policy shock

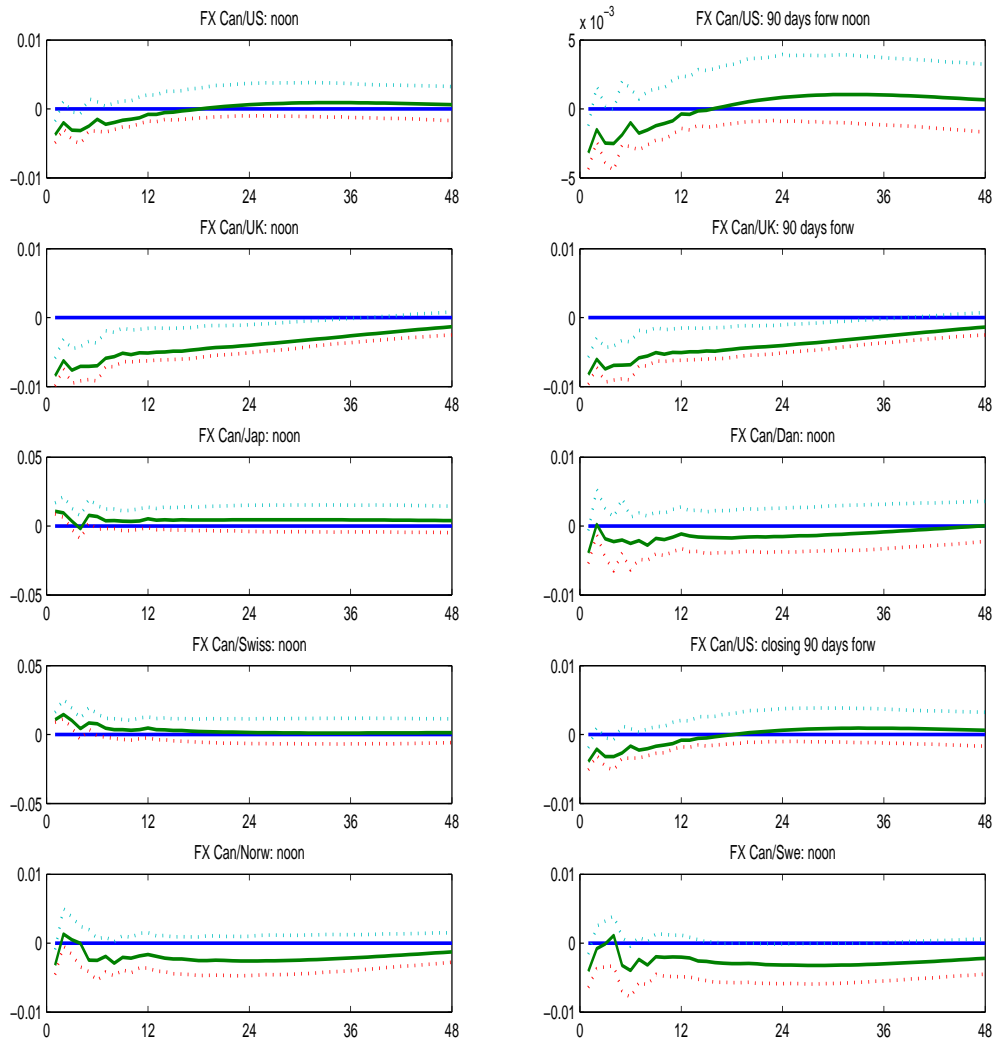


Figure 2: Impulse responses of exchange rates to a national monetary policy shock

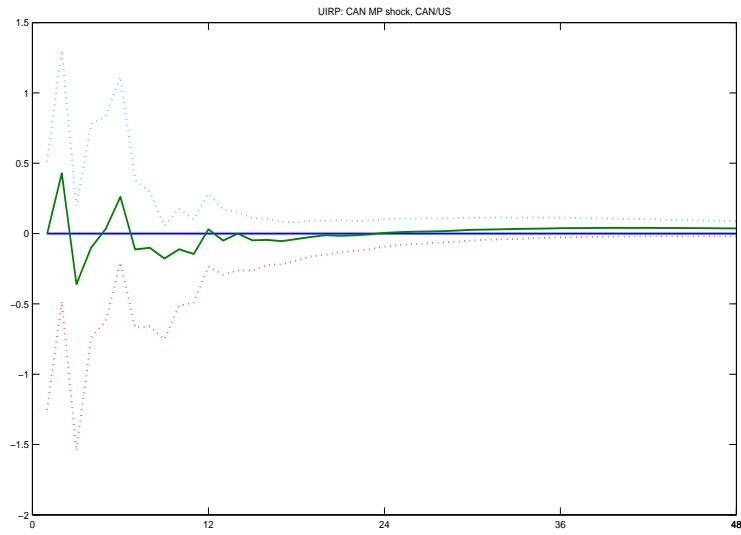


Figure 3: UIRP CAN/US, conditional on Canadian monetary policy shock

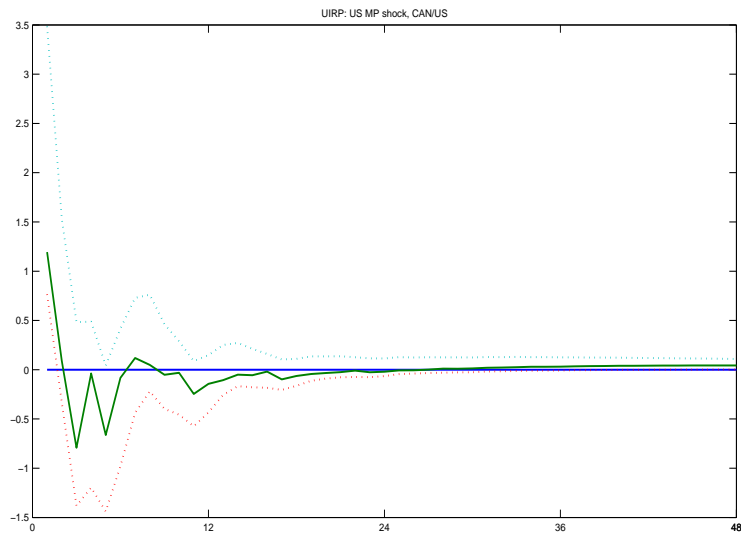


Figure 4: UIRP CAN/US, conditional on US monetary policy shock

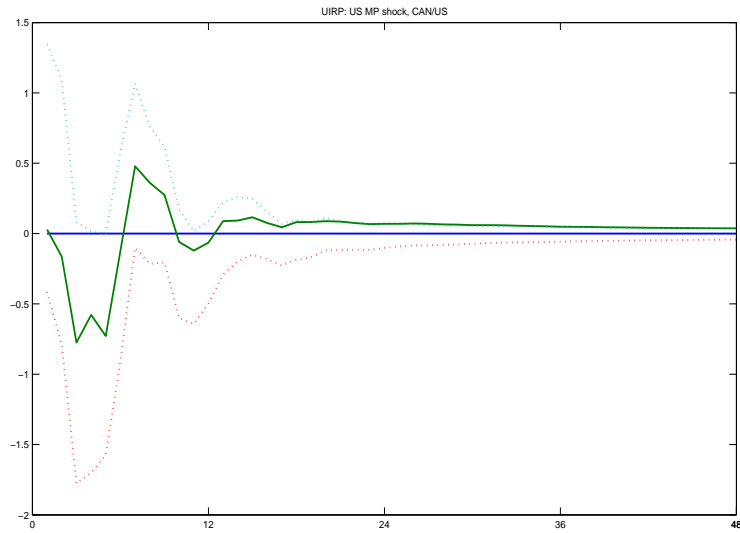


Figure 5: UIRP CAN/US, conditional on US monetary policy shock with alternative ordering

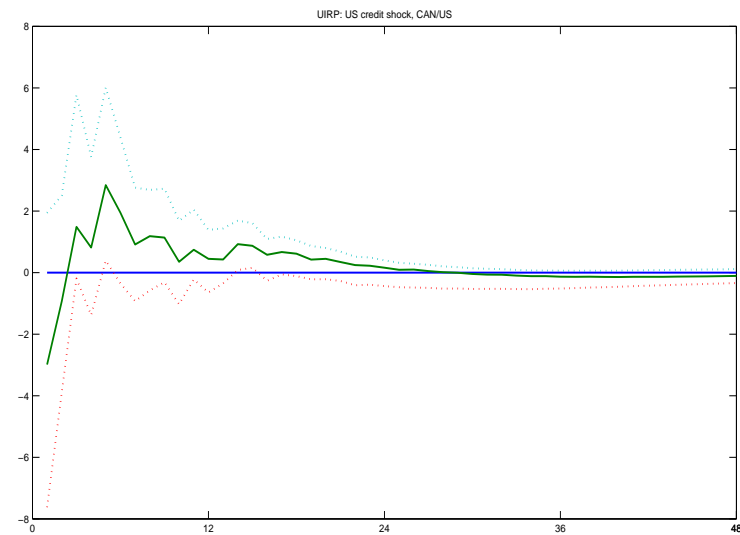


Figure 6: UIRP CAN/US, conditional on US (global) credit shock

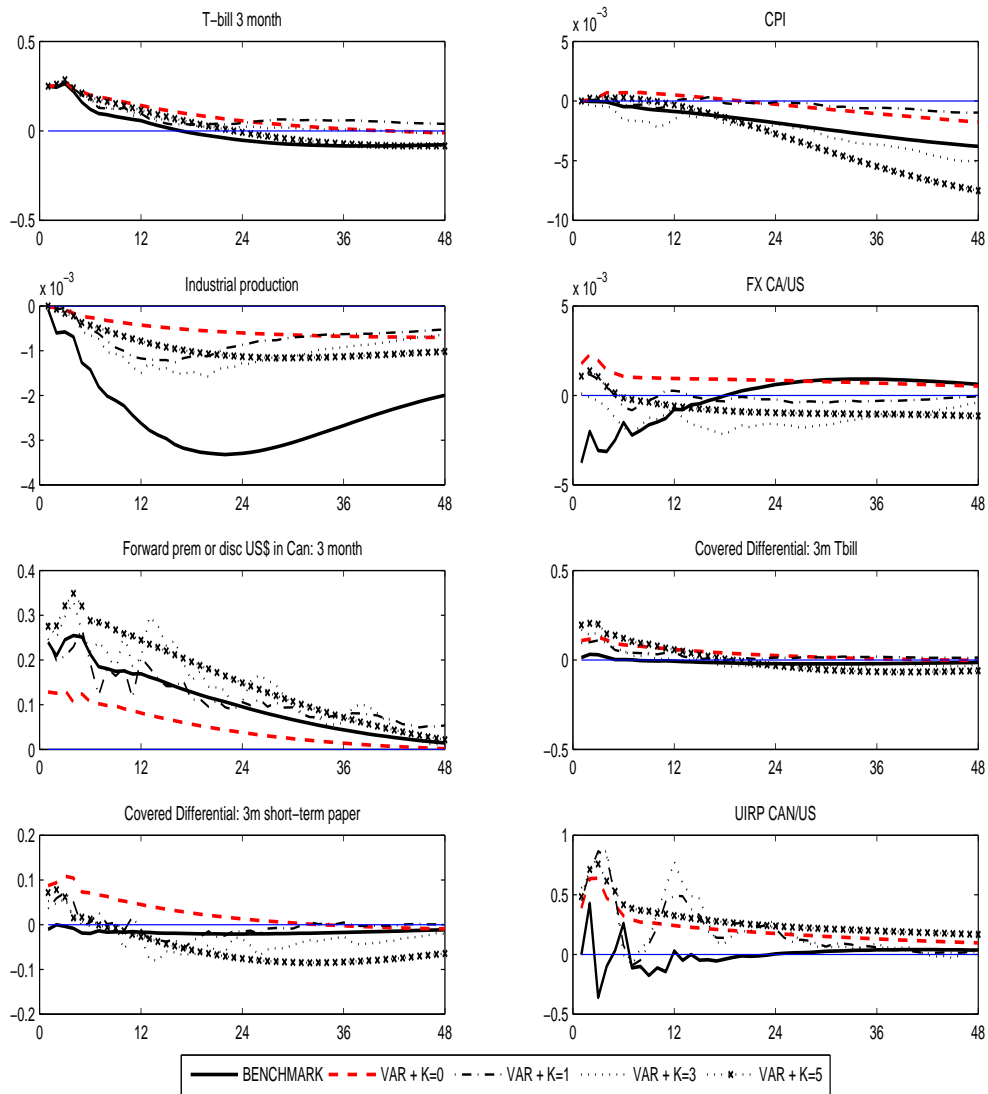


Figure 7: FAVAR-VAR comparison. Here, VAR consists of [US Tbill, CPI, IP, CA Tbill, FX CA/US]

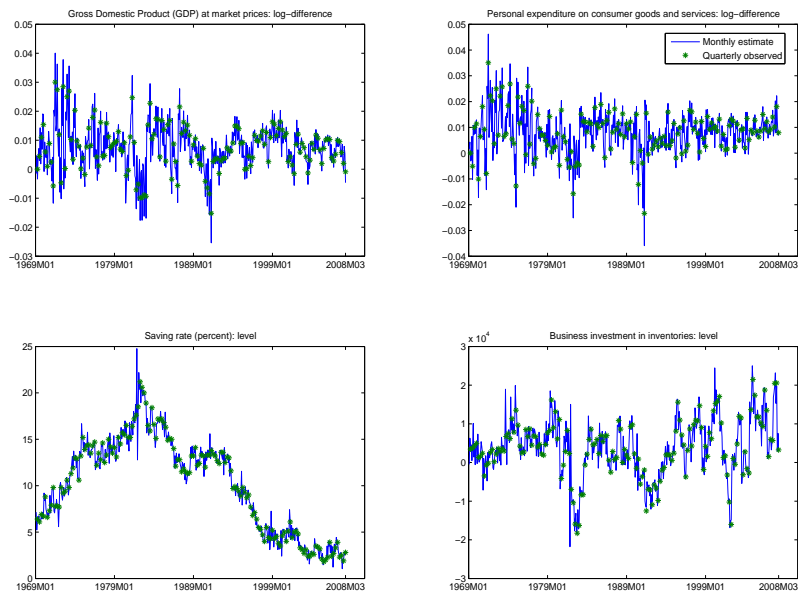


Figure 8: Monthly estimates vs quarterly observed series

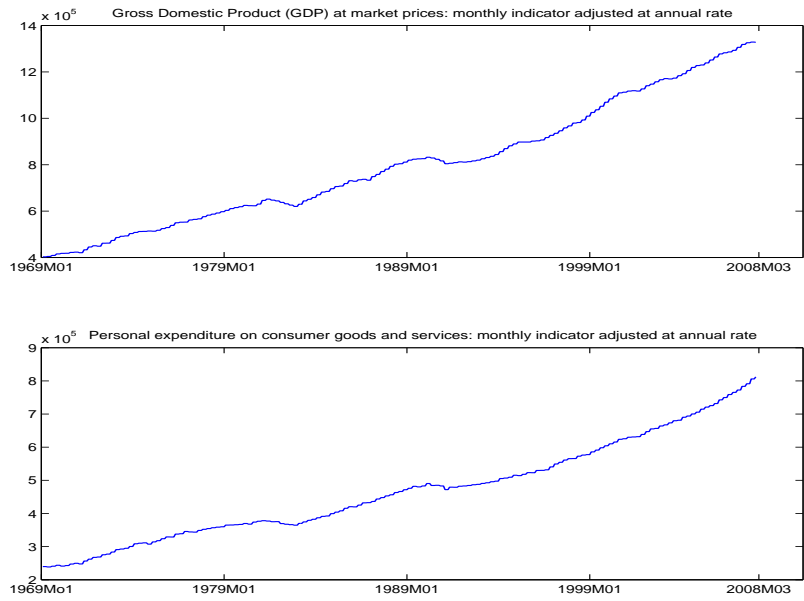


Figure 9: Monthly estimates in annualized level

A Appendix

A.1 Additional results with mixed-frequencies monthly data

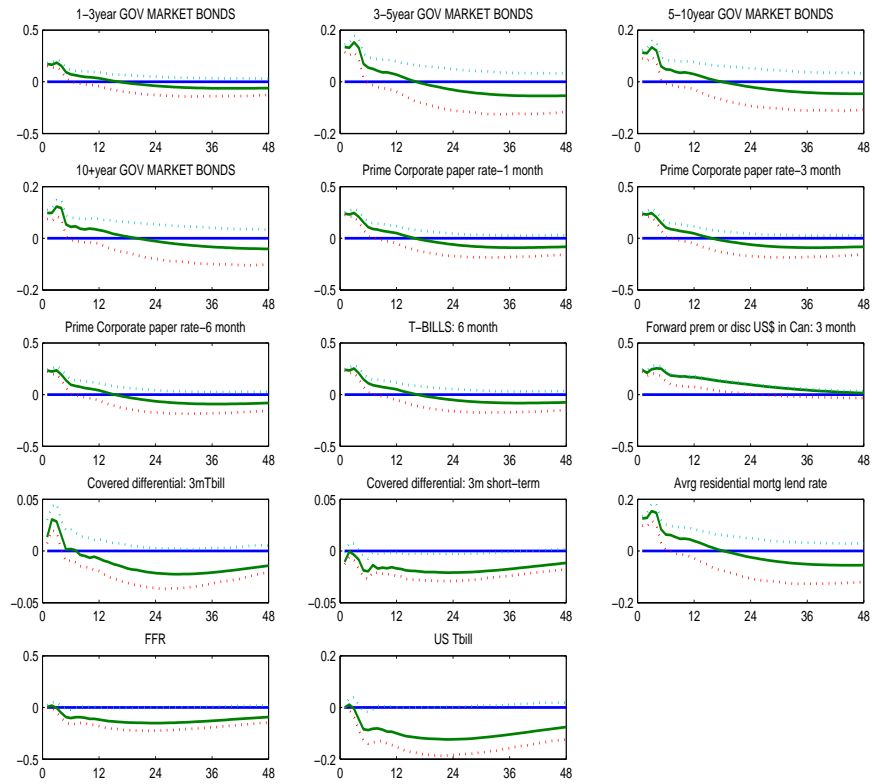


Figure 10: Interest rates

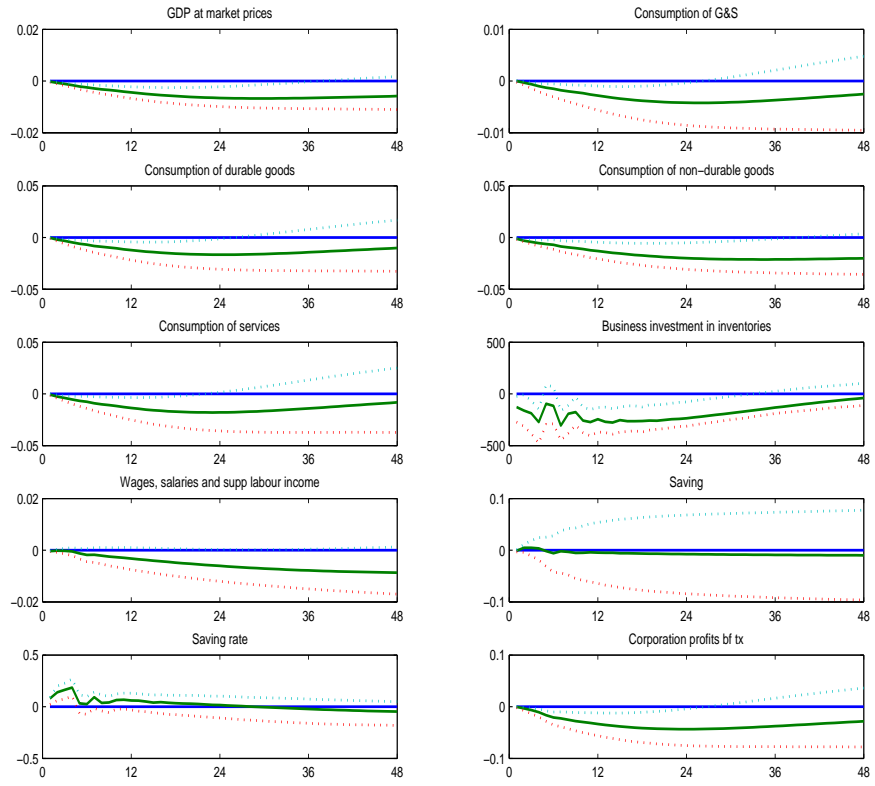


Figure 11: Quarterly indicators IRFs to CA MP shock

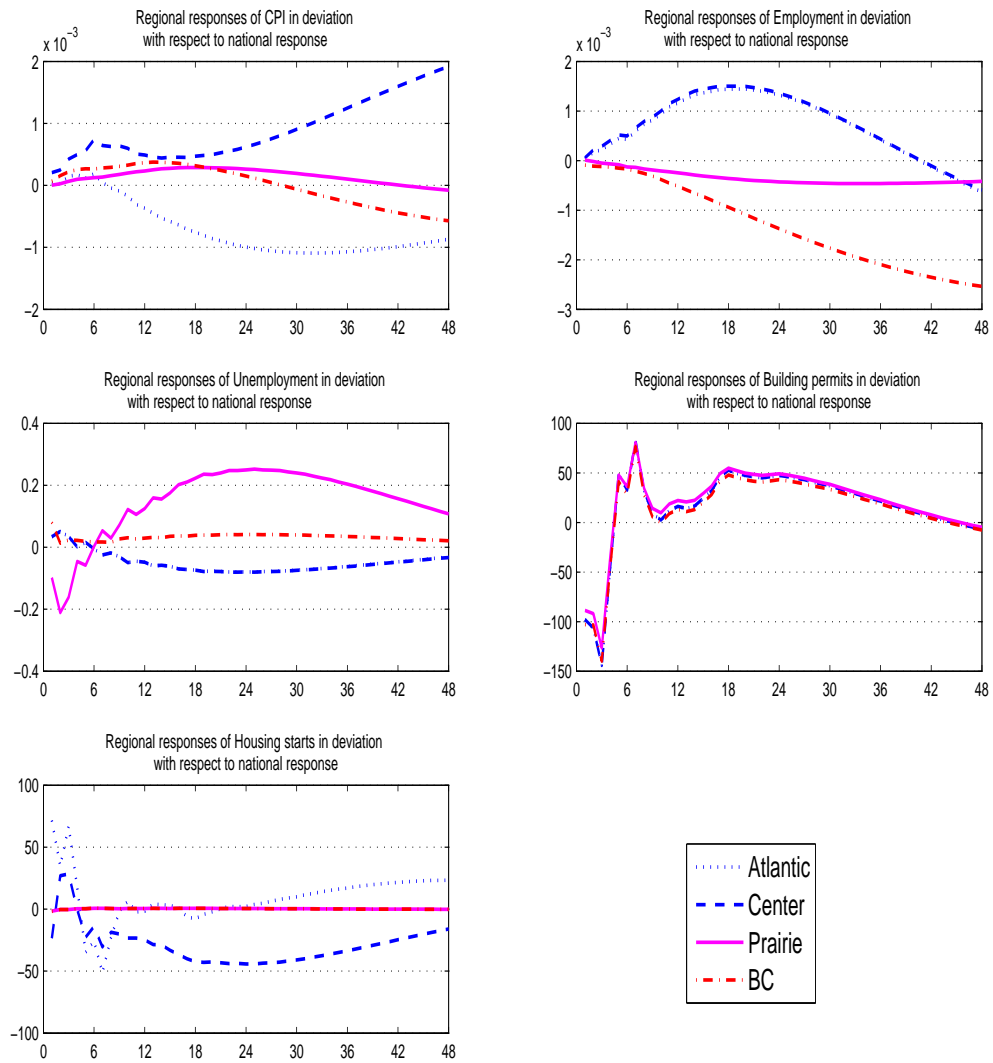


Figure 12: Comparison of regional economic indicators relative to national impulse responses

Table 1: Variance decomposition and R^2 with mixed-frequencies monthly panel

Variables	Variance decomposition	R^2
CPI	0.0074	0.8317
Core CPI	0.0338	0.6732
Service-Producing Industries	0.0137	0.5308
Industrial Production	0.0166	0.8238
Durable Manufact. Industries	0.0195	0.8232
IPI Manufact	0.0318	0.6622
IPI All Commodities	0.0483	0.4418
TSE 300 Index	0.1016	0.1695
Busin&Pers Services Empl	0.1298	0.1309
Housing index	0.0415	0.8438
New Orders: durables	0.0765	0.1977
Retal trade. furn&appliance	0.1060	0.2017
Money supply	0.3347	0.4782
Shipment/Inventory: finished products	0.0614	0.8325
Gross M2	0.0552	0.4896
Resid Mortgage Credit	0.0284	0.7301
Consumer Credit	0.1098	0.5231
Business Credit	0.0481	0.6070
Short Business Credit	0.0570	0.5251
Imports	0.0105	0.5394
Exports	0.0127	0.5509
Employment CAN	0.0632	0.8432
Unemployment CAN	0.1004	0.8923
Average work week	0.1555	0.4915
1-3year GOV MARKET BONDS	0.3461	0.9679
3-5year GOV MARKET BONDS	0.3004	0.9509
5-10year GOV MARKET BONDS	0.2708	0.9373
10+year GOV MARKET BONDS	0.2335	0.9221
Prime Corporate paper rate-1 month	0.3854	0.9823
Prime Corporate paper rate-3 month	0.3843	0.9854
Prime Corporate paper rate-6 month	0.3794	0.9862
Treasury bill: 6 month	0.3882	0.9960
Forward prem or disc US\$ in Can: 3m	0.3486	0.3822
Covered differential: Canada-US 3m T-bill	0.1919	0.5533
Covered differential: Canada-US 3m short-term paper	0.0705	0.6333
Avrg residential mortg lend rate	0.3112	0.9253
FX Can/US: noon	0.0891	0.7566
FX Can/US: 90 days forw noon	0.0800	0.7534
FX Can/UK: noon	0.0990	0.4174
FX Can/UK: 90 days forw	0.0905	0.4113
FX Can/Jap: noon	0.0147	0.8502
FX Can/Dan: noon	0.1018	0.5707
FX Can/Swiss: noon	0.0057	0.8529
FX Can/US: closing 90 days forw	0.0910	0.7547
FX Can/Norw: noon	0.0466	0.5015
FX Can/Swe: noon	0.0391	0.5873
All industries	0.0160	0.8537
Business sector: goods	0.0188	0.8347
Business sector: services	0.0152	0.5392
Mining, oil and gas extraction	0.0095	0.1952
Manufacturing	0.0178	0.8758
Finance, insurance, real estate, rental	0.0274	0.1645
Residential build. constr.	0.0405	0.1440
Motor vehicle manuf.	0.0090	0.3591
Building permits CAN	0.0097	0.7936
Housing starts CAN	0.0283	0.7124
CPI Atlantic	0.0059	0.8665
CPI Center	0.0064	0.8331
CPI Prairie	0.0074	0.8048
Employment Atlantic	0.0548	0.2969
Employment Center	0.0616	0.7305
Employment Prairie	0.0925	0.3255
Unemployment Atlantic	0.1131	0.8483
Unemployment Center	0.0887	0.7649
Unemployment Prairie	0.1001	0.8979
Building Permits Atlantic	0.0145	0.6473
Building Permits Center	0.0064	0.7090
Building Permits Prairie	0.0309	0.5858
Housing Starts Atlantic	0.0178	0.5284
Housing Starts Center	0.0217	0.6312
Housing Starts Prairie	0.0754	0.4594
GDP at market prices	0.1229	0.4073
Consumption of G&S	0.0753	0.3978
Consumption of durable goods	0.0929	0.3021
Business gross fixed capital formation	0.0954	0.5971
Residential structures	0.1074	0.3675
Business investment in inventories	0.0444	0.4407
Wages salaries and supp labour inc.	0.0351	0.7553
Saving	0.0156	0.6493
Saving rate	0.0753	0.9023
Corporation profits bf tx;	0.06746	0.4985
Treasury bill 3 month	0.39842	1.0000

A.2 Monetary policy shock with mixed-frequencies quarterly data

The frequency in which series are observed can be important in such structural exercise. Since the identification of structural shocks relies on timing restrictions, here contemporaneous ones, these can be more or less realistic across different frequencies. In following, we present impulse responses functions obtained after a positive monetary policy shock in a FAVAR model fitted to mixed-frequencies quarterly data. The benchmark model is composed of eight unobserved factors and one observed factor, T-Bill. The number of lags is set at two and we use the same identification procedure as in the case of monthly panel.

The results for some indicators of interest are presented in Figure 13. We can see that the responses at quarterly frequency are quite similar to those obtained using monthly panel: slowdown for most of production and price indicators, credit measures and leading indicators. Also, there is no presence of price nor exchange rate puzzles.

According to variance decomposition and R^2 results, not reported here, the monetary policy shock does not have a huge effect on most of the variables, but the common component explains an important fraction of variability in observable series.

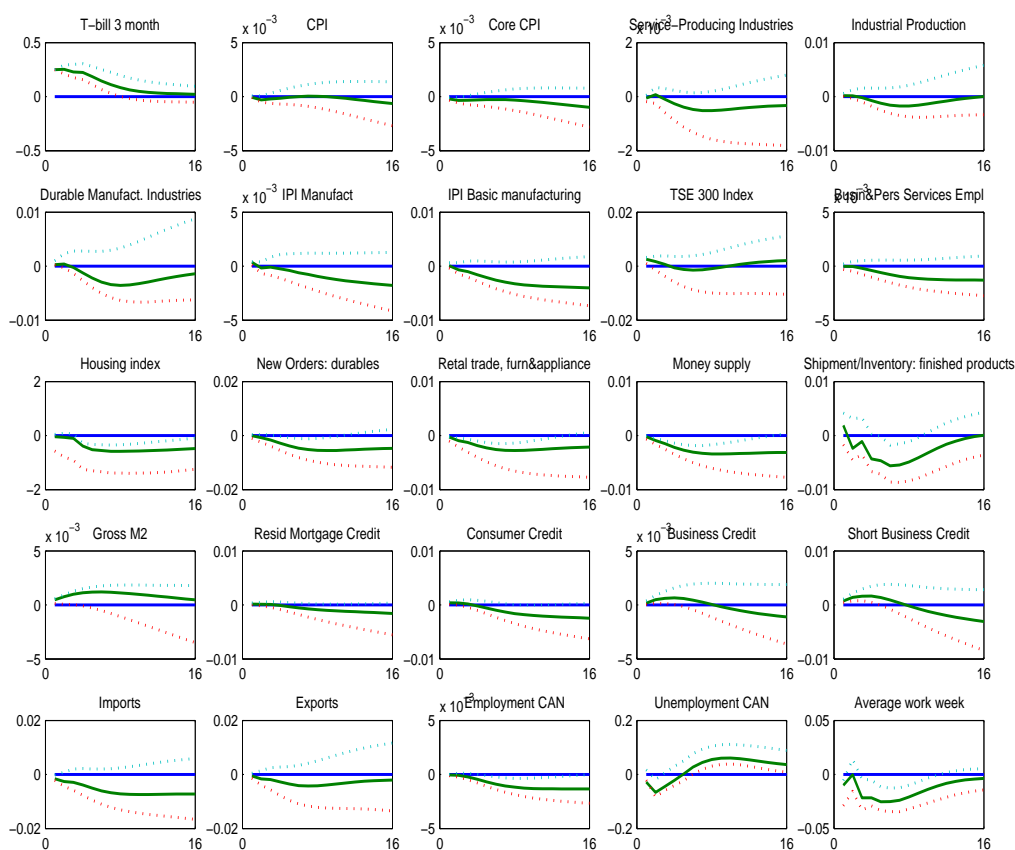


Figure 13: Impulse responses of some quarterly indicators to identified monetary policy shock

A.3 EM Algorithm

When we want to expand the cross-sectional size of the informational panel, i.e. increase N , it is almost sure that we will face some data irregularities causing unbalanced panels. There can be occasionally missing observations, some important data series that start later than the rest of panel, or mixed frequency data. In order to estimate factors by principal component, we need to construct a balanced panel. We present the EM estimation proposed in Stock and Watson (2002b). Consider the least square estimators of Λ and F_t from a generalized factor representation (1) using a balanced panel. The objective function is

$$V(F, \Lambda) = \sum_{i=1}^N \sum_{t=1}^T (X_{it} - \lambda_i' F_t)^2 \quad (3)$$

which can be minimized by the usual eigenvalue calculations. When the panel is unbalanced, least square estimators of F_t can be calculated using an indicator I_{it} equal to 1 if X_{it} is available and 0 otherwise

$$V^*(F, \Lambda) = \sum_{i=1}^N \sum_{t=1}^T I_{it} (X_{it} - \lambda_i' F_t)^2 \quad (4)$$

which requires the following iterative method to be minimized.

Let $\hat{\Lambda}$ and \hat{F} denote estimates of Λ and F from the previous iteration, and let

$$Q(X^*, \hat{F}, \hat{\Lambda}, F, \Lambda) = E_{\hat{F}, \hat{\Lambda}}[V(F, \Lambda) | X^*] \quad (5)$$

where X^* denotes the full set of observed data and the RHS of (5) is the expected value of the complete data log-likelihood $V(F, \Lambda)$, evaluated using the conditional density of $X | X^*$ evaluated at \hat{F} and $\hat{\Lambda}$. The estimates of F and Λ minimize (5).

Developing the equation (5) gives

$$Q(X^*, \hat{F}, \hat{\Lambda}, F, \Lambda) = \sum_i \sum_t E_{\hat{F}, \hat{\Lambda}}(X_{it}^2 | X^*) + (\lambda_i' F_t)^2 - 2\hat{X}_{it}(\lambda_i' F_t) \quad (6)$$

where $\hat{X}_{it} = E_{\hat{F}, \hat{\Lambda}}(X_{it} | X^*)$. Since the first term on the RHS of (6) does not depend on factors and loadings, we can replace it by $\sum_i \sum_t \hat{X}_{it}^2$, implying that at iteration j , \hat{F} and $\hat{\Lambda}$ minimize $\hat{V}(F, \Lambda) = \sum_{i=1}^N \sum_{t=1}^T (\hat{X}_{it} - \lambda_i' F_t)^2$. Then, it reduces to the standard principal component eigenvalue calculation where the missing data are replaced by their expectation conditional on the observed data and using the parameter values from the previous iteration. One way to obtain starting values for \hat{F} and $\hat{\Lambda}$ is to estimate them from a subset that constitutes a balanced panel.

The main problem is to calculate \hat{X}_{it} depending on the nature of missing value (occasional missing value, mixed frequency, etc.). Let $\underline{X}_i = (X_{i1}, \dots, X_{iT})'$, and let \underline{X}_i^* be the vector of observations on the i th variable. Suppose that $\underline{X}_i^* = A_i \underline{X}_i$ for some known matrix A_i . Then, $E(\underline{X}_i | X^*) = E(\underline{X}_i | X_i^*) = F \lambda_i + A_i' (A_i A_i')^{-} (\underline{X}_i^* - A_i F \lambda_i)$, where $(A_i A_i')^{-}$ is the generalized inverse. Now, we present five particular cases to calculate \hat{X}_{it} .

A. Missing Observations. The easiest and most current case is when some observations on X_{it}

are missing. At the iteration j , $\hat{X}_{it} = X_{it}$ if X_{it} observed and $\hat{X}_{it} = \hat{\lambda}'_i \hat{F}_t$ otherwise. The estimate of F is then updated by computing the eigenvectors corresponding to the largest r eigenvalues of $N^{-1} \sum_i \hat{X}_i \hat{X}_i'$, where $\hat{X}_i = (\hat{X}_{i1}, \dots, \hat{X}_{iT})'$, and $\hat{\Lambda}$ is updated by the OLS regression of \hat{X} onto this updated estimate of F .

B. Mixed Monthly and Quarterly Data - I(0) Stock Variables. If the quarterly observed series is the point-in-time level of a variable at the end of the quarter, stock variable, is integrated of order zero, then it is handled as in case A, i.e. it is treated as a monthly series with missing observations in the first and second months of the quarter.

C. Mixed Monthly and Quarterly Data - I(0) Flow Variable. A quarterly flow variable is the average (sum) of unobserved monthly values. If this series is $I(0)$, the unobserved monthly series, X_{it} , is measured only as the time aggregate $X_{it}^q = (1/3)(X_{i,t-2} + X_{i,t-1} + X_{it})$ for $t = 3, 6, 9, \dots$, and X_{it}^q is missing for all other values of t . In this case estimation proceeds as in case A except that $\hat{X}_{it} = \hat{\lambda}'_i \hat{F}_t + \hat{e}_{it}$, where $\hat{e}_{it} = X_{it}^q - \hat{\lambda}'_i (\hat{F}_{\tau-2} + \hat{F}_{\tau-1} + \hat{F}_\tau)/3$, where $\tau = 3$ when $t = 1, 2, 3, \dots$, $\tau = 6$, when $t = 4, 5, 6, \dots$, and so forth.

D. Mixed Monthly and Quarterly Data - I(1) Stock Variables. Let X_{it}^1 denote the quarterly first difference stock variable, assumed to be measured in the third month of every quarter, and X_{it} denote the monthly first difference of the variable. Then, $X_{it}^q = (X_{i,t-2} + X_{i,t-1} + X_{it})$ for $t = 3, 6, 9, \dots$, and X_{it}^q is missing for all other values of t . In this case estimation proceeds as in case A but with $\hat{X}_{it} = \hat{\lambda}'_i \hat{F}_t + (1/3)\hat{e}_{it}$, where $\hat{e}_{it} = X_{it}^q - \hat{\lambda}'_i (\hat{F}_{\tau-2} + \hat{F}_{\tau-1} + \hat{F}_\tau)/3$, where $\tau = 3$ when $t = 1, 2, 3, \dots$, $\tau = 6$, when $t = 4, 5, 6, \dots$, and so forth.

E. Mixed Monthly and Quarterly Data - I(1) Flow Variables. Once again, let X_{it}^q be the quarterly first difference assumed observed at the end of every quarter. The vector of observations is then $\underline{X}_i^* = (X_{i3}^q, X_{i6}^q, \dots, X_{i\tau}^q)$, where τ denotes the month of the last quarterly observation. If the underlying quarterly data are averages of monthly series, and if the monthly first differences are denoted by X_{it} , then $X_{it}^q = (1/3)(X_{i,t} + 2X_{i,t-1} + 3X_{i,t-2} + 2X_{i,t-3} + X_{i,t-4})$ for $t = 3, 6, 9, \dots$ (which defines implicitly the rows of A_i). Then, the estimate of \underline{X}_i is given by $\hat{\underline{X}}_i = F\lambda_i + A_i'(A_i A_i')^{-1}(\underline{X}_i^* - A_i F\lambda_i)$.

A.4 Data Sets

Format contains series number; StatCan number; transformation code; series description and time span. The transformation codes are: 1 - no transformation; 2 - first difference; 4 - logarithm; 5 - first difference of logarithm.

MONTHLY SERIES				
Table 326-0020 Consumer Price Index Canada, Provinces				
1	v41690973	5	All-items (2002=100)	1969-01-01 to 2008-05-01
2	v41690974	5	Food (2002=100)	1969-01-01 to 2008-05-01
3	v41690993	5	Dairy products (2002=100)	1969-01-01 to 2008-05-01
4	v41691046	5	Food purchased from restaurants (2002=100)	1969-01-01 to 2008-05-01
5	v41691051	5	Rented accommodation (2002=100)	1969-01-01 to 2008-05-01
6	v41691055	5	Owned accommodation (2002=100)	1969-01-01 to 2008-05-01
7	v41691065	5	Natural gas (2002=100)	1969-01-01 to 2008-05-01
8	v41691066	5	Fuel oil and other fuels (2002=100)	1969-01-01 to 2008-05-01
9	v41691108	5	Clothing and footwear (2002=100)	1969-01-01 to 2008-05-01
10	v41691129	5	Private transportation (2002=100)	1969-01-01 to 2008-05-01
11	v41691153	5	Health and personal care (2002=100)	1969-01-01 to 2008-05-01
12	v41691170	5	Recreation, education and reading (2002=100)	1969-01-01 to 2008-05-01
13	v41692942	5	All-items excluding eight of the most volatile components (Bank of Canada definition) (2002=100)	1969-01-01 to 2008-05-01
14	v41691232	5	All-items excluding food (2002=100)	1969-01-01 to 2008-05-01
15	v41691233	5	All-items excluding food and energy (2002=100)	1969-01-01 to 2008-05-01
16	v41691238	5	All-items excluding energy (2002=100)	1969-01-01 to 2008-05-01
17	v41691237	5	Food and energy (2002=100)	1971-01-01 to 2008-05-01
18	v41691239	5	Energy (2002=100)	1969-01-01 to 2008-05-01
19	v41691219	5	Housing (1986 definition) (2002=100)	1969-01-01 to 2008-05-01
20	v41691222	5	Goods (2002=100)	1969-01-01 to 2008-05-01
21	v41691223	5	Durable goods (2002=100)	1969-01-01 to 2008-05-01
22	v41691225	5	Non-durable goods (2002=100)	1969-01-01 to 2008-05-01
23	v41691229	5	Goods excluding food purchased from stores and energy (2002=100)	1969-01-01 to 2008-05-01

24	v41691230	5	Services (2002=100)	1969-01-01 to 2008-05-01
25	v41691231	5	Services excluding shelter services (2002=100)	1969-01-01 to 2008-05-01
26	v41691244	5	Newfoundland and Labrador; All-items (2002=100)	1978-09-01 to 2008-05-01
27	v41691369	5	Newfoundland and Labrador; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
28	v41691363	5	Newfoundland and Labrador; Goods (2002=100)	1978-09-01 to 2008-05-01
29	v41691367	5	Newfoundland and Labrador; Services (2002=100)	1978-09-01 to 2008-05-01
30	v41691379	5	Prince Edward Island; All-items (2002=100)	1978-09-01 to 2008-05-01
31	v41691503	5	Prince Edward Island; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
32	v41691497	5	Prince Edward Island; Goods (2002=100)	1978-09-01 to 2008-05-01
33	v41691501	5	Prince Edward Island; Services (2002=100)	1978-09-01 to 2008-05-01
34	v41691513	5	Nova Scotia; All-items (2002=100)	1978-09-01 to 2008-05-01
35	v41691638	5	Nova Scotia; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
36	v41691632	5	Nova Scotia; Goods (2002=100)	1978-09-01 to 2008-05-01
37	v41691636	5	Nova Scotia; Services (2002=100)	1978-09-01 to 2008-05-01
38	v41691648	5	New Brunswick; All-items (2002=100)	1978-09-01 to 2008-05-01
39	v41691773	5	New Brunswick; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
40	v41691767	5	New Brunswick; Goods (2002=100)	1978-09-01 to 2008-05-01
41	v41691771	5	New Brunswick; Services (2002=100)	1978-09-01 to 2008-05-01
42	v41691783	5	Quebec; All-items (2002=100)	1978-09-01 to 2008-05-01
43	v41691909	5	Quebec; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
44	v41691903	5	Quebec; Goods (2002=100)	1978-09-01 to 2008-05-01
45	v41691907	5	Quebec; Services (2002=100)	1978-09-01 to 2008-05-01
46	v41691919	5	Ontario; All-items (2002=100)	1978-09-01 to 2008-05-01
47	v41692045	5	Ontario; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
48	v41692039	5	Ontario; Goods (2002=100)	1978-09-01 to 2008-05-01
49	v41692043	5	Ontario; Services (2002=100)	1978-09-01 to 2008-05-01
50	v41692055	5	Manitoba; All-items (2002=100)	1978-09-01 to 2008-05-01
51	v41692181	5	Manitoba; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
52	v41692175	5	Manitoba; Goods (2002=100)	1978-09-01 to 2008-05-01
53	v41692179	5	Manitoba; Services (2002=100)	1978-09-01 to 2008-05-01
54	v41692191	5	Saskatchewan; All-items (2002=100)	1978-09-01 to 2008-05-01
55	v41692317	5	Saskatchewan; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
56	v41692311	5	Saskatchewan; Goods (2002=100)	1978-09-01 to 2008-05-01
57	v41692315	5	Saskatchewan; Services (2002=100)	1978-09-01 to 2008-05-01
58	v41692327	5	Alberta; All-items (2002=100)	1978-09-01 to 2008-05-01
59	v41692452	5	Alberta; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
60	v41692446	5	Alberta; Goods (2002=100)	1978-09-01 to 2008-05-01
61	v41692450	5	Alberta; Services (2002=100)	1978-09-01 to 2008-05-01
62	v41692462	5	British Columbia; All-items (2002=100)	1978-09-01 to 2008-05-01
63	v41692588	5	British Columbia; All-items excluding food and energy (2002=100)	1978-09-01 to 2008-05-01
64	v41692582	5	British Columbia; Goods (2002=100)	1978-09-01 to 2008-05-01
65	v41692586	5	British Columbia; Services (2002=100)	1978-09-01 to 2008-05-01
Table 026-0001 Building permits, residential values and number of units				
66	v14098	1	Canada; Total dwellings (number of units) [D848383]	1969-01-01 to 2008-05-01
67	v41651	1	Canada; Total dwellings (dollars - thousands) [D845521]	1969-01-01 to 2008-05-01
68	v13824	1	Newfoundland and Labrador; Total dwellings (number of units) [D847651]	1969-01-01 to 2008-05-01
69	v41560	1	Newfoundland and Labrador; Total dwellings (dollars - thousands) [D845363]	1969-01-01 to 2008-05-01
70	v13859	1	Prince Edward Island; Total dwellings (number of units) [D847658]	1969-01-01 to 2008-05-01
71	v41595	1	Prince Edward Island; Total dwellings (dollars - thousands) [D845370]	1969-01-01 to 2008-05-01
72	v13866	1	Nova Scotia; Total dwellings (number of units) [D847665]	1969-01-01 to 2008-05-01
73	v41602	1	Nova Scotia; Total dwellings (dollars - thousands) [D845377]	1969-01-01 to 2008-05-01
74	v13873	1	New Brunswick; Total dwellings (number of units) [D847672]	1969-01-01 to 2008-05-01
75	v41609	1	New Brunswick; Total dwellings (dollars - thousands) [D845384]	1969-01-01 to 2008-05-01
76	v13880	1	Quebec; Total dwellings (number of units) [D847679]	1969-01-01 to 2008-05-01
77	v41616	1	Quebec; Total dwellings (dollars - thousands) [D845391]	1969-01-01 to 2008-05-01
78	v13887	1	Ontario; Total dwellings (number of units) [D847686]	1969-01-01 to 2008-05-01
79	v41623	1	Ontario; Total dwellings (dollars - thousands) [D845398]	1969-01-01 to 2008-05-01
80	v13894	1	Manitoba; Total dwellings (number of units) [D847693]	1969-01-01 to 2008-05-01
81	v41630	1	Manitoba; Total dwellings (dollars - thousands) [D845405]	1969-01-01 to 2008-05-01
82	v13901	1	Saskatchewan; Total dwellings (number of units) [D847700]	1969-01-01 to 2008-05-01
83	v41637	1	Saskatchewan; Total dwellings (dollars - thousands) [D845412]	1969-01-01 to 2008-05-01
84	v13908	1	Alberta; Total dwellings (number of units) [D847707]	1969-01-01 to 2008-05-01
85	v41644	1	Alberta; Total dwellings (dollars - thousands) [D845419]	1969-01-01 to 2008-05-01
86	v13831	1	British Columbia; Total dwellings (number of units) [D847714]	1969-01-01 to 2008-05-01
87	v41567	1	British Columbia; Total dwellings (dollars - thousands) [D845426]	1969-01-01 to 2008-05-01
Table 027-0002 CMHC, housing starts, under constr and completions, SA				
88	v730040	1	Canada; Total units (units - thousands) [J9001]	1969-01-01 to 2008-05-01
89	v729972	1	Newfoundland and Labrador; Total units (units - thousands) [J7002]	1969-01-01 to 2008-05-01
90	v729973	1	Prince Edward Island; Total units (units - thousands) [J7003]	1969-01-01 to 2008-05-01
91	v729974	1	Nova Scotia; Total units (units - thousands) [J7004]	1969-01-01 to 2008-05-01
92	v729975	1	New Brunswick; Total units (units - thousands) [J7005]	1969-01-01 to 2008-05-01
93	v729976	1	Quebec; Total units (units - thousands) [J7006]	1969-01-01 to 2008-05-01
94	v729981	1	Ontario; Total units (units - thousands) [J7008]	1969-01-01 to 2008-05-01
95	v729987	1	Manitoba; Total units (units - thousands) [J7011]	1969-01-01 to 2008-05-01
96	v729988	1	Saskatchewan; Total units (units - thousands) [J7012]	1969-01-01 to 2008-05-01
97	v729989	1	Alberta; Total units (units - thousands) [J7013]	1969-01-01 to 2008-05-01
98	v729990	1	British Columbia; Total units (units - thousands) [J7014]	1969-01-01 to 2008-05-01
Table 377-0003 Business leading indicators for Canada				
99	v7677	1	Average work week, manufacturing; Smoothed (hours) [D100042]	1969-01-01 to 2008-05-01
100	v7680	1	Housing index; Smoothed (index, 1992=100) [D100043]	1969-01-01 to 2008-05-01
101	v7681	5	United States composite leading index; Smoothed (index, 1992=100) [D100044]	1969-01-01 to 2008-04-01
102	v7682	5	Money supply; Smoothed (dollars, 1992 - millions) [D100045]	1969-01-01 to 2008-05-01
103	v7683	5	New orders, durable goods; Smoothed (dollars, 1992 - millions) [D100046]	1969-01-01 to 2008-03-01
104	v7684	5	Retail trade, furniture and appliances; Smoothed (dollars, 1992 - millions) [D100047]	1969-01-01 to 2008-03-01
105	v7686	1	Shipment to inventory ratio, finished products; Smoothed (ratio) [D100049]	1969-01-01 to 2008-03-01
106	v7678	5	Stock price index, TSE 300; Smoothed (index, 1975=1000) [D100050]	1969-01-01 to 2008-05-01
107	v7679	5	Business and personal services employment; Smoothed (persons - thousands) [D100051]	1969-01-01 to 2008-05-01
108	v7688	5	Composite index of 10 indicators; Smoothed (index, 1992=100) [D100053]	1969-01-01 to 2008-05-01
Table 379-0027 GDP at basic prices, by NAICS, Canada, SA, 2002 constant prices				

109	v41881478	5	All industries [T001] (dollars - millions)	1981-01-01 to 2008-04-01
110	v41881480	5	Business sector, goods [T003] (dollars - millions)	1981-01-01 to 2008-04-01
111	v41881481	5	Business sector, services [T004] (dollars - millions)	1981-01-01 to 2008-04-01
112	v41881482	5	Non-business sector industries [T005] (dollars - millions)	1981-01-01 to 2008-04-01
113	v41881485	5	Goods-producing industries [T008] (dollars - millions)	1981-01-01 to 2008-04-01
114	v41881486	5	Service-producing industries [T009] (dollars - millions)	1981-01-01 to 2008-04-01
115	v41881487	5	Industrial production [T010] (dollars - millions)	1981-01-01 to 2008-04-01
116	v41881488	5	Non-durable manufacturing industries [T011] (dollars - millions)	1981-01-01 to 2008-04-01
117	v41881489	5	Durable manufacturing industries [T012] (dollars - millions)	1981-01-01 to 2008-04-01
118	v41881494	5	Agriculture, forestry, fishing and hunting [11] (dollars - millions)	1981-01-01 to 2008-04-01
119	v41881501	5	Mining and oil and gas extraction [21] (dollars - millions)	1981-01-01 to 2008-04-01
120	v41881524	5	Residential building construction [230A] (dollars - millions)	1981-01-01 to 2008-04-01
121	v41881525	5	Non-residential building construction [230B] (dollars - millions)	1981-01-01 to 2008-04-01
122	v41881527	5	Manufacturing [31-33] (dollars - millions)	1981-01-01 to 2008-04-01
123	v41881555	5	Wood product manufacturing [321] (dollars - millions)	1981-01-01 to 2008-04-01
124	v41881564	5	Paper manufacturing [322] (dollars - millions)	1981-01-01 to 2008-04-01
125	v41881602	5	Rubber product manufacturing [3262] (dollars - millions)	1981-01-01 to 2008-04-01
126	v41881606	5	Non-metallic mineral product manufacturing [327] (dollars - millions)	1981-01-01 to 2008-04-01
127	v41881637	5	Machinery manufacturing [333] (dollars - millions)	1981-01-01 to 2008-04-01
128	v41881654	5	Electrical equipment, appliance and component manufacturing [335] (dollars - millions)	1981-01-01 to 2008-04-01
129	v41881662	5	Transportation equipment manufacturing [336] (dollars - millions)	1981-01-01 to 2008-04-01
130	v41881663	5	Motor vehicle manufacturing [3361] (dollars - millions)	1981-01-01 to 2008-04-01
131	v41881674	5	Aerospace product and parts manufacturing [3364] (dollars - millions)	1981-01-01 to 2008-04-01
132	v41881675	5	Railroad rolling stock manufacturing [3365] (dollars - millions)	1981-01-01 to 2008-04-01
133	v41881688	5	Wholesale trade [41] (dollars - millions)	1981-01-01 to 2008-04-01
134	v41881689	5	Retail trade [44-45] (dollars - millions)	1981-01-01 to 2008-04-01
135	v41881690	5	Transportation and warehousing [48-49] (dollars - millions)	1981-01-01 to 2008-04-01
136	v41881699	5	Pipeline transportation [486] (dollars - millions)	1981-01-01 to 2008-04-01
137	v41881724	5	Finance, insurance, realestate, rental and leasing and management of companies and enterprises [5A] (dollars - millions)	1981-01-01 to 2008-04-01
138	v41881756	5	Educational services [61] (dollars - millions)	1981-01-01 to 2008-04-01
139	v41881759	5	Health care and social assistance [62] (dollars - millions)	1981-01-01 to 2008-04-01
140	v41881776	5	Federal government public administration [911] (dollars - millions)	1981-01-01 to 2008-04-01
141	v41881777	5	Defence services [9111] (dollars - millions)	1981-01-01 to 2008-04-01
142	v41881779	5	Provincial and territorial public administration [912] (dollars - millions)	1981-01-01 to 2008-04-01
143	v41881780	5	Local, municipal and regional public administration [913] (dollars - millions)	1981-01-01 to 2008-04-01
Tables 329-00(46,38,39) Industrial price indexes, 1997=100				
144	v1575728	5	Transformer equipment (index, 1997=100) [P5648]	1969-01-01 to 2008-05-01
145	v1575754	5	Electric motors and generators (index, 1997=100) [P5674]	1969-01-01 to 2008-05-01
146	v1575886	5	Diesel fuel (index, 1997=100) [P5806]	1969-01-01 to 2008-04-01
147	v1575925	5	Light fuel oil (index, 1997=100) [P5845]	1969-01-01 to 2008-04-01
148	v1575903	5	Heavy fuel oil (index, 1997=100) [P5823]	1969-01-01 to 2008-04-01
149	v1575934	5	Lubricating oils and greases (index, 1997=100) [P5854]	1969-01-01 to 2008-04-01
150	v1575958	5	Asphalt mixtures and emulsions (index, 1997=100) [P5878]	1969-01-01 to 2008-04-01
151	v1575457	5	Industrial trucks, tractors and parts (index, 1997=100) [P5329]	1971-01-01 to 2008-05-01
152	v1575493	5	Parts, air conditioning and refrigeration equipment (index, 1997=100) [P5365]	1969-01-01 to 2008-05-01
153	v1575511	5	Food products industrial machinery and equipment (index, 1997=100) [P5383]	1971-01-01 to 2008-05-01
154	v1575557	5	Trucks, chassis, tractors, commercial (index, 1997=100) [P5429]	1969-01-01 to 2008-05-01
155	v1575610	5	Motor vehicle engine parts (index, 1997=100) [P5482]	1969-01-01 to 2008-05-01
156	v3860051	5	Motor vehicle brakes (index, 1997=100) [P5512]	1969-01-01 to 2008-05-01
157	v3822562	5	All manufacturing (index, 1997=100) [P6253]	1969-01-01 to 2008-05-01
158	v3825177	5	Total excluding food and beverage manufacturing (index, 1997=100) [P6491]	1969-01-01 to 2008-05-01
159	v3825178	5	Food and beverage manufacturing [311, 3121] (index, 1997=100) [P6492]	1969-01-01 to 2008-05-01
160	v3825179	5	Food and beverage manufacturing excluding alcoholic beverages (index, 1997=100) [P6493]	1969-01-01 to 2008-05-01
161	v3825180	5	Non-food (including alcoholic beverages) manufacturing (index, 1997=100) [P6494]	1969-01-01 to 2008-05-01
162	v3825181	5	Basic manufacturing industries [321, 322, 327, 331] (index, 1997=100) [P6495]	1978-07-01 to 2008-05-01
163	v3825183	5	Primary metal manufacturing excluding precious metals (index, 1997=100) [P6497]	1971-01-01 to 2008-05-01
164	v1574377	5	Total, all commodities (index, 1997=100) [P4000]	1969-01-01 to 2008-05-01
Table 176-0001 Commodity price index, US\$ (index, 82-90=100)				
165	v36382	1	Total, all commodities (index, 82-90=100) [B3300]	1972-01-01 to 2008-06-01
166	v36383	1	Total excluding energy (index, 82-90=100) [B3301]	1972-01-01 to 2008-06-01
167	v36384	1	Energy (index, 82-90=100) [B3302]	1972-01-01 to 2008-06-01
168	v36385	1	Food (index, 82-90=100) [B3303]	1972-01-01 to 2008-06-01
169	v36386	1	Industrial materials (index, 82-90=100) [B3304]	1972-01-01 to 2008-06-01
Tables 176-00(46,47), 184-0002 Stock market statistics				
170	v37412	5	Toronto Stock Exchange, value of shares traded (dollars - millions) [B4213]	1969-01-01 to 2008-03-01
171	v37413	5	Toronto Stock Exchange, volume of shares traded (shares - millions) [B4214]	1969-01-01 to 2008-03-01
172	v37414	5	United States common stocks, Dow-Jones industrials, high (index) [B4218]	1969-01-01 to 2008-05-01
173	v37415	5	United States common stocks, Dow-Jones industrials, low (index) [B4219]	1969-01-01 to 2008-05-01
174	v37416	5	United States common stocks, Dow-Jones industrials, close (index) [B4220]	1969-01-01 to 2008-05-01
175	v37419	5	New York Stock Exchange, customers' debit balances (dollars - millions) [B4223]	1969-01-01 to 2008-01-01
176	v37420	5	New York Stock Exchange, customers' free credit balance (dollars - millions) [B4224]	1969-01-01 to 2008-01-01
177	v122620	5	Standard and Poor's/Toronto Stock Exchange Composite Index, close (index, 1975=1000) [B4237]	1969-01-01 to 2008-05-01
178	v122628	1	Toronto Stock Exchange, stock dividend yields (composite), closing quotations (percent) [B4245]	1969-01-01 to 2008-05-01
179	v122629	1	Toronto Stock Exchange, price earnings ratio, closing quotations (ratio) [B4246]	1969-01-01 to 2008-05-01
180	v6384	5	Total volume; Value of shares traded (dollars - millions) [D4560]	1969-01-01 to 2008-06-01
181	v6385	5	Industrials; Value of shares traded (dollars - millions) [D4558]	1969-01-01 to 2008-06-01
182	v6386	5	Mining and oils; Value of shares traded (dollars - millions) [D4559]	1969-01-01 to 2008-06-01
Table 176-0064 Foreign exchange rates				
183	v37426	4	United States dollar, noon spot rate, average (dollars) [B3400]	1969-01-01 to 2008-06-01
184	v37437	4	United States dollar, 90-day forward noon rate (dollars) [B3401]	1969-01-01 to 2008-06-01
185	v37452	4	Danish krone, noon spot rate, average (dollars) [B3403]	1969-01-01 to 2008-06-01
186	v37456	4	Japanese yen, noon spot rate, average (dollars) [B3407]	1969-01-01 to 2008-06-01
187	v37427	4	Norwegian krone, noon spot rate, average (dollars) [B3409]	1969-01-01 to 2008-06-01
188	v37428	4	Swedish krona, noon spot rate, average (dollars) [B3410]	1969-01-01 to 2008-06-01
189	v37429	4	Swiss franc, noon spot rate, average (dollars) [B3411]	1969-01-01 to 2008-06-01
190	v37430	4	United Kingdom pound sterling, noon spot rate, average (dollars) [B3412]	1969-01-01 to 2008-06-01
191	v37431	4	United Kingdom pound sterling, 90-day forward noon rate (dollars) [B3413]	1969-01-01 to 2008-06-01
192	v37432	4	United States dollar, closing spot rate (dollars) [B3414]	1969-01-01 to 2008-06-01

193	v37433	4	United States dollar, highest spot rate (dollars) [B3415]	1969-01-01 to 2008-06-01
194	v37434	4	United States dollar, lowest spot rate (dollars) [B3416]	1969-01-01 to 2008-06-01
195	v37435	4	United States dollar, 90-day forward closing rate (dollars) [B3417]	1969-01-01 to 2008-06-01
196	v41498903	4	Canadian dollar effective exchange rate index (CERI) (1992=100) (dollars)	1981-01-01 to 2008-06-01
Table 176-0043 Interest rates				
197	v122550	1	Bank rate, last Tuesday or last Thursday (percent) [B14079]	1969-01-01 to 2008-06-01
198	v122530	1	Bank rate (percent) [B14006]	1969-01-01 to 2008-06-01
199	v122495	1	Chartered bank administered interest rates - prime business (percent) [B14020]	1969-01-01 to 2008-06-01
200	v122505	1	Forward premium or discount (-), United States dollar in Canada: 3 month (percent) [B14034]	1969-01-01 to 2008-06-01
201	v122509	1	Prime corporate paper rate: 1 month (percent) [B14039]	1969-01-01 to 2008-06-01
202	v122556	1	Prime corporate paper rate: 2 month (percent) [B14084]	1969-01-01 to 2008-06-01
203	v122491	1	Prime corporate paper rate: 3 month (percent) [B14017]	1969-01-01 to 2008-06-01
204	v122504	1	Bankers' acceptances: 1 month (percent) [B14033]	1969-01-01 to 2008-06-01
205	v122558	1	Government of Canada marketable bonds, average yield: 1-3 year (percent) [B14009]	1969-01-01 to 2008-06-01
206	v122485	1	Government of Canada marketable bonds, average yield: 3-5 year (percent) [B14010]	1969-01-01 to 2008-06-01
207	v122486	1	Government of Canada marketable bonds, average yield: 5-10 year (percent) [B14011]	1969-01-01 to 2008-06-01
208	v122487	1	Government of Canada marketable bonds, average yield: over 10 years (percent) [B14013]	1969-01-01 to 2008-06-01
209	v122515	1	Chartered bank - 5 year personal fixed term (percent) [B14045]	1969-01-01 to 2008-06-01
210	v122493	1	Chartered bank - non-chequable savings deposits (percent) [B14019]	1969-01-01 to 2008-06-01
211	v122541	1	Treasury bill auction - average yields: 3 month (percent) [B14007]	1969-01-01 to 2008-06-01
212	v122484	1	Treasury bill auction - average yields: 3 month, average at values (percent) [B14001]	1969-01-01 to 2008-06-01
213	v122552	1	Treasury bill auction - average yields: 6 month (percent) [B14008]	1969-01-01 to 2008-06-01
214	v122554	1	Treasury bills: 2 month (percent) [B14082]	1969-01-01 to 2008-06-01
215	v122531	1	Treasury bills: 3 month (percent) [B14060]	1969-01-01 to 2008-06-01
216	v122499	1	Government of Canada marketable bonds, average yield, average of Wednesdays: 1-3 year (percent)	1969-01-01 to 2008-06-01
217	v122500	1	Government of Canada marketable bonds, average yield, average of Wednesdays: 3-5 year (percent)	1969-01-01 to 2008-06-01
218	v122502	1	Government of Canada marketable bonds, average yield, average of Wednesdays: 5-10 year (percent)	1969-01-01 to 2008-06-01
219	v122501	1	Government of Canada marketable bonds, average yield, average of Wednesdays: +10 years (percent)	1969-01-01 to 2008-06-01
220	v122497	1	Average residential mortgage lending rate: 5 year (percent) [B14024]	1969-01-01 to 2008-06-01
221	v122506	1	Chartered bank - chequable personal savings deposit rate (percent) [B14035]	1969-01-01 to 2008-06-01
222	v122507	1	Covered differential: Canada-United States 3 month Treasury bills (percent) [B14036]	1972-10-01 to 2008-06-01
223	v122508	1	Covered differential: Canada-United States 3 month short-term paper (percent) [B14038]	1971-04-01 to 2008-06-01
224	v122510	1	First coupon of Canada Savings Bonds (percent) [B14040]	1969-01-01 to 2008-06-01
Table 176-0051 Canada's official international reserves				
225	v122396	5	Total, Canada's official international reserves (dollars - millions) [B3800]	1969-01-01 to 2008-06-01
226	v122397	5	Convertible foreign currencies, United States dollars (dollars - millions) [B3801]	1969-01-01 to 2008-06-01
227	v122398	5	Convertible foreign currencies, other than United States (dollars - millions) [B3802]	1969-01-01 to 2008-06-01
228	v122399	5	Gold (dollars - millions) [B3803]	1969-01-01 to 2008-06-01
229	v122401	5	Reserve position in the International Monetary Fund (IMF) (dollars - millions) [B3805]	1969-01-01 to 2008-06-01
Table 176-0032 Credit measures				
230	v36414	5	Total business and household credit; Seasonally adjusted (dollars - millions) [B165]	1969-01-01 to 2008-04-01
231	v36415	5	Household credit; Seasonally adjusted (dollars - millions) [B166]	1969-01-01 to 2008-04-01
232	v36416	5	Residential mortgage credit; Seasonally adjusted (dollars - millions) [B167]	1969-01-01 to 2008-04-01
233	v36417	5	Consumer credit; Seasonally adjusted (dollars - millions) [B168]	1969-01-01 to 2008-04-01
234	v36418	5	Business credit; Seasonally adjusted (dollars - millions) [B169]	1969-01-01 to 2008-05-01
235	v36419	5	Other business credit; Seasonally adjusted (dollars - millions) [B170]	1969-01-01 to 2008-05-01
236	v36420	5	Short-term business credit; Seasonally adjusted (dollars - millions) [B171]	1969-01-01 to 2008-05-01
Table 176-0025 Monetary aggregates				
237	v37148	5	Currency outside banks (dollars - millions) [B1604]	1969-01-01 to 2008-05-01
238	v37153	5	Canadian dollar assets, total loans (dollars - millions) [B1605]	1969-01-01 to 2008-05-01
239	v37154	5	General loans (including grain dealers and installment finance companies) (dollars - millions)	1969-01-01 to 2008-05-01
240	v37107	5	Total, major assets (dollars - millions) [B1611]	1969-01-01 to 2008-05-01
241	v37111	5	Canadian dollar assets, liquid assets (dollars - millions) [B1615]	1969-01-01 to 2008-05-01
242	v37112	5	Canadian dollar assets, less liquid assets (dollars - millions) [B1616]	1969-01-01 to 2008-05-01
243	v37119	5	Total personal loans, average of Wednesdays (dollars - millions) [B1622]	1969-01-01 to 2008-05-01
244	v37120	5	Business loans, average of Wednesdays (dollars - millions) [B1623]	1969-01-01 to 2008-05-01
245	v41552793	5	Currency outside banks and chartered bank deposits, held by general public (including private sector float) (dollars - millions)	1969-01-01 to 2008-05-01
246	v41552795	5	M1B (gross) (currency outside banks, chartered bank chequable deposits, less inter-bank chequable deposits) (dollars - millions)	1969-01-01 to 2008-05-01
247	v41552796	5	M2 (gross) (currency outside banks, chartered bank demand and notice deposits, chartered bank personal term deposits, adjustments to M2 (gross) (continuity adjustments and inter-bank demand and notice deposits)) (dollars - millions)	1969-01-01 to 2008-05-01
248	v41552797	5	Currency outside banks and chartered bank deposits (including private sector float) (dollars - millions)	1969-01-01 to 2008-05-01
249	v37130	5	Residential mortgages (dollars - millions) [B1632]	1969-01-01 to 2008-05-01
250	v41552798	5	M2+ (gross) (dollars - millions)	1969-01-01 to 2008-04-01
251	v37135	5	Chartered bank deposits, personal, term (dollars - millions) [B1637]	1969-01-01 to 2008-05-01
252	v37138	5	Total, deposits at trust and mortgage loan companies (dollars - millions) [B1639]	1969-01-01 to 2008-04-01
253	v37139	5	Total, deposits at credit unions and caisses populaires (dollars - millions) [B1640]	1969-01-01 to 2008-05-01
254	v37140	5	Bankers' acceptances (dollars - millions) [B1641]	1969-01-01 to 2008-05-01
255	v37145	5	Monetary base (notes and coin in circulation, chartered bank and other Canadian Payments Association members' deposits with the Bank of Canada) (dollars - millions) [B1646]	1969-01-01 to 2008-05-01
256	v37146	5	Monetary base (notes and coin in circulation, chartered bank and other Canadian Payments Association members' deposits with the Bank of Canada) (excluding required reserves) (dollars - millions) [B1647]	1969-01-01 to 2008-05-01
257	v37147	5	Canada Savings Bonds and other retail instruments (dollars - millions) [B1648]	1969-01-01 to 2008-06-01
258	v41552801	5	M2++ (gross), Canada Savings Bonds, non-money market mutual funds) (dollars - millions)	1969-01-01 to 2008-04-01
259	v37152	5	M1++ (gross) (dollars - millions) [B1652]	1969-01-01 to 2008-05-01
Table 282-0087 LFS, SA, Canada and provinces				
260	v2062811	5	Canada; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
261	v2062815	1	Canada; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
262	v2063000	5	Newfoundland and Labrador; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
263	v2063004	1	Newfoundland and Labrador; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
264	v2063189	5	Prince Edward Island; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
265	v2063193	1	Prince Edward Island; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
266	v2063378	5	Nova Scotia; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
267	v2063382	1	Nova Scotia; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
268	v2063567	5	New Brunswick; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01

269	v2063571	1	New Brunswick; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
270	v2063756	5	Quebec; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
271	v2063760	1	Quebec; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
272	v2063945	5	Ontario; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
273	v2063949	1	Ontario; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
274	v2064134	5	Manitoba; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
275	v2064138	1	Manitoba; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
276	v2064323	5	Saskatchewan; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
277	v2064327	1	Saskatchewan; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
278	v2064512	5	Alberta; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
279	v2064516	1	Alberta; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
280	v2064701	5	British Columbia; Employment; Both sexes; 15 years and over; (persons - thousands)	1976-01-01 to 2008-05-01
281	v2064705	1	British Columbia; Unemployment rate; Both sexes; 15 years and over; (rate)	1976-01-01 to 2008-05-01
Table 282-0088 Employment by industry, SA				
282	v2057603	5	Total employed, all industries; (persons - thousands)	1976-01-01 to 2008-05-01
283	v2057604	5	Goods-producing sector; (persons - thousands)	1976-01-01 to 2008-05-01
284	v2057605	5	Agriculture [1100-1129, 1151-1152]; (persons - thousands)	1976-01-01 to 2008-05-01
285	v2057606	5	Forestry, fishing, mining, oil and gas [1131-1133, 1141-1142, 1153]; (persons - thousands)	1976-01-01 to 2008-05-01
286	v2057607	5	Utilities [2211-2213]; (persons - thousands)	1976-01-01 to 2008-05-01
287	v2057608	5	Construction [2361-2389]; (persons - thousands)	1976-01-01 to 2008-05-01
288	v2057609	5	Manufacturing [3211-3219, 3271-3279, 3311-3399, 3111-3169, 3221-3262]; (persons - thousands)	1976-01-01 to 2008-05-01
289	v2057610	5	Services-producing sector; Seasonally adjusted (persons - thousands)	1976-01-01 to 2008-05-01
290	v2057611	5	Trade [4111-4191, 4411-4543]; Seasonally adjusted (persons - thousands)	1976-01-01 to 2008-05-01
291	v2057612	5	Transportation and warehousing [4811-4931]; Seasonally adjusted (persons - thousands)	1976-01-01 to 2008-05-01
292	v2057613	5	Finance, insurance, real estate and leasing [5211-5269, 5311-5331]; (persons - thousands)	1976-01-01 to 2008-05-01
293	v2057614	5	Professional, scientific and technical services [5411-5419]; (persons - thousands)	1976-01-01 to 2008-05-01
294	v2057615	5	Business, building and other support services [5511-5629]; (persons - thousands)	1976-01-01 to 2008-05-01
295	v2057616	5	Educational services [6111-6117]; (persons - thousands)	1976-01-01 to 2008-05-01
296	v2057617	5	Health care and social assistance [6211-6244]; (persons - thousands)	1976-01-01 to 2008-05-01
297	v2057618	5	Information, culture and recreation [5111-5191, 7111-7139]; (persons - thousands)	1976-01-01 to 2008-05-01
298	v2057619	5	Accommodation and food services [7211-7224]; (persons - thousands)	1976-01-01 to 2008-05-01
299	v2057620	5	Other services [8111-8141]; (persons - thousands)	1976-01-01 to 2008-05-01
300	v2057621	5	Public administration [9110-9191]; (persons - thousands)	1976-01-01 to 2008-05-01
Tables 228-00(01,41) Merchandise imports and exports Canada, SA				
301	v183474	5	Imports, United States, including Puerto Rico and Virgin Islands (dollars - millions)	1971-01-01 to 2008-04-01
302	v183475	5	Imports, United Kingdom (dollars - millions) [D398059]	1971-01-01 to 2008-04-01
303	v183476	5	Imports, Other European Economic Community (dollars - millions) [D398060]	1971-01-01 to 2008-04-01
304	v183477	5	Imports, Japan (dollars - millions) [D398061]	1971-01-01 to 2008-04-01
305	v191559	5	Exports, United States, including Puerto Rico and Virgin Islands (dollars - millions)	1971-01-01 to 2008-04-01
306	v191560	5	Exports, United Kingdom (dollars - millions) [D399519]	1971-01-01 to 2008-04-01
307	v191561	5	Exports, Other European Economic Community (dollars - millions) [D399520]	1971-01-01 to 2008-04-01
308	v191562	5	Exports, Japan (dollars - millions) [D399521]	1971-01-01 to 2008-04-01
309	v21386488	5	Imports, total of all merchandise (dollars - millions)	1971-01-01 to 2008-04-01
310	v21386489	5	Imports, Sector 1 Agricultural and fishing products (dollars - millions)	1971-01-01 to 2008-04-01
311	v21386492	5	Imports, Sector 2 Energy products (dollars - millions)	1971-01-01 to 2008-04-01
312	v21386495	5	Imports, Sector 3 Forestry products (dollars - millions)	1971-01-01 to 2008-04-01
313	v21386496	5	Imports, Sector 4 Industrial goods and materials (dollars - millions)	1971-01-01 to 2008-04-01
314	v21386500	5	Imports, Sector 5 Machinery and equipment (dollars - millions)	1971-01-01 to 2008-04-01
315	v21386505	5	Imports, Sector 6 Automotive products (dollars - millions)	1971-01-01 to 2008-04-01
316	v21386509	5	Imports, Sector 7 Other consumer goods (dollars - millions)	1971-01-01 to 2008-04-01
317	v21386512	5	Imports, Sector 8 Special transactions trade (dollars - millions)	1971-01-01 to 2008-04-01
318	v21386514	5	Exports, total of all merchandise (dollars - millions)	1971-01-01 to 2008-04-01
319	v21386515	5	Exports, Sector 1 Agricultural and fishing products (dollars - millions)	1971-01-01 to 2008-04-01
320	v21386518	5	Exports, Sector 2 Energy products (dollars - millions)	1971-01-01 to 2008-04-01
321	v21386522	5	Exports, Sector 3 Forestry products (dollars - millions)	1971-01-01 to 2008-04-01
322	v21386526	5	Exports, Sector 4 Industrial goods and materials (dollars - millions)	1971-01-01 to 2008-04-01
323	v21386531	5	Exports, Sector 5 Machinery and equipment (dollars - millions)	1971-01-01 to 2008-04-01
324	v21386535	5	Exports, Sector 6 Automotive products (dollars - millions)	1971-01-01 to 2008-04-01
325	v21386539	5	Exports, Sector 7 Other consumer goods (dollars - millions)	1971-01-01 to 2008-04-01
326	v21386540	5	Exports, Sector 8 Special transactions trade (dollars - millions)	1971-01-01 to 2008-04-01
Regional series				
327		5	CPI Atlantic	1978-09-01 to 2008-05-01
328		5	CPI Center	1978-09-01 to 2008-05-01
329		5	CPI Prairies	1978-09-01 to 2008-05-01
330		5	Employment Atlantic	1976-01-01 to 2008-05-01
331		5	Employment Center	1976-01-01 to 2008-05-01
332		5	Employment Prairies	1976-01-01 to 2008-05-01
333		1	Unemployment Atlantic	1976-01-01 to 2008-05-01
334		1	Unemployment Center	1976-01-01 to 2008-05-01
335		1	Unemployment Prairies	1976-01-01 to 2008-05-01
336		1	Building permits Atlantic	1969-01-01 to 2008-05-01
337		1	Building permits Center	1969-01-01 to 2008-05-01
338		1	Building permits Prairies	1969-01-01 to 2008-05-01
339	v729971	1	Housing starts Atlantic	1969-01-01 to 2008-05-01
340		1	Housing starts Center	1969-01-01 to 2008-05-01
341	v729986	1	Housing starts Prairies	1969-01-01 to 2008-05-01
Table 026-0008: Building permits, values by activity sector, SA; Canada;				
342	v4667	5	Total residential and non-residential (dollars - thousands) [D2677]	1969-01-01 to 2008-05-01
343	v4668	5	Residential (dollars - thousands) [D2681]	1969-01-01 to 2008-05-01
344	v4669	5	Non-residential (dollars - thousands) [D4898]	1969-01-01 to 2008-05-01
345	v4670	5	Industrial (dollars - thousands) [D2678]	1969-01-01 to 2008-05-01
346	v4671	5	Commercial (dollars - thousands) [D2679]	1969-01-01 to 2008-05-01
347	v4672	5	Institutional and governmental (dollars - thousands) [D2680]	1969-01-01 to 2008-05-01
348		5	Nominal Spot oil price: West Texas Intermediate	1969-01-01 to 2008-05-01
QUARTERLY VARIABLES				
Table 380-0001: Gross Domestic Product, income-based; Canada; SAAR;				
349	v498077	5 F	Corporation profits before taxes (dollars - millions) [D14806]	1969Q1 to 2008Q1
350	v498079	5 F	Interest and miscellaneous investment income (dollars - millions) [D14808]	1969Q1 to 2008Q1
351	v498081	5 F	Net income of non-farm unincorporated business, including rent (dollars - millions)	1969Q1 to 2008Q1

352	v498082	1 F	Inventory valuation adjustment (dollars - millions) [D14811]	1969Q1 to 2008Q1
353	v1992216	5 F	Taxes less subsidies, on factors of production (dollars - millions) [D100100]	1969Q1 to 2008Q1
354	v1997473	5 F	Taxes less subsidies, on products (dollars - millions) [D100102]	1969Q1 to 2008Q1
Table 380-0004: Sector accounts, persons and unincorporated businesses; Canada; SAAR;				
355	v498166	5 F	Wages, salaries and supplementary labour income (dollars - millions) [D14896]	1969Q1 to 2008Q1
356	v498170	5 F	Unincorporated business net income (dollars - millions) [D14897]	1969Q1 to 2008Q1
357	v498171	5 F	Interest, dividends and miscellaneous investment receipts (dollars - millions) [D14898]	1969Q1 to 2008Q1
358	v498172	5 F	Current transfers from government (dollars - millions) [D14899]	1969Q1 to 2008Q1
359	v498176	5 F	Current transfers from corporations (dollars - millions) [D14903]	1969Q1 to 2008Q1
360	v498179	5 F	Personal expenditure on goods and services (dollars - millions) [D14906]	1969Q1 to 2008Q1
361	v498180	5 F	Current transfers to government (dollars - millions) [D14907]	1969Q1 to 2008Q1
362	v498184	5 F	Current transfers to corporations (dollars - millions) [D14911]	1969Q1 to 2008Q1
363	v498185	5 F	Current transfers to non-residents (dollars - millions) [D14912]	1969Q1 to 2008Q1
364	v498164	5 F	Saving (dollars - millions) [D14913]	1969Q1 to 2008Q1
365	v498186	5 F	Disposable income (dollars - millions) [D14914]	1969Q1 to 2008Q1
366	v498187	1 F	Saving rate (percent) [D14915]	1969Q1 to 2008Q1
367	v498199	2 F	Net financial investment (dollars - millions) [D14939]	1969Q1 to 2008Q1
Table 380-0002: Gross Domestic Product, expenditure-based; Canada; Chained (2002) dollars; SAAR;				
368	v1992067	5 F	Gross Domestic Product (GDP) at market prices (dollars - millions) [D100126]	1969Q1 to 2008Q1
369	v1992044	5 F	Personal expenditure on consumer goods and services (dollars - millions) [D100103]	1969Q1 to 2008Q1
370	v1992045	5 F	Personal expenditure on durable goods (dollars - millions) [D100104]	1969Q1 to 2008Q1
371	v1992046	5 F	Personal expenditure on semi-durable goods (dollars - millions) [D100105]	1969Q1 to 2008Q1
372	v1992047	5 F	Personal expenditure on non-durable goods (dollars - millions) [D100106]	1969Q1 to 2008Q1
373	v1992048	5 F	Personal expenditure on services (dollars - millions) [D100107]	1969Q1 to 2008Q1
374	v1992049	5 F	Government current expenditure on goods and services (dollars - millions) [D100108]	1969Q1 to 2008Q1
375	v1992050	5 F	Government gross fixed capital formation (dollars - millions) [D100109]	1969Q1 to 2008Q1
376	v1992052	5 F	Business gross fixed capital formation (dollars - millions) [D100111]	1969Q1 to 2008Q1
377	v1992053	5 F	Residential structures (dollars - millions) [D100112]	1969Q1 to 2008Q1
378	v1992054	5 F	Non-residential structures and equipment (dollars - millions) [D100113]	1969Q1 to 2008Q1
379	v1992055	5 F	Non-residential structures (dollars - millions) [D100114]	1969Q1 to 2008Q1
380	v1992056	5 F	Machinery and equipment (dollars - millions) [D100115]	1969Q1 to 2008Q1
381	v1992057	5 F	Business investment in inventories (dollars - millions) [D100116]	1969Q1 to 2008Q1
382	v1992058	5 F	Business investment in non-farm inventories (dollars - millions) [D100117]	1969Q1 to 2008Q1
383	v1992059	5 F	Business investment in farm inventories (dollars - millions) [D100118]	1969Q1 to 2008Q1
384	v1992060	5 F	Exports of goods and services (dollars - millions) [D100119]	1969Q1 to 2008Q1
385	v1992061	5 F	Exports of goods (dollars - millions) [D100120]	1969Q1 to 2008Q1
386	v1992062	5 F	Exports of services (dollars - millions) [D100121]	1969Q1 to 2008Q1
387	v1992063	5 F	Deduct: imports of goods and services (dollars - millions) [D100122]	1969Q1 to 2008Q1
388	v1992064	5 F	Imports of goods (dollars - millions) [D100123]	1969Q1 to 2008Q1
389	v1992065	5 F	Imports of services (dollars - millions) [D100124]	1969Q1 to 2008Q1
390	v1992068	5 F	Final domestic demand (dollars - millions) [D100127]	1969Q1 to 2008Q1
Table 380-0003: Gross domestic Product indexes; Canada; Implicit price indexes 2002=100;				
391	v1997756	5 F	Gross Domestic Product (GDP) at market prices (2002=100) [D100465]	1969Q1 to 2008Q1
392	v1997738	5 F	Personal expenditure on consumer goods and services (2002=100) [D100447]	1969Q1 to 2008Q1
393	v1997739	5 F	Personal expenditure on durable goods (2002=100) [D100448]	1969Q1 to 2008Q1
394	v1997740	5 F	Personal expenditure on semi-durable goods (2002=100) [D100449]	1969Q1 to 2008Q1
395	v1997741	5 F	Personal expenditure on non-durable goods (2002=100) [D100450]	1969Q1 to 2008Q1
396	v1997742	5 F	Personal expenditure on services (2002=100) [D100451]	1969Q1 to 2008Q1
397	v1997743	5 F	Government current expenditure on goods and services (2002=100) [D100452]	1969Q1 to 2008Q1
398	v1997744	5 F	Government gross fixed capital formation (2002=100) [D100453]	1969Q1 to 2008Q1
399	v1997745	5 F	Business gross fixed capital formation (2002=100) [D100454]	1969Q1 to 2008Q1
400	v1997746	5 F	Residential structures (2002=100) [D100455]	1969Q1 to 2008Q1
401	v1997747	5 F	Non-residential structures and equipment (2002=100) [D100456]	1969Q1 to 2008Q1
402	v1997748	5 F	Non-residential structures (2002=100) [D100457]	1969Q1 to 2008Q1
403	v1997749	5 F	Machinery and equipment (2002=100) [D100458]	1969Q1 to 2008Q1
404	v1997750	5 F	Exports of goods and services (2002=100) [D100459]	1969Q1 to 2008Q1
405	v1997751	5 F	Exports of goods (2002=100) [D100460]	1969Q1 to 2008Q1
406	v1997752	5 F	Exports of services (2002=100) [D100461]	1969Q1 to 2008Q1
407	v1997753	5 F	Imports of goods and services (2002=100) [D100462]	1969Q1 to 2008Q1
408	v1997754	5 F	Imports of goods (2002=100) [D100463]	1969Q1 to 2008Q1
409	v1997755	5 F	Imports of services (2002=100) [D100464]	1969Q1 to 2008Q1
410	v1997757	5 F	Final domestic demand (2002=100) [D100466]	1969Q1 to 2008Q1
Table 380-0031: Saving, investment and net lending; Canada; SAAR;				
411	v498490	5 F	Persons and unincorporated businesses; Saving (dollars - millions) [D15234]	1969Q1 to 2008Q1
412	v498495	5 F	Persons and unincorporated businesses; Capital consumption allowances (dollars - millions)	1969Q1 to 2008Q1
413	v498499	2 F	Persons and unincorporated businesses; Net capital transfers (dollars - millions) [D15243]	1969Q1 to 2008Q1
414	v498504	5 F	Persons and unincorporated businesses; Investment in fixed capital and inventories (dollars - millions) [D15248]	1969Q1 to 2008Q1
415	v498508	5 F	Persons and unincorporated businesses; Acquisition of existing assets (dollars - millions)	1969Q1 to 2008Q1
416	v498512	2 F	Persons and unincorporated businesses; Net lending (dollars - millions) [D15256]	1969Q1 to 2008Q1
417	v498518	2 F	Persons and unincorporated businesses; Net financial investment (dollars - millions)	1969Q1 to 2008Q1
418	v498491	2 F	Corporations and government business enterprises; Saving (dollars - millions) [D15235]	1969Q1 to 2008Q1
419	v498496	5 F	Corporations and government business enterprises; Capital consumption allowances (dollars - millions) [D15240]	1969Q1 to 2008Q1
420	v498500	5 F	Corporations and government business enterprises; Net capital transfers (dollars - millions) [D15244]	1969Q1 to 2008Q1
421	v498505	5 F	Corporations and government business enterprises; Investment in fixed capital and inventories (dollars - millions) [D15249]	1969Q1 to 2008Q1
422	v498509	2 F	Corporations and government business enterprises; Acquisition of existing assets (dollars - millions) [D15253]	1969Q1 to 2008Q1
423	v498513	2 F	Corporations and government business enterprises; Net lending (dollars - millions) [D15257]	1969Q1 to 2008Q1
424	v498519	2 F	Corporations and government business enterprises; Net financial investment (dollars - millions) [D15263]	1969Q1 to 2008Q1
425	v498492	2 F	Government; Saving (dollars - millions) [D15236]	1969Q1 to 2008Q1
426	v498497	5 F	Government; Capital consumption allowances (dollars - millions) [D15241]	1969Q1 to 2008Q1
427	v498501	2 F	Government; Net capital transfers (dollars - millions) [D15245]	1969Q1 to 2008Q1
428	v498506	5 F	Government; Investment in fixed capital and inventories (dollars - millions) [D15250]	1969Q1 to 2008Q1
429	v498510	2 F	Government; Acquisition of existing assets (dollars - millions) [D15254]	1969Q1 to 2008Q1

430	v498514	2 F	Government; Net lending (dollars - millions) [D15258]	1969Q1 to 2008Q1
431	v498520	2 F	Government; Net financial investment (dollars - millions) [D15264]	1969Q1 to 2008Q1
432	v498493	2 F	Non-residents; Saving (dollars - millions) [D15237]	1969Q1 to 2008Q1
433	v498502	2 F	Non-residents; Net capital transfers (dollars - millions) [D15246]	1969Q1 to 2008Q1
434	v498515	2 F	Non-residents; Net lending (dollars - millions) [D15259]	1969Q1 to 2008Q1
435	v498521	2 F	Non-residents; Net financial investment (dollars - millions) [D15265]	1969Q1 to 2008Q1