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Economic policy uncertainty in the US: Does it matter for Canada?

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Abstract

This paper uses an indicator of economic policy uncertainty recently developed by Baker et al. (2013) to understand the impact of US economic policy uncertainty on Canada's economic activities. To accomplish this I apply a structural vector autoregression model with US and Canadian macroeconomic aggregates, and use short-term restrictions to identify the structural shocks. The analysis shows that a shock (an increase) to US economic policy uncertainty leads to a fall in Canadian output, price and Treasury bill rate. Moreover, the impact of US uncertainty shock on Canadian macroeconomic aggregates is larger than that of Canadian uncertainty shock.

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1. Introduction

Whether it is due to a government shutdown, the implementation of the Affordable Health Care Act, a new tax increase or the duration of the Fed's bailout mission, economic policy uncertainty (hereafter referred to as EPU) has reached a new high in recent years. This increase in policy uncertainty has reignited interest in the macroeconomic effects of uncertainty. Many economists argue that EPU is responsible for recession as it slows down recovery from a crisis by reducing rates of hiring, lending, and investing. Following a very influential paper by Bloom (2009), a series of papers investigates the impact of economic policy uncertainty on economic activities. One set of papers investigate the impact of economic policy uncertainty on "within-country" economic activities (see Alexopoulos and Cohen (2009), Baker et al. (2013), Caggiano et al. (2013), Leduc and Liu (2013), and Nodari (2013)). Another series of papers investigates the cross-border impacts of US and EU policy uncertainty (see Mumtaz and Theodoridis (2012), Colombo (2013), IMF (2013)). Taking a different approach, Klobner and Sekkel (2014) examines the correlations among policy uncertainties within a number of economies.

This paper falls within the second category, investigating the impact of US macroeconomic uncertainty on Canadian economic activities. Colombo (2013), using the uncertainty index developed by Baker et al. (2013), finds that US policy uncertainty shocks have a higher impact on Euro-area economic activities than Euro-area policy uncertainty itself. An IMF (2013) study shows that policy uncertainty shocks in the US and the Euro area affect growth in other regions of the world. The authors of the study find this by dividing the world into several regions and conducting their analyses region by region. Mumtaz and Theodoridis (2012) shows that, the volatility of the shocks to US real activities has an impact on economic activities of the UK. To the best of my knowledge, no study has yet examined the impact of US economic policy uncertainty on Canadian economic activities, particularly through the use of the uncertainty index recently developed by Baker et al. (2013). This is an interesting research issue because the US and Canada not only share an extensive border, but are also partners of a free-trade agreement. Moreover, the economies of the two countries are highly integrated (Bloom, 2013).

This paper is structured as follows: section 2 describes the VAR model and the data, section 3 presents the results of the study and discussions, section 4 presents the results of the robustness tests, and section 5 consists of the researcher's conclusions.

2. Econometric specification and data

To determine the impact of US EPU shocks on the Canadian economic aggregates I develop the following two-country Structural Vector Autoregression model

$$B(L)y_t = \varepsilon_t \tag{1}$$

where B(L) is a matrix polynomial in the lag operator L, y_t is the (n x 1) data vector, and ε_t is the (n x 1) vector of structural shocks. The variance-covariance matrix of ε_t is Φ where Φ is a diagonal matrix, meaning that structural shocks are uncorrelated.

Following Kim and Roubini(2000), let B_0 be the contemporaneous coefficient matrix in B(L), and $B^0(L)$ be the coefficient matrix in B(L) without contemporaneous coefficients. This means that

$$B(L) = B_0 + B^0(L) \quad (2)$$

Now, using (2) and (1), we get

$$y_t = -B_0^{-1} B^0(L)y_t + B_0^{-1} \varepsilon_t$$
$$\text{or} \quad y_t = C(L)y_t + \mu_t \quad (3)$$

where $C(L) = -B_0^{-1} B^0(L)$, and $\varepsilon_t = B_0 \mu_t$..
Equation (3) is the corresponding reduced-form VAR, and μ_t is the (n x 1) vector of reduced form disturbances. If we let the variance-covariance matrix of μ_t be Σ, it can be shown that

$$\Sigma = B_0^{-1} \Phi B_0^{-1'} \quad (4)$$

Consistent estimates of B_0 and Φ can be obtained through the estimates of Σ. The right-hand side of equation (4) has (n x (n+1)) free parameters to be estimated. Since Σ contains (n x (n+1)/2) parameters, we need at least (n x (n+1)/2) restrictions. By normalizing the n diagonal elements of B_0 to 1's, we need at least (n x (n-1)/2) additional restrictions on B_0 to achieve identification. The identification scheme followed here is a standard recursive structure (the Cholesky decomposition). Ordering is important in the Cholesky Decomposition. Following Favero and Giavazzi (2008) and Colombo (2013), the US block is ordered before the Canadian block, which implies that, no Canadian variables contemporaneously affect the US variables. The ordering of the variables is as follows: output^{US}, price^{US}, monetary policy rate^{US}, EPU^{US}, output^{CAN}, price^{CAN}, monetary policy rate^{CAN}, and EPU^{CAN}. Such short-term restrictions imply that while no other variables contemporaneously affect US output, US output contemporaneously affects the others. US price is contemporaneously affected by US output and contemporaneously affects others with the exception of US output, and so on.

I use industrial production and consumer price indices to indicate output and price. In order to account for monetary policy, the federal funds rate of the US and 3-month Treasury bill rates of Canada are considered. The EPU index consists of a combination of three observable measures. The first component quantifies newspaper coverage of policy-related economic uncertainty, the second component reflects the number and size of federal tax code provisions set to expire in future years, and the third component captures disagreement among economic forecasters within the Philadelphia Federal Reserve's Survey of Professional Forecasters. Currently, the Canadian EPU index is constructed based solely on the 'news' component. Therefore, for the sake of commonality, we use "news"-based uncertainty indices. The uncertainty indices are retrieved from http://www.policyuncertainty.com. The source of all the other data is the IFS (IMF). The data are monthly and range between 1985m1–2014m8. We also use a sub-sample, 1985m1-2008m8, to determine the robustness of the findings when the period of financial crisis is excluded from analysis. The beginning of the sample period is dictated by the availability of uncertainty data. Following Sims and Watson (1990), we use the variables in level. Before using in the VAR models all of the variables but interest rates are transformed into logarithmic form.

Based on various information criteria we choose a uniform lag length of six; however, we also utilize lag lengths of four and eight and find no major changes in the results.

3. Empirical Results

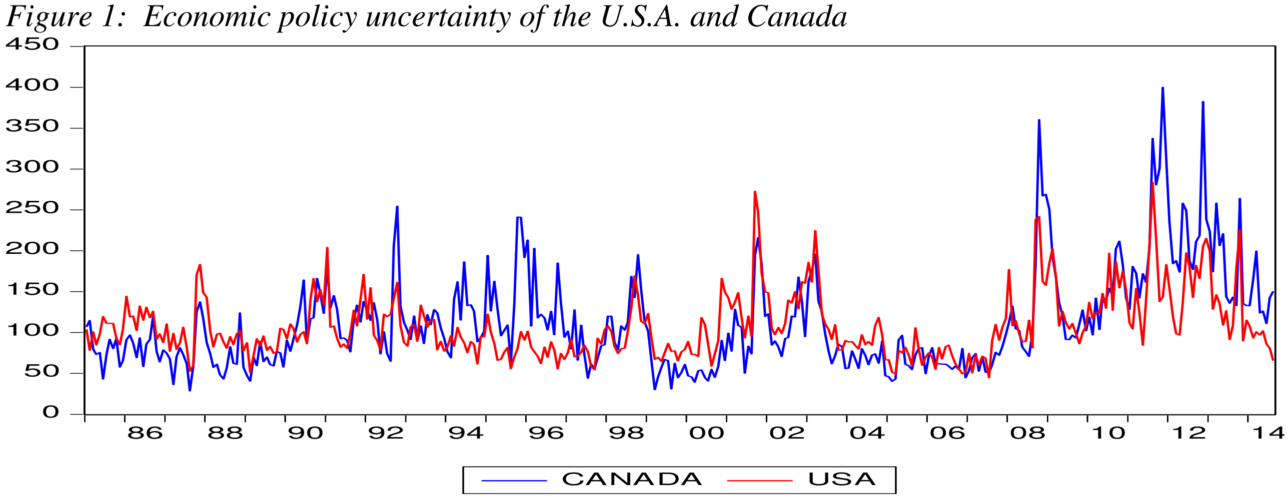
A good starting point in making an empirical analysis is to examine some summary statistics of and correlation between the economic policy uncertainty indices of the two countries. Table 1 presents the correlation between the two indices and other summary statistics for two periods: (i) 1985-2007 and (ii) 2008-2014. Mean policy uncertainty is higher for the US before the start of the financial crisis and for Canada after the crisis. Dispersion in the uncertainty index is higher for Canada in both periods. Correlation between uncertainty indices of the two economies is higher during the period of financial crisis.

Table 1: Descriptive statistics of and correlation between economic-policy-uncertainty indices of U.S.A. and Canada.

Sample: 1985-2007				
	Mean	Std. deviation	Range	Correlation
U.S.A.	99	33	181	0.53
Canada	94	41	225	
Sample:2008-2014				
U.S.A.	137	45	159	0.67
Canada	170	74	255	

Figure 1 plots the two uncertainty indices. The figure shows considerable co-movement between the two indices.

Figure 1: Economic policy uncertainty of the U.S.A. and Canada



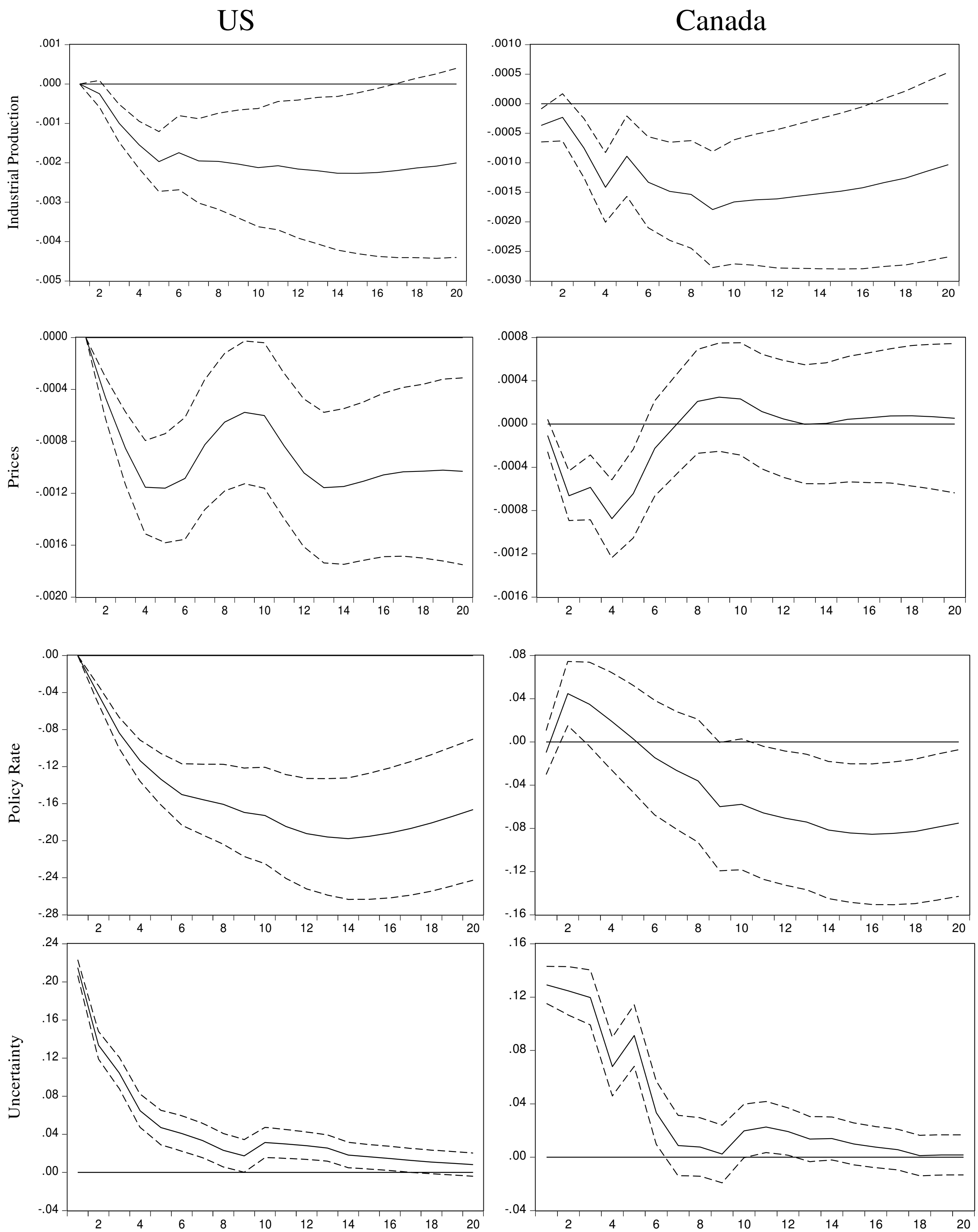
I estimate the VAR model with all the variables except interest rates in logarithmic form. Figure 2 shows the impulse responses of US and Canadian industrial production, price levels, monetary policy rates and EPU indices to a one-standard-deviation positive shock to the US EPU index. The upper and lower dashed lines plotted in each graph are one-standard-error bands. Due to a positive shock (an increase) to the US EPU index, US and Canadian industrial production fall, and reach their minimum at 0.25% and 0.20% below baseline respectively after 10 months. The response of US industrial production becomes statistically significant from the 2nd month while that of Canada becomes statistically significant after the 3rd month. Both responses remain significant for around 18 months. Due to the shock to the US EPU, price levels in both countries also fall, and reach their minimum at 0.10% below baseline after five months. While the response of the US price level remains significant even after 20 months, the response of the Canadian price level becomes statistically insignificant after 8 months. The monetary policy rates also respond to the US EPU shocks. Policy rates of both countries fall in response to a positive shock to US EPU. After twenty months, policy rates reach their minimum at 18 basis points below baseline in the US and 10 basis points below baseline in Canada. While the impulse responses of the US policy rate are significant from the 2nd month, those of Canada become significant after 8 months. In response to the US EPU shock, the Canadian EPU index jumps to 15% above baseline in a month. The effect dies out in 18 months and remains significant for first 12 months.

Table 2 reports the forecast error variance decomposition of Canadian output, price and policy rates due to the shock to both the US and the Canadian EPU indices. The table clearly shows that fluctuations in the Canadian variables are explained better by the US than the Canadian EPU shock. It can be seen that after 15 months 5.22% of the variation in Canadian output is due to US EPU shock, whereas only 0.15% of the variation is due to its own EPU shock. Likewise, after 15 months 1.76% of the variation in price is due to US EPU shock while 1.36% of the variation is due to its own EPU shock. The case is the same for monetary policy response. After 15 months, 2.65% of the variation in Canadian monetary policy is due to US EPU shock while 0.95% of the variation is due to its own EPU shock.

Table 2: Forecast Error Variance decomposition of Canadian economic aggregates

Horizon in month	Output		Price		Monetary Policy	
	$News^{US}$	$News^{CAN}$	$News^{US}$	$News^{CAN}$	$News^{US}$	$News^{CAN}$
5	2.48	0.25	3.69	0.89	0.50	1.18
10	4.86	0.17	2.56	0.95	1.10	1.12
15	5.22	0.15	1.76	1.36	2.65	0.95
20	4.68	0.17	1.62	1.54	4.06	0.82

Figure 2: Impulse responses of US and Canadian variables to a one-standard-deviation shock to US EPU. Sample 1985m01:2014m08. The dotted lines represent one-standard-error band.



4. Robustness Check

We use the sub-sample 1985m1-2008m8 to check the robustness of the findings. This sub-sample is chosen to determine whether the results are robust when data from the period of financial crisis are excluded. Figure 3 shows no substantial difference in the impulse response functions from figure 2. The forecast error variance decomposition in table 3 provides even stronger evidence in favor of our claim that fluctuations in Canadian aggregates are explained better by US EPU shocks than by Canadian EPU shocks. We also experiment with different lag lengths and a different ordering of the variables but find no significant differences in results. While the results are not reported here, they are available upon request.

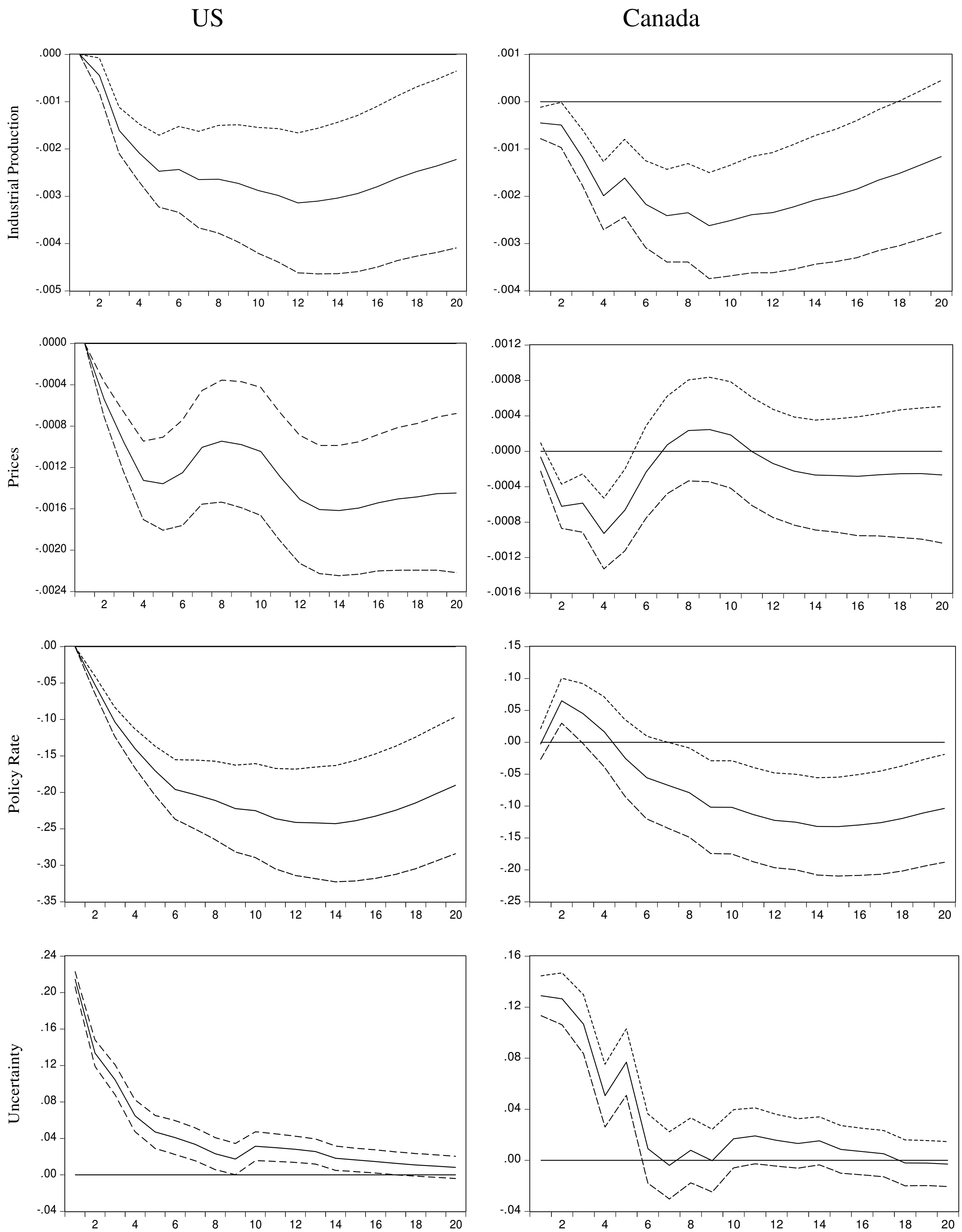
Table 3: Forecast Error Variance decomposition of Canadian economic aggregates (1985m1-2008m8)

Horizon in month	Output		Price		Monetary Policy	
	$News^{US}$	$News^{CAN}$	$News^{US}$	$News^{CAN}$	$News^{US}$	$News^{CAN}$
5	5.38	0.71	3.64	0.17	0.82	2.17
10	11.00	0.91	2.49	0.15	2.96	2.18
15	11.51	1.29	1.92	0.14	6.16	1.76
20	10.14	1.96	1.62	0.14	8.03	1.46

5. Conclusion

The increased policy uncertainty caused by the financial crisis has ignited interest in the role played by uncertainty in the business cycle. This paper investigates the effects of US economic policy uncertainty on Canadian economic activities. Analyses of impulse response functions show that Canadian economic aggregates such as production, price level and monetary policy rates respond to US economic policy uncertainty. Policy uncertainty in Canada also increases as a result of increased uncertainty in the US. Moreover, fluctuations in Canadian macroeconomic indicators are explained better by US than by Canadian uncertainty shocks.

Figure 3: Impulse response of US and Canadian variables to a one-standard-deviation shock to US EPU. Sample 1985m1:2008m8. The Dotted lines represent one-standard-error band.



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