Using Exogenous Changes in Government Spending to estimate Fiscal Multiplier for Canada: Do we get more than we bargain for? *

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Abstract

In this paper, we estimate the size of government spending multiplier in Canada by constructing a new variable about news of exogenous government spending changes. We define exogenous changes in government spending as the ones not motivated by contemporaneous movements in the economy. We use the budget speeches and other government documents of Canada to record different government spending changes, their sizes, and the motivations behind them from 1975:1 - 2012:2. We then classify these changes along the lines of Cloyne (2013) into exogenous and endogenous changes and use their present discounted values as news about future changes in government spending. The estimates for government spending multipliers from a VAR with shock to our newly constructed news variable are considerably bigger than the estimates found in the literature. Our estimates lie in the rage of 4-6. We argue that the *news* variable affects output through channels other than increase in government expenditure. In particular, we suggest that changes in consumer sentiments caused by announcement about future increases in government expenditure can affect output before government spending affects output. Further results show that consumption, investment, hours, and wages all rise following a shock to the news variable

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1 Introduction

The effects of changes in government spending on macroeconomic activity has drawn considerable attention from economists. This strand of literature has mainly used two methodologies to estimate size of government spending multipliers. The first methodology - the Vector Autoregression (VAR) technique - finds generally expansionary effects of increases in government expenditure. The second methodology - the narrative approach - finds overall expansionary effects of increases in government expenditure but finds that some key variables - consumption and wages - decrease after an increase in government expenditure.

Our paper contributes to this literature by estimating the government spending multiplier for Canada for the period 1975-2012. To achieve identification, we consider all changes in government spending that are unrelated to the contemporaneous movements in the economy. To do this, we study the budget speeches to identify each government spending change. We then classify each government spending change according to the motivation behind the change. Changes in government spending that are in response to contemporaneous movements in the economy are called endogenous changes. Other changes, that are not in response to current movements in the economy are called exogenous. This methodology is similar to the classification methodology used by Romer and Romer (2010) and Cloyne (2013) to identify exogenous tax changes. We then construct a *news* variable using the exogenous government spending changes along the lines of Ramey (2011).

The key difference between Ramey (2011) and Ramey and Zubairy (2015) and our work is that we use all exogenous changes in government spending whereas Ramey (2011) use narrative sources to identify changes in military spending to construct their measure of the news variable. The government spending multiplier is then estimated through a VAR using shocks to the news variable. Ramey and Zubairy (2015) do a similar exercise for Canada.[1] Our paper, on the other hand, uses all exogenous changes in government expenditure to construct the variable about news about future changes in government spending.

We believe that our measure of news about future changes in government spending has certain advantages over the measure used by Ramey (2011). First, our measure includes all types of government spending changes and hence is a richer blend of different changes rather than consisting of just one type of spending change. Second, our methodology separates between temporary and permanent spending changes where military spending changes in Ramey (2011) only consist of temporary changes. Finally, our measure is independent of any subjective decision making when it comes to assigning the present discounted values of

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[1]Ramey and Zubairy (2015)'s main research question is to study regime dependent effects of changes in government spending.

exogenous changes in government spending. Ramey (2011) relies on news sources to identify the size and timing of changes in military spending. The assignment of a change to a particular quarter is rather subjective due to the wide range of dates in which news about changes in military spending appears. Our methodology does not suffer from this problem because by definition, the date of announcement of changes in government spending is the date when the speech is made.

The multipliers that we estimate using our new measure of exogenous changes in government spending are larger than the multipliers estimated by Ramey and Zubairy (2015). Ramey and Zubairy (2015) report a multiplier of around 0.5 for Canada. Our multiplier estimates are substantially larger. Depending upon the specification and the type of government spending changes included, the estimates of government spending multipliers range from 4-6. These are bigger than most estimates found in the literature.

Further analysis of our measure of news about government spending show that both consumption and real wages increase following news about future increases in government spending. These results are in contrast to those found in various papers like Ramey (2011), Ramey and Shapiro (1998), Edelberg et al. (1999), and Eichenbaum and Fisher (2005). However, these results are consistent with those found in Blanchard and Perotti (2002), Fats and Mihov (2001), and Mountford and Uhlig (2009) among others.

The larger multipliers of our study are not necessarily in contradiction to earlier results. A closer inspection of the results that the predicted increase in output may be caused by factors other than increase in government expenditure. We believe that they way the *news* variable is constructed can cause it to affect output in different ways. In particular, it is possible that *news* about future increases in government expenditure leads to an increase in output through a change in expectations. Recent literature, in particular Barsky and Sims (2012), find that news about future productivity is important in affecting confidence of consumers which can then affect their consumption behavior. We believe that the bigger increase that we find using our measure is caused by the effect of the news about future increase in government expenditure on consumer confidence. Our view is supported by our results that show that the increase in output and consumption happens much earlier than the increase in government expenditure and personal disposable income.

Thus, our paper makes three important contributions. First and most importantly, it constructs a novel measure of exogenous government spending changes for Canada for the time period by drawing upon information contained in budget speeches. Second, it suggests that the government spending multipliers are larger than previously reported in the literature and connects with literature regarding effects of government spending changes on economy. Finally, it discusses how the *announcement* about future increases in government spending

may lead to changes in output not caused by actual changes in government spending.

The paper is organized as following: section 2 describes the data and our methodology of constructing the narrative of exogenous changes in government spending. Section 3 presents the basic results. Section 4 discusses these results and section 5 concludes.

2   Data

We begin by describing the standard data used in our paper. We use Statistics Canada as our main source for data. The variables that we abstract from Statistics Canada are output, consumption, investment, government spending, tax revenues, and personal disposable income. The source for labor market variables like labor compensation and total hours worked is the Canadian Socioeconomic database from Statistics Canada. Interest rates are extracted from the Bank of Canada sources.

Our main contribution in this paper is the construction of a new set of exogenous changes in government spending. To construct this series, we proceed as follows. We first reach each budget statement carefully and identify the government spending changes made in the budget. Some smaller government spending changes are often not mentioned in the budget speeches. Although we can get information regarding such changes from other sources, we choose not to do so because such small changes are unlikely to affect expectations.

We then study the motivation behind each tax change. We then use the classification methodology of Cloyne (2013) to classify each government spending change. An exogenous policy change is one that is uncorrelated with current or prospective economic conditions whereas an endogenous policy change is one that is in response to a contemporaneous change in the economy.

We then record the size of each change. Our primary sources for this task remain the budget speeches. When we were unable to find sizes of government spending changes in the budget speeches, we extracted this information from other sources like budget papers. Finally, we constructed the *news* variable by calculating the present discounted values of the changes that we recorded. We use the long-term interest rate to calculate the PDV. We differentiate between three types of changes in government spending: permanent changes, temporary changes, and changes in military spending. For government spending changes intended to be permanent, we use only two time periods to calculate the PDV since we assume that agents do not look beyond two years because of the frequent nature of government spending changes. The results do not change if we allow for a longer horizon. For the temporary and military spending changes, we use the actual number of years for which the

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change was announced. All military spending changes were also temporary.

Figure 1 shows our *news* variable. To put all changes on a consistent basis, we normalize every change by the nominal GDP of that quarter and report that in figure 1. The figure shows that expected changes in government spending were small the period 1975:1 - 1997:4 with the variable exceeding 1 percent of GDP only once during period. The post 1997 period, however, contains a large number of exogenous changes in government spending which are bigger in magnitude too. Figures 2 and 3 show the present discounted values of exogenous temporary changes in government spending and military spending respectively.

3 Results

To investigate the effects of a shock to news about government spending, we use a VAR model. In our basic model, we use log of real government spending, log of real GDP, log of real tax revenues, and our measure of news about government spending. We include 4 lags in the VAR.

The results from our basic VAR are given in figure 4. The figure shows that a shock to news leads to an increase in both government spending and output. However, the increase in output is much faster as compared to the increase in government spending. The peak response of output is around 0.6 percent which happens 7 quarters after the initial shock. The peak response of government spending is around 0.45 which happens 19 quarters after the initial shock. These elasticities together with the average ratio of output and government expenditure of 4 gives a multiplier of 5.3.

Figure 5 shows the effect of a shock to the news variable when only temporary changes (including military spending changes) are included. The figure shows that now output shows a smaller response and the implied multiplier is 4. Figure 6shows the response of consumption and investment to a shock to the news variable. The results show that the response of both consumption and investment is positive for most of the horizons.

Figure 7 shows the responses of total hours and hourly wage. The figure shows that the response of hours and wage is positive following a shock to the news variable at most horizons. It has to be noted that in most cases, the standard error bands are wide enough to include 0 at most horizons. We believe that the smaller sample size that we are working with is the reason for the imprecise results.

4   Discussion and Conclusion

A number of results presented in the previous section are different than those found in the literature. First, the multipliers estimated in this paper are bigger than most estimates found in the literature. Secondly, we find that wages and consumption increase in response to a shock to news about government spending which is different from what Ramey (2011) found.

We believe that our results indicate that the *news* about future changes in government spending changes can affect the economy by influencing expectations of economic agents. The results in the previous section showed that both consumption and output changed before government expenditure. This suggests that the change in expectations associated with the news about government spending changes affect the economy along the lines of Barsky and Sims (2012) who argue that news about future changes can affect consumer confidence and hence the economy. We also estimated our VAR by including personal disposable income and we found that consumption peaks at least 5 quarters before the peak of personal disposable income which supports our hypothesis.

This paper has several dimension along which to expand. First, the data set needs to be extended back to at least 1961 which is the first year for which quarterly output data for Canada is available. Secondly, the analysis needs to be extended by including monetary variables. It is also important to study the effects of changes in government spending over time.

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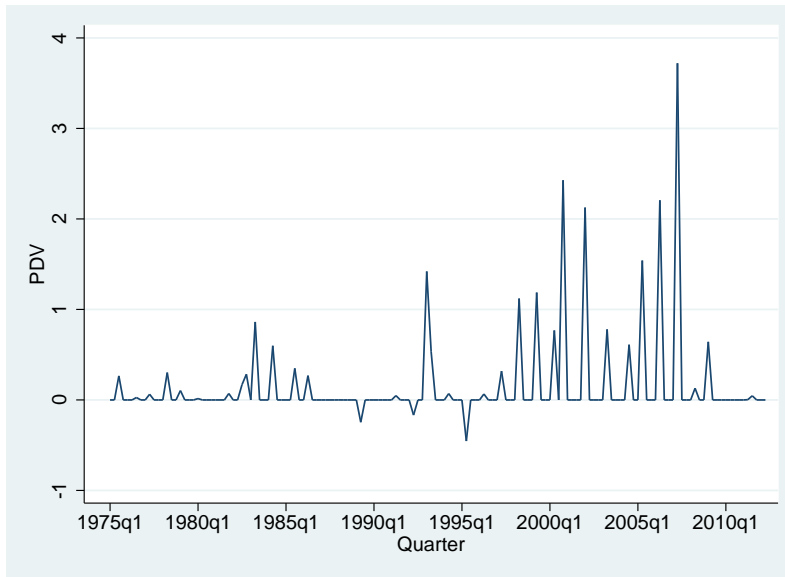
Figure 1: PDV of Exogenous Changes in Government Spending as a fraction of Nominal GDP
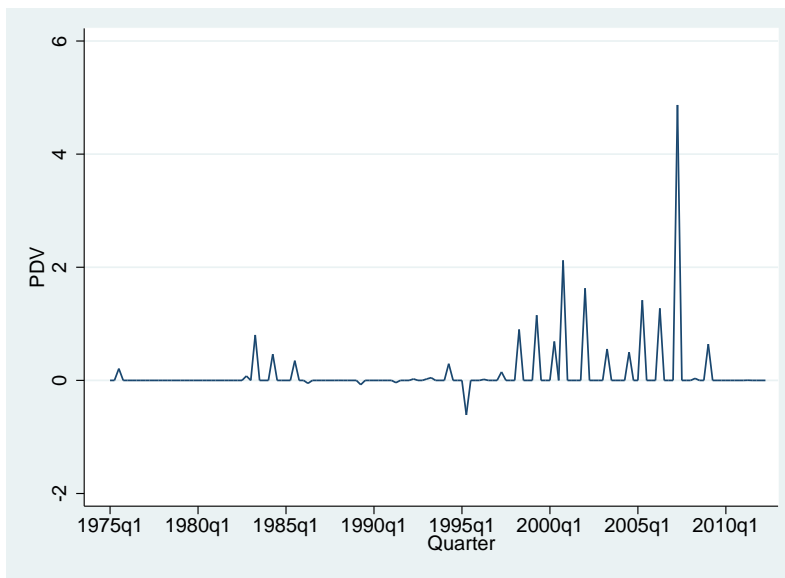

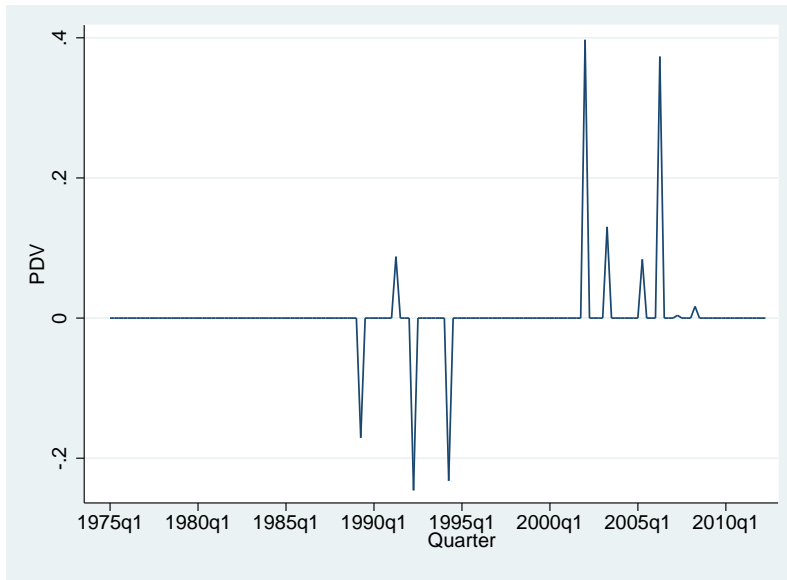Figure 2: PDV of Exogenous Temporary Changes in Government Spending as a fraction of Nominal GDP

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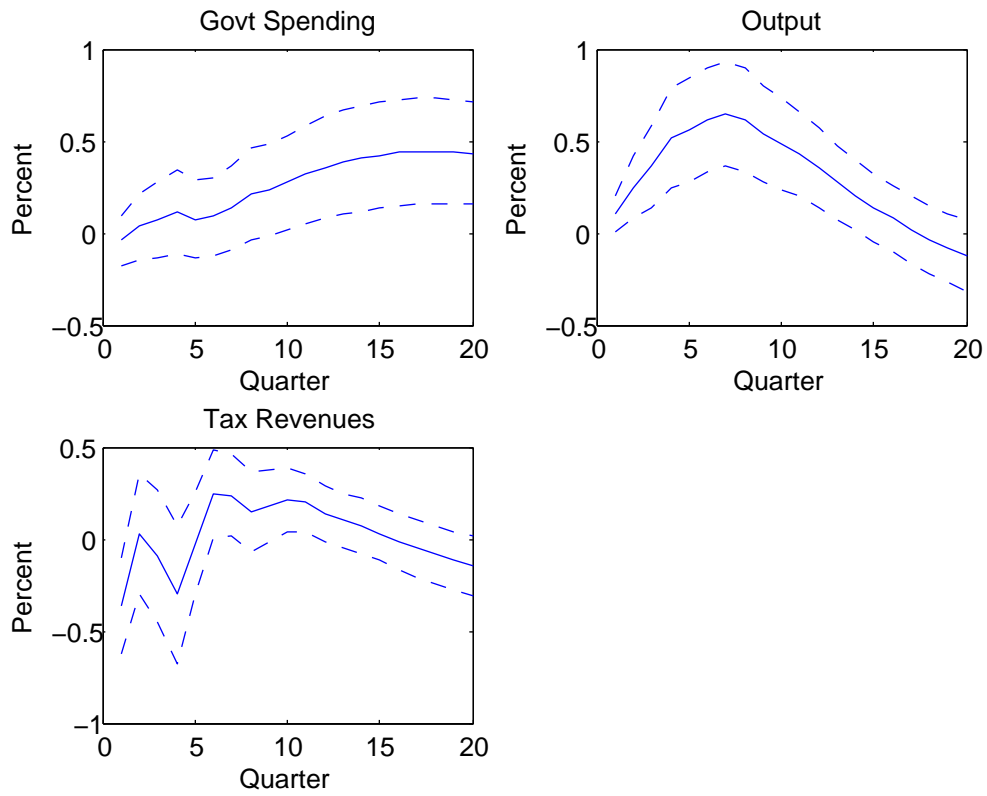Figure 3: PDV of Exogenous Changes in Military Spending as a fraction of Nominal GDP

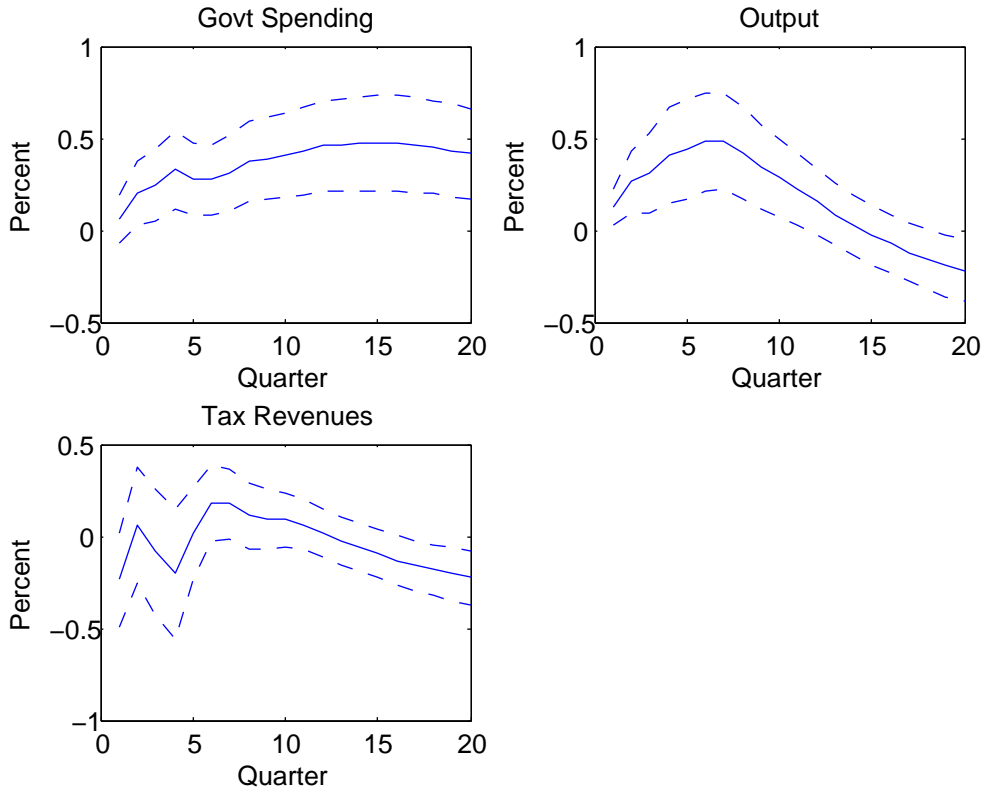Figure 4: Effects of a news shock equal to 1 percent of GDP

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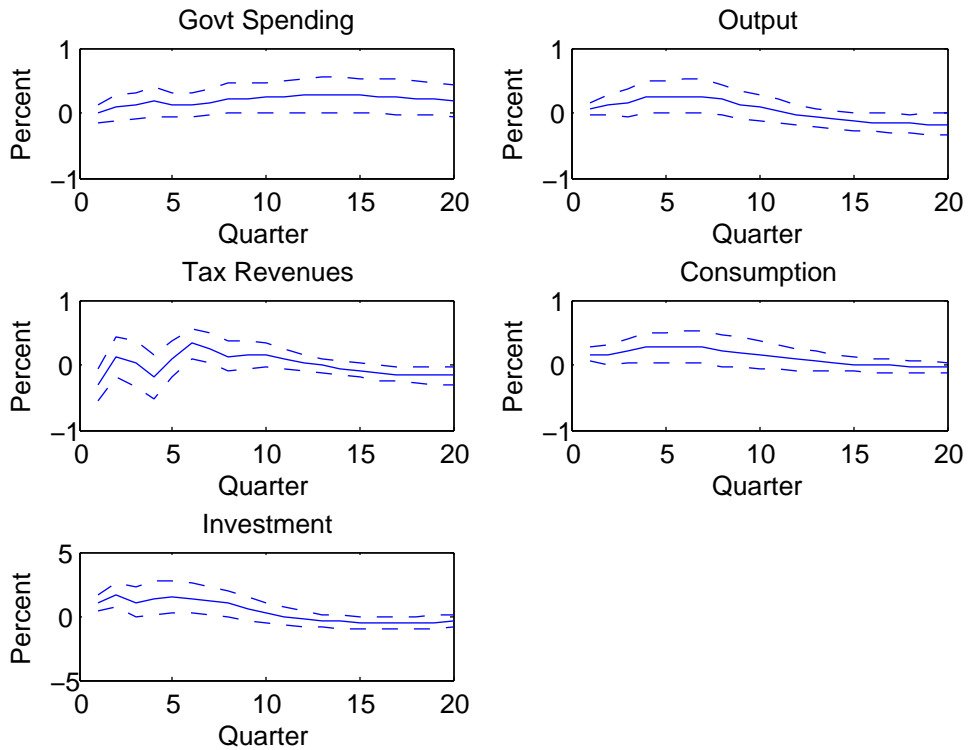Figure 5: Effects of a news shock equal to 1 percent of GDP
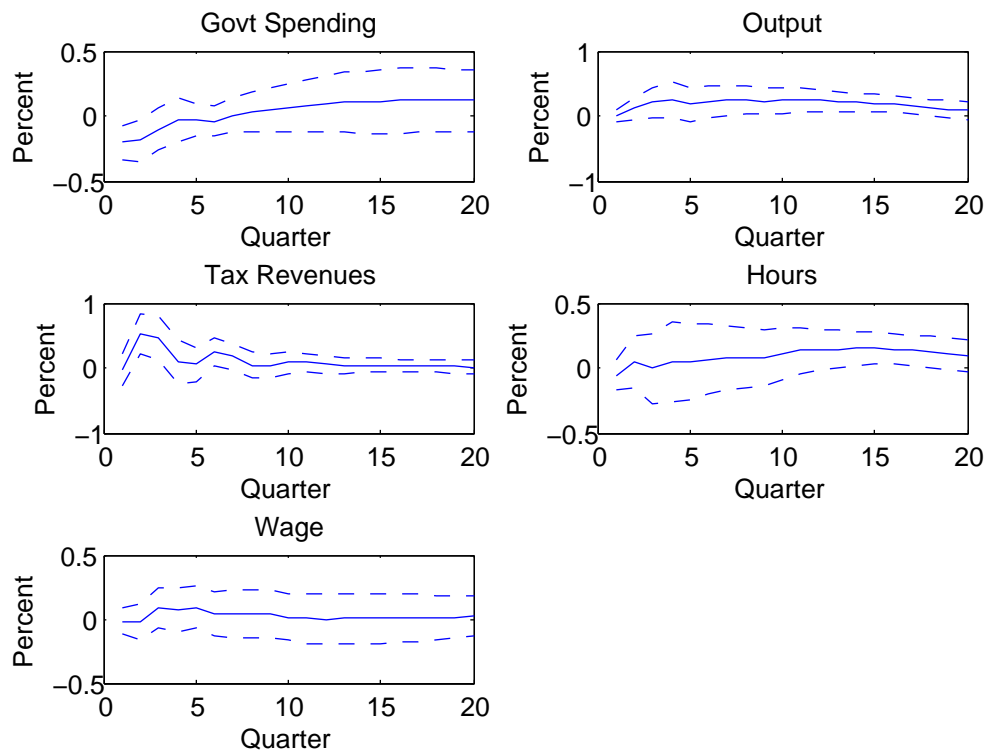

Figure 6: Effects of a news shock equal to 1 percent of GDP

Figure 7: Effects of a news shock equal to 1 percent of GDP