Does the Confidence Fairy of Fiscal Consolidations Exist? Evidence from a New Narrative Dataset on Announcements of Fiscal Austerity Measures[1]

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"*This was the month the confidence fairy died*." (Paul Krugman, the New York Times, 2012)

"*To choose austerity is to bet it all on the confidence fairy."* (Joseph E. Stiglitz, The Guardian, 2010)

Abstract

Using a newly constructed dataset of announcements of fiscal consolidations, we explore the role of the confidence channel in shaping the effect of those announcements on macroeconomic aggregates. Overall, consumer confidence falls and long interest rates rise upon the announcement of a fiscal consolidation. These effects are stronger for revenue-based announcements than for spending-based announcements. Counterfactual experiments show that the combined effect of the responses of consumer confidence and interest rates amplifies the negative effect on the real economy of announcements of revenue-based austerity measures.

Keywords: fiscal consolidation, fiscal austerity, revenues, spending , consumer confidence, long-term interest rates, fiscal multipliers,.

JEL classifications: E21, E62, H5.

1. Introduction

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What is the role of confidence in the transmission of fiscal austerity measures? Many commentators believe that the negative confidence effects of fiscal austerity have contributed to the prolonged sluggishness of the European economies in the aftermath of the Great Recession.

Recent research assigns an key role to news-driven changes in expectations as drivers of business cycle fluctuations. Nevertheless, the evidence of the role of sentiment in the transmission of fiscal shocks is mixed, especially in the context of austerity measures. In this paper we use a newly-constructed narrative dataset of fiscal consolidation announcements to test how announcements of fiscal consolidations affect consumer and financial market confidence, as well as to explore the role of the confidence channel in the transmission of the announcements to the real economy. [5] Using our narrative dataset based on official documents and newspaper articles, we can model the response of the economy to real-time information on consolidation news.

Information about fiscal measures usually becomes available before the measures are actually implemented. It is important to pinpoint the moment when the information becomes available, because once the private sector avails of the information it will adjust its behavior. Hence, the private sector may start to respond to fiscal measures before they actually materialize. We assign the shock to the quarter when the information becomes available. While highly valuable, existing datasets that narratively identify consolidation plans are constructed at annual frequency and fail to account for the combined effect of legislative and implementation fiscal policy lags, which can range from a couple of months to even two years. For example, the annual narrative dataset constructed by Devries *et al.* (2011) assigns consolidation measures to the year when they are actually implemented. However, not taking account of the aforementioned lags may lead to flawed inference about the macroeconomic effects of the measures.

Models in the Keynesian tradition predict that a cut in public spending or a tax hike have short-term contractionary effects, because of their negative impact on disposable income. Recognizing the importance of sentiment for the effects of fiscal policy, Akerlof and Shiller (2009) posit the existence of a "confidence multiplier" that can amplify the Keynesian effects of fiscal measures. Bachmann and Sims (2012) quantify the role of confidence for the transmission of government spending shocks in the United States and do indeed find evidence of a "confidence multiplier" of the Akerlof and Shiller (2009) type during recessions.

The Keynesian predictions stand in sharp contrast with those by the proponents of the "expansionary austerity" hypothesis, who posit that the positive confidence effects can mitigate the contractionary effects of fiscal consolidations (Blanchard, 1990). Motivated by the experiences of Ireland and Denmark in the 1980s (Giavazzi and Pagano, 1990), the hypothesis relies on the general public understanding the reasons for a fiscal adjustment. Economic agents understand that, if austerity measures are taken now, there is less need for more disruptive consolidation measures in the future. The awareness of this link stimulates the effects of consolidation on private demand and investment. Ardagna (2004) and Alesina and Ardagna (2010) present evidence in favor of this hypothesis, suggesting that through the expectations channel spending cuts may even have a positive effect on sentiment.

To the best of our knowledge, this is the first paper that based on narrative identification of fiscal austerity shocks (for thirteen EU countries over the period 1978-2013) singles out the effect of news-

[5] Although the terms "sentiment", "confidence" and "expectations" are not stricto sensu equivalent, in this paper we will use them interchangeably to refer to the perception of the economic outlook by private agents. Similarly, when referring to the consumer confidence index, we will also use the term of `consumer sentiment'.

driven changes in confidence on the real economy. The role of the confidence channel in the transmission of the consolidation shocks is assessed by running counterfactual experiments. We do not find any evidence of the existence of a "confidence fairy". Consumer confidence tends to fall following a consolidation announcement, while the long-term interest rate tends to rise. In fact, for the full sample of consolidation announcements we even find that muting the responses of consumer confidence and the long interest rate leads to an almost statistically significant dampening of the fall in GDP following the announcement.

A split into tax-based and spending-based announcements shows that the confidence effects of revenue-based consolidations tend to be larger than those of spending-based consolidations and, hence, the dampening effects on the GDP-fall associated with shutting off the confidence response are stronger for revenue-based consolidations. The paper also tries to shed light on the sources of the difference in economic performance under the two approaches to consolidation. In fact, our findings suggest that the difference in responses between revenues- and spending-based consolidation plans may well be explained by the fact that the follow up of revenues-based announcements is better in terms of improving the fiscal balance than the follow up on spending-based announcements. Loosely speaking, revenue-based plans have a more negative effect on the economy, because they are more likely to be carried out as announced.

The remainder of this paper is structured as follows. Section 2 provides a brief overview of the relevant literature. Section 3 describes our newly constructed dataset of announcements of fiscal consolidations. Section 4 presents the empirical model and discusses some issues regarding anticipation in fiscal vector auto regressions (VARs). Section 5 presents and discusses the results, and Section 6 shows the results of the counterfactual experiments. Finally, Section 7 concludes the paper.

2. Literature review

This paper is at the intersection of the literature using the "narrative" VAR approach to estimating fiscal multipliers and the literature on news-driven business cycles.

The Great Recession has motivated a large body of work estimating the sign and magnitude of fiscal multipliers. According to the Keynesian view on how an economy works, public revenue increases depress private consumption by reducing disposable income, thereby leading to contractions in output. Reductions public wage expenditures lower disposable income directly, while reductions in non-wage public spending on goods and services lower disposable income by depressing demand for private sector output and, hence, income generated in the private sector. Indeed, empirical evidence generally shows that positive shocks to revenues are contractionary (Blanchard and Perotti, 2002; Romer and Romer, 2010; Barro and Redlick, 2011; Favero and Giavazzi, 2012), with output multipliers between -0.5 and -5. Focusing on fiscal consolidation episodes in a panel of OECD countries, Guajardo et al. (2014) find that austerity measures, whether through revenue or expenditure measures, are associated with reductions in private consumption and GDP.

However, some empirical studies point to potential non-Keynesian effects of fiscal consolidations, attributing an important role to the expectations channel in shaping the response of the economy to policy impulses. For a sample of OECD countries Alesina and Ardagna (1998) and Alesina and Ardagna (2010) find that fiscal adjustments through public spending cuts can be expansionary. A common explanation for the expansionary austerity phenomenon is attributed to the expectations channel: if private agents realize that the fiscal consolidation prevents a future increase in taxation, the

adjustment spurs optimism about the future path of public expenditure and tax burdens. The positive revision of expectations results in a private expenditure increase, which can offset the negative effect of the adjustment on output. The experiences of Denmark and Ireland in the 1980s (Giavazzi and Pagano, 1990), the empirical work of Alesina and Ardagna (2010). Additionally, a fiscal consolidation might reduce the interest rate by lowering the risk premium (Ardagna, 2007; Perotti, 2013), thus further encouraging consumption. Bertola and Drazen (1993) and Sutherland (1996) provide theoretical underpinnings for the expansionary austerity hypothesis.

The importance of the "expectations channels" in shaping the dynamics of real variables has been confirmed by the recently developed news view of business cycles. The core element of this framework is the assumption that short-run output fluctuations can be driven by changes in the information set and expectations of agents. The revelation of information about future developments affects perceptions of individuals and firms, who act in anticipation of the future state of the economy (Beaudry and Portier, 2014). Our work is linked to a growing literature that explores the role of news for short-term economic dynamics by using explicitly identified shocks (see also Ramey, 2011; Mertens and Ravn, 2012; Brückner and Pappa, 2015). As in Ramey (2011), here "news" refers to information about fiscal policy changes. In our case "news" consists of the announcements of future fiscal austerity measures.

In this paper, we explore both the consequences of fiscal consolidation announcements for private sector confidence and the role that the confidence channel plays in the transmission of these announcements to the real economy. The remainder of our literature review is also demarcated along this line. That is, we will first discuss existing evidence on how news affects confidence. This is followed by the discussion of existing evidence on the role of confidence in the transmission to the dynamics of real economic variables.

Research indicates that news shocks affect perceptions about economic variables and measures of consumer sentiment. Using announcements of GNP growth, Mora and Schulstad (2007) find that current output growth is more accurately predicted by perceived than by realized GNP growth rate in the previous period. Oh and Waldman (1990) conclude that, even when false, predictions about future economic activity explain about a fifth of the realized movements in output. The empirical application in Beaudry and Portier (2014) illustrates that news shocks with a long-run impact on total factor productivity explain about 80% of the variance in the consumer sentiment index. Based on a New Keynesian model, Barsky and Sims (2011) estimate that the relationship between confidence and economic activity is governed by news related to future fundamentals, thus indicating that foreseen changes in economic conditions might generate important movements in confidence by altering consumer expectations about the future state of the economy. This hypothesis is explored in the context of fiscal policy: using quarterly data, Konstantinou and Tagkalakis (2011) find that expansionary fiscal policy can boost consumer and business confidence. Using monthly data, Beetsma et al. (2015) conclude that private sector confidence and long-term bond yields react to announcements of fiscal austerity.

In turn, consumer sentiment is an important predictor of household consumption growth (Caroll, 1994; Souleles, 2004; Ludvigson, 2004) and business cycles (Taylor and McNabb, 2007; Christiansen et al., 2014). Acemoglu and Scott (1994) empirically reject the rational expectations permanent income hypothesis due to the predictive content of consumer confidence for consumption and income growth, and Matsusaka and Sbordone (1995) find that changes in the index of consumer confidence that are not explained by fundamentals Granger-cause movements in output, explaining between 13-26% of its variance.

Regarding the transmission from sentiment to the dynamics of real variables, Akerlof and Shiller (2009) posit the existence of a "confidence multiplier" that may amplify the Keynesian effects of fiscal policy. This hypothesis is investigated in a recent study by Bachmann and Sims (2012), by testing the role of confidence for the transmission of government spending shocks in the United States. Using VAR models, the authors carry out a counterfactual experiment to quantify the importance of consumer confidence in shaping the magnitude of fiscal multipliers. In linear specifications there is little evidence that confidence plays an important role in the transmission of spending shocks to output. Nevertheless, during recessions the "confidence multiplier" is found to reinforce the Keynesian effects of increases in government spending.

The operation of the expectations channel is potentially different in the case of fiscal consolidation measures. The positive role of sentiment is a recurrent element in discussions about the effects of fiscal consolidations, but it is backed only by scant empirical evidence. Some studies that investigate the response of financial markets to fiscal adjustments conclude that bond yields may drop in response to credible cuts in public spending (Ardagna, 2007). Alesina et al. (2015) claim that fiscal consolidations done on the spending side of the budget may induce a positive response of business confidence and investment. However, there has been no comprehensive investigation of the role of expectations for the effects of austerity measures. Based on existing literature, the evidence appears to be mixed.

Our present work contributes to existing knowledge about the transmission of fiscal policy shocks, by explicitly accounting for the consumer confidence and financial market channels. Similar to Bachmann and Sims (2012), we quantify the "confidence channel" in the transmission of fiscal policy shocks. We expand their analysis in a number of directions. First, we consider both revenue adjustments and changes in government spending, using real-time information on fiscal shocks. Second, we use a panel of countries as opposed a setting of a single economy. By tailoring our analysis to a European context and focusing on austerity measures, we provide a test for the existence of the "confidence fairy" mentioned in recent policy discussions. Third, we broaden the concept of sentiment by considering the reaction of the long-term government bond yield alongside that of consumer confidence. Through a set of counterfactual simulations we consider the relative importance of these two channels in shaping the responses of real variables to fiscal austerity measures. Finally, we use a unique new dataset in which we narratively identify consolidation shocks.

3. Anticipation in fiscal VARs

Empirical identification of fiscal shocks generally encounters a number of complications. One concerns the legislative and implementation lags inherent in fiscal policy, the sum of which can range from a couple of months to over two years from the official announcement of a policy measure (Leeper *et al.*, 2013a). Another complication is that the media coverage of impending policy changes generally predates the official announcement of the policy change. By looking at military spending, Ramey (2011) finds that news reports about war dates Granger-cause increases in defense spending, thus providing evidence of the anticipation of government spending shocks. If anticipated changes in revenues and public spending prompt economic agents to respond before the fiscal measures are actually implemented, the innovations identified in a structural VAR do not correspond to the true timing of the shocks. Formally, the moving-average representation of the VAR system is not invertible (Leeper *et al*., 2013a), leading to imprecise inference. Moreover, according to Guajardo *et*

al. (2014), anticipation effects could be an important explanation for the generally different findings of narrative and structural VARs.

However, existing datasets based on narrative identification, such as Devries *et al*. (2011), tends to assign austerity measures to the years in which they are implemented. To address the possibility of fiscal foresight, we construct a dataset of austerity announcements pinpointed to the moment of the announcement. This way, we circumvent both legislative lags, i.e. the time between the moment a law is proposed and when it is passed into law, and implementation lags, the time between signing the relevant legislation and when the new legislation comes into force. In addition we will address the issue of official announcements being covered in the media beforehand.

4. The data

We use data from various sources. Novel is the dataset on announcements of fiscal austerity measures, which is an update of the dataset used in Beetsma *et al*. (2015), with the period since the start of the Great Recession.

4.1. Fiscal Austerity Announcements

Our empirical analysis uses a newly-constructed dataset that pinpoints the moment of announcements of fiscal austerity measures. We time each announcement to the month of the first official proposal of the measure by the government. It may be the case that a measure receives media attention before the first official announcement, for example, because information from discussions at the government level or in ministries is leaked to the press. Pinpointing the first moments of media attention to such measures is virtually undoable given the coverage of the data in terms of countries and sample period. Moreover, initial discussions in the media generally provide only little information about the size and the composition of the measures.

Our dataset of the moments of fiscal austerity announcements covers thirteen EU countries over the period 1978 – 2013. It extends the set of announcements used in Beetsma *et al*. (2015) with the additional years 2009 – 2013 and by assigning values for the sizes of the announced measures rather than merely a zero-one indicator of the occurrence of a consolidation announcement that in many cases in the Beetsma *et al*. (2015) dataset is the only available information. The countries in our sample are Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. The announcements for the subsample period 1978-2008 are based on the consolidation measures documented at the annual frequency in Devries *et al*. (2011). Using the same methodology, for a number of EU countries the Devries *et al*. (2011) dataset is extended by Alesina *et al*. (2015) at the annual frequency to the period 2009 – 2013.

In addition, Alesina *et al*. (2015) convert the consolidation measures into "fiscal plans". Total implementation in a given year is the sum of anticipated measures announced in previous years, but implemented in the current year, and unanticipated measures implemented in this year. A corresponding split is made for revenues and spending. If a measure is announced in the last quarter of the previous year, it is considered as unanticipated for the current calendar year. Measures approved earlier and that are supposed to have an effect on the current year are coded as anticipated. In addition, using their methodology we expand their data with Finland, the Netherlands and Sweden for the period 2009 – 2013. For the period 1978-2008 these countries are already present in the Devries *et al*. (2011) dataset.

The consolidation measures recorded in Devries *et al*. (2011), Alesina *et al*. (2015) and our expansion of the country sample of the latter for the period 2009-2013 are identified from official government documents. By carefully studying the motivation of each consolidation plan, one can single out the plans that were *not* carried out as a response to macroeconomic fluctuations. Hence, the identified plans are in principle exogenous to the business cycle.

The next step is to map the annual consolidation measures into moments and magnitudes of announcements. In some instances, Devries *et al*. (2011) already provide announcement moments, and in those cases we use what they report. For the other cases we work as follows. For each measure, using official documents, we identify the month when it is first officially mentioned or proposed by the government. Appendix A, taken from Beetsma *et al*. (2015) provides further details and contains some examples.

We also try to quantify the magnitude of the measure. We do this by extracting, cross-checking and combining information from a variety of official documents, such as the OECD Economic Surveys, the OECD Restoring Public Finances 2011 and 2012 Update Reports, national budgets, EU Stability and Convergence Plans, as well as from newspaper articles. The documents contain information on the projected effects of the various measures. By grouping the measures according to the date of their first official mention, we obtain an estimate of the importance of each announcement, which is the sum of the effects of the various individual measures announced on that date. Concretely, the magnitude of an announcement is the sum of the marginal impacts on the primary balance of the various new measures announced on that date between now and six years ahead.

To give an example. Suppose two new measures are announced in September of year t-1. Measure 1 concerns an increase in the value-added tax rate that is expected to have a positive marginal effect of 0.5% of GDP on the primary balance from year t+3 and on, while measure 2 lowers the value-added tax rate from year t+5 and on, and this reduction is expected to have a negative marginal effect on the primary balance of 0.2% of GDP from year t+5 and on.[6] Then, the value of the announcement that we record for September of year t-1 is 0.5 – 0.2 = 0.3% of GDP.

It needs mention that, owing to inaccuracies in the data sources, the actual value assigned to an announcement can be a mix of *ex-ante* forecasts and *ex-post* estimates of the impact of the measures on the primary balance.[7] Hence, the assigned is only anestimate of the pure shock value of the consolidation plan. Nevertheless, reporting a value has a substantial advantage over merely reporting a simple indicator for a fiscal announcement. Despite potential concerns about measurement errors, using values implies that less information is thrown away and takes care of the fact that larger consolidations are likely to elicit stronger private sector responses than smaller consolidations. Moreover, it helps in more accurately classifying plans into whether they are revenue- or expenditure-based, namely not on the basis of the narrative description, but based on the relative estimated impact of the revenue versus the expenditure measures.

[6] While most measures are permanent in nature, some are temporary. The temporariness of a measure is accounted for by defining a second measure that (partially) reverses the original measure.

[7] The Devries *et al*. (2011) dataset does not mention the moment when the impact of the consolidation was forecast. Most of the time, our sources (mainly the OECD Economic Surveys) provide an estimated impact of a plan at the moment of its announcement. However, there are instances when we do not have information about the estimated impact of a plan upon its announcement. In those cases, we used the impact as recorded by the EU's Stability and Convergence programmes or IMF or OECD documents, some of which may have been issued after the consolidation started, thereby potentially providing an *ex-post* assessment of the impact of a plan.

We convert the resulting set of announcements constructed at the monthly frequency to the quarterly frequency. The reason is that in this way we can be more accurate in terms of the period in which the information about the consolidation actually becomes available. The most straightforward approach in this transformation would be to assign the news shock to the quarter of the month when the announcement is made. However, extensive investigation in Beetsma *et al.* (2015) suggests that fiscal news recorded the way we do tends to be anticipated beforehand.[8] As mentioned above, the most plausible explanation concerns the media coverage foreshadowing an impending announcement by the government. To avoid this potential anticipation effect, if an official fiscal announcement is made in the first month of a quarter, we assign it to the preceding quarter.[9]

Turning to the descriptive statistics, our database contains a total of 211 fiscal announcements. For 181 of them we were also able to establish the magnitude of their impact on the primary balance. The cumulative impact of the measures on the primary balance ranges between 0% and 9.3% of GDP over a period of 6 years, with an average value of 1.36% of GDP in our country sample. [10]

Table 1: Summary statistics of fiscal announcement data

Country	Number of announcements	Average size - All measures	Average size – Spending measures	Average size – revenue measures
Austria	7	1.98	1.21	0.77
Belgium	18	1.14	0.68	0.46
Denmark	6	1.35	0.85	0.50
Finland	10	1.47	1.37	0.10
France	14	0.88	0.44	0.43
Germany	16	0.92	0.56	0.36
Ireland	15	2.05	1.10	0.95
Italy	25	1.31	0.74	0.57
Netherlands	23	1.12	0.96	0.16
Portugal	10	2.09	1.19	0.90
Spain	19	1.57	0.91	0.66
Sweden	5	2.38	1.57	0.80
UK	12	0.79	0.41	0.39
Total	181	1.36	0.85	0.51

Most consolidation plans combine measures on both the revenue and the expenditure side of the budget, which is why in Table 2 we classify announcements as predominantly revenue- or expenditure-based using a 50% threshold. That is, if more than 50% of the total budgetary impact comes from the expenditure side, the plan is classified as "spending based", while if more than 50% comes from the revenue side, it is classified as "revenue based". The two cases in which the division

[8] This is investigated by exploring the movements in consumer confidence around the official announcement dates. We observe that consumer confidence tends to move significantly already before the official announcement.

[9] Below, we find that our results are robust to assigning the announcement to the quarter in which it officially takes place. Incidentally, note that Ramey (2011) also carries out an adjustment in the quarterly timing of the weekly defense shock. If the news occurs in the final two weeks of a quarter, it is assigned to the following quarter based on the assumption that it occurs too late to have a material effect on macroeconomic aggregates in the quarter in which it originates.

[10] The largest consolidations were announced for Ireland 2010:Q4 (9.3% of GDP), Sweden 1994:Q3 (8.4% of GDP) and Portugal 2011:Q3 (6.1% of GDP). Excluding these three consolidations, the average announcement has a value of 1.25% of GDP. For the average announcement, the cumulative impact of the revenue measures is 0.5% of GDP and that of the expenditure measures is 0.85% of GDP.

between spending and revenue measures is equal will be dropped from the sample, whenever we study the two subsamples of spending and revenue based plans separately.

Table 2: Fiscal announcements according to their predominant instrument

Country	Spending based	Revenue based	Equal	Total
Austria	5	2	0	7
Belgium	9	8	1	18
Denmark	3	3	0	6
Finland	8	2	0	10
France	9	5	0	14
Germany	10	6	0	16
Ireland	9	6	0	15
Italy	15	9	1	25
Netherlands	20	3	0	23
Portugal	6	4	0	10
Spain	11	8	0	19
Sweden	5	0	0	5
UK	8	4	0	12

As Table 2 shows, the majority of the announcements in our sample are spending-based. In the group of expenditure-based announcements, the average announcement has a value of 1.42% of GDP, with an impact of 1.14% of GDP on the spending side and 0.28% on the revenue side. In the group of revenue-based announcements, the average announcement has a value of 1.26% of GDP, with an impact of 0.30% of GDP on the spending side and 0.96% of GDP on the revenue side. Given the reduced number of announcements per country once we split into spending and revenue-based plans, the panel dimension is particularly useful for uncovering the differences between the effects of spending and revenue-based measures.

4.2. The consumer confidence indicator

For consumer confidence we use the monthly data available from the OECD, which for the European Union countries is the "harmonized consumer confidence indicator" collected by the European Commission (2016). It is obtained from national-level consumer opinion surveys. These data are based on questionnaires sent out to a random sample of the population. Each questionnaire contains four questions that elicit expectations regarding the future economic situation of the household. In particular, individuals are asked about:

- The expected change in the *financial situation* of the household over the next 12 months;
- The expected change in the *general economic situation* over the next 12 months;
- The expected change in *unemployment* over the next 12 months;
- The expected change in the *savings of household* over the next 12 months.

There are five possible answers to each question: "a lot better", "a little better", "the same", "a little worse" and "a lot worse". We base our analysis on the original measure of consumer confidence, expressed as the raw balance of positive minus negative answers. The answers are weighed to create an index. The European Commission assigns a weight of one to the two extremes, "a lot better" and "a lot worse", a weight of one-half to "a little better" and "a little worse", and a weight of zero to "the

same". The European Commission uses the DAINTIES software to seasonally adjust the series. In the case of remaining seasonality, the OECD conducts a further adjustment using Demetra+ software.

In order to use the variable in logs, we transform the series by shifting its mean (adding 100 to all values). This allows us to interpret the impulse response of confidence as the percentage change in the transformed variable. Further details on the construction of the consumer confidence variable are found in the appendix of Beetsma *et al*. (2015).

4.3. Other macroeconomic Variables

Most of our quarterly macroeconomic variables are extracted from the Economic Outlook database from the OECD (2016). We retrieve the data (through Datastream) on private investment from the IMF International Financial Statistics database.[11] When the data is not seasonally adjusted at the source, we transform the series with the standard X-11 procedure. Where necessary, we perform a nonlinear (quadratic) interpolation of the annual data to quarterly frequency, ensuring that the annual value is equal to the sum of the resulting quarterly observations for the year.

5. The empirical specification

We estimate a quarterly panel vector auto regression (PVAR) model of the standard form:

$$Y_{i,t} = \sum_{l=1}^{L} A_l Y_{i,t-l} + U_{i,t},$$

where i indicates the country and t the period (expressed as year-quarter), $Y_{i,t}$ is a vector of endogenous variables, and $U_{i,t}$ is a vector of zero-mean, stationary reduced-form disturbances. L represents the number of lags included in the PVAR and A_l is the matrix of coefficients associated with the l^{th} lag. The baseline specification features the following vector of endogenous variables is:

$$Y_{i,t} = [F_{i,t}, GDP_{i,t}, C_{i,t}, I_{i,t}, CCONF_{i,t}, LTI_{i,t}]'.$$

Here, $F_{i,t}$ is the fiscal consolidation announcement, $GDP_{i,t}$ is GDP, $C_{i,t}$ is private consumption, $I_{i,t}$ is private investment, $CCONF_{i,t}$ is consumer confidence and $LTI_{i,t}$ is the long-term interest rate. All macroeconomic variables are expressed in real terms and deflated using the GDP deflator. With the exception of the long-term interest rate, all series are expressed in logarithms and multiplied by 100 to facilitate the interpretation of the coefficients as percentage changes. In the case of interest rates, coefficients represent changes in basis points. The deterministic components included in baseline are seasonal dummies, country fixed effects and country-specific linear trends. The Akaike, Schwarz and Hannan Quinn information criteria select lag lengths ranging between two and five. We opt for a baseline specification containing four lags of the endogenous variables, hence amounting a maximum lag length of one year. The main results of the paper are robust to different choices for the lag structure and other configurations of the deterministic components.

We estimate the model at the quarterly frequency on our sample of 13 European Union countries over the period 1978:Q1-2013:Q4. Over this full period structural VAR estimation including fiscal

[11] The precise series is "Gross fixed capital formation, corporations, households and non-profit institutions serving households (from gross domestic product by expenditure), nominal, current prices, not seasonally-adjusted". For non-Eurozone countries we multiply with the exchange rate against the euro or ecu (for the period preceding the Eurozone) obtained from the ECB (2016). Finally, we deflate all the series with the GDP deflator from the OECD (2016).

variables would not be appropriate, because in a structural VAR, fiscal policy shocks are recovered by imposing structural restrictions and only source data collected at quarterly frequency would enable correct identification (Ilzetzki *et al*., 2013). In our case, the shocks are obtained through narrative identification and, hence, the frequency of the data collection does not pose any complications in this regard. Even so, potential measurement error in fiscal variables could bias the coefficient estimates towards zero. Therefore, our baseline regression excludes fiscal variables other than our announcement series. Later, we will also present results including government spending and government revenues.

We estimate the VAR by means of ordinary least squares (OLS) with all variables in levels. Pedroni panel tests give mixed results about the presence of co-integration. The presence of co-integration is rejected when the equation includes an intercept and a deterministic trend, but not when we exclude the deterministic trend. In view of the potential for co-integration, we do not estimate the model in first differences. Our formulation of the VAR in levels does not pose a problem, first, because for consistent estimates a VAR does not require differencing (Sims, 1990) and, second, by virtue of the Engle-Granger representation theorem, as long as residuals are stationary a VAR in levels yields consistent estimates even if the variables are co-integrated.[12]

De Cos and Moral-Benito (2013) and Jordà and Taylor (2016) find that the narrative shocks of Devries *et al*. (2011) can be predicted using a range of economic variables. Although our series consist of announcements as opposed to implementations, it is conceivable that fiscal consolidation announcements represent responses to past economic and financial conditions.[13] As a result, we estimate a panel VAR model and identify it under a Cholesky decomposition with the fiscal consolidation announcements ordered first, which allows for our austerity news to be predicted by lags of the economic and financial variables contained in the VAR. In doing so, the VAR equation corresponding to the fiscal consolidation announcement could be interpreted as a "policy announcement reaction function", with its residuals representing the discretionary fiscal consolidation news.[14]

Our identification scheme thus assumes that consolidation announcements respond to the other variables in the VAR with at least a quarter lag. The ordering of the ensuing variables is irrelevant and for convenience we stick to the ordering in the vector, $Y_{i,t}$.[15] Using standard bootstrapping with 1000 replications we construct 90% confidence bands around the impulse responses. Finally, we normalize the consolidation announcements to have an impact of 1% of GDP on the primary balance. The impulse responses can be interpreted as percentage changes in the endogenous variables in response to a *consolidation* announcement of this size.

[12] Alternatively, we could estimate vector error correction (VEC) model. However, because any VEC has a representation as a VAR in levels and we lack a clear prior as regards to the existence and potential form of a long-run co-integrating relationship among our variables including confidence, we prefer to estimate the VAR in levels. We find that all specifications of the PVAR satisfy the VAR stability condition and generate I(0) residuals.

[13] In the spirit of De Cos and Moral-Benito (2013) and Jordà and Taylor (2016), we analyze the predictability of the consolidation announcements by means of logistic regressions and find that the announcement shocks are predicted by past debt dynamics and past values of long-term interest rates.

[14] We have also tried ordering the announcement variable last in the VAR. The impulse response are similar to those reported below for the ordering with the announcement variable ordered first, which is consistent with the fact that the correlation coefficients between the residual of the reduced-form equation for the announcement variable and the reduced-form residuals of the other variables in the VAR are very low.

[15] As demonstrated in Christiano *et al*. (1999), under the recursiveness assumption the impulse responses of the variables in the block following the announcement shock are invariant to the ordering of the variables within the block under the Cholesky ordering.

Our procedure relates to Ramey (2011) and Guajardo *et al*. (2014). While a standard VAR often uses a Cholesky decomposition to identify shocks to government spending, the Ramey–Shapiro method augments the system with a variable capturing the announcement of military action. This then serves as the shock to the system. Guajardo *et al*. (2014) estimate a VAR with the narratively identified series of fiscal shocks (ordered first), the change in the cyclically-adjusted primary balance over GDP and the changes in the logarithms of consumption and GDP.

6. Results

This section presents the results on the baseline specification and a number of robustness checks.

6.1. Baseline

Figure 2 shows the impulse responses for the baseline model. We observe a significantly negative response of output to fiscal consolidation announcements. The peak response is a fall of output by roughly 0.38 percent after ten quarters. The output response casts substantial doubt on the "expansionary austerity" hypothesis. Contributing to the fall in output are significant reductions by private consumption and private investment. Private consumption falls by a maximum of 0.52 percent of its baseline value, while private investment falls by a maximum of about 1.33 percent. In addition, we observe a highly significant drop in consumer confidence by a maximum of about 1.86 percent after 3 quarters and a significant increase in the long-term interest rate by a maximum of about 15 basis points after 3 quarters. Both the fall in consumer confidence and the rise in the long interest rate precede the peak reductions in GDP, private consumption and investment by 1.5 – 2 years, which leaves the possibility that the two variables are potential drivers of GDP and its components, rather than the other way.[16]

6.2. Robustness

To ensure that the baseline results are not driven by a specific individual country, our first robustness check drops one country at a time. Figure A.1 in the Appendix makes clear that there is no single country that drives the impulse responses. The only somewhat exception case concerns the response of the long-term interest rate when we drop Ireland. While the interest rate still rises, the peak in the increase is only about 8 basis points.

We use the long-term interest rate as a measure of confidence by the financial markets. However, a consolidation announcement may also affect the long-term interest rate through its effect on inflation expectations. A priori, we would not expect a consolidation announcement to raise the long-term interest rate because of its effect on expected inflation. Since the consolidation announcement is not expected to stimulate the economy, we do not expect it to raise inflation, although an exception is when a consolidation takes place largely through an increase in indirect taxes. To get a better handle on the issue, one would ideally purge the long-term interest rate of expected inflation (over the lifetime of the long-term debt). However, while we have survey measures on expected inflation, these measures only indicate whether private agents expect inflation to go up or down. Hence, we do not have a proper quantification of expected inflation. Therefore, our second robustness exercise follows an easier route by replacing in the baseline specification the long-term interest rate with the difference

[16] Obviously, the variables may also simply be forward-looking indicators and not have any role in the transmission of the fiscal announcement to the real economy.

between the long- and short-term interest rate, i.e. the long-short interest spread. We expect inflation expectations inherent in the two rates to be close to each other, so that the difference between the spread is presumably driven by factors more relevant for confidence that affect the long rate more than the short rate. Figure 2a shows the impulse responses. We observe that the results are unaffected. We also observe that the long-short spread increases after a consolidation shock. An alternative approach is to replace in the baseline the long-term interest rate by the difference of the long-term against Germany. However, this variable only controls for common movements in expected inflation caused by consolidation measures, and a priori we might expect the spill-overs from consolidation measures in other EU countries onto German inflation not to be too strong. Figure 2b shows the impulse responses. Not surprisingly, the results are not too different from the baseline results.

Next, we split the full sample into the period up to 1994 and the period as of 1995. Figures A.2a and A.2b in the Appendix show the responses. Obviously, owing to the smaller number of observations in each of the subsamples, the confidence bands have become wider. Nevertheless, for the period before 1994, shown in Figure A.2a, we still observe a significant fall in GDP of around 0.4 percent of GDP after around two years since the announcement. Both private consumption and private investment fall significantly and the size of the effects is of roughly the same magnitude as for the full sample. Consumer confidence again exhibits a statistically, but also economically, significant drop that reaches a peak of almost 3%. The main difference with the full sample results concerns the long-term interest rate, which does not exhibit any significant movement and, if anything, seems to fall rather than to rise following the shock. For period after 1994, shown in Figure A.2b, the peak fall in GDP is no longer significant, likely as a result of the smaller number of observations, although it is close to significance. The pattern is similar to that for the full sample, although the peak fall is about half of that for the full sample, namely around 0.2 percent. Private consumption and private investment fall significantly, though with peak magnitudes also smaller than for the full sample. The long-term interest rate peaks at about 20 basis points, while consumer confidence peaks with a fall of roughly 1.5%.

Further robustness investigation yields very similar results. In Figure A.3 in the Appendix, we replace the country-specific time trends with a common time trend. Replacing the individual trends with time fixed effects (Figure A.4) also has no effect on the results. The same holds for including eight instead of four lags in the VAR (Figure A.5) and including lagged debt in the vector of exogenous variables (following Favero and Giavazzi, 2012).

6.3. Counterfactuals

This subsection explores the role of private sector confidence in the transmission of fiscal austerity. Consumer confidence can be captured through the consumer confidence index and financial market confidence through the long-term interest rate. Less confidence in the latter case implies an increase in the risk-premium and thereby in the long-term interest rate. The role of the confidence channel can be assessed through a counterfactual experiment in which we shut off the responses of the consumer confidence index and the long-term interest rate to the announcements, hence force the responses of these variables to zero at any horizon. In this manner, we obtain “sentiment-free" responses of the variables of interest to fiscal announcement shocks. By restricting the impulse responses rather than the coefficients we remain within the same environment and do not compare an economy in which

confidence is a potential part of the transmission channel to one in which it is excluded from being part of the transmission channel.[17,18]

Figure 3a depicts the impulse responses for the case in which we shut off the response of the consumer confidence index. We observe that the drops in GDP, investment and consumption become substantially less pronounced, although their reactions remain statistically not different from the baseline responses. The response of the long-term interest rate is virtually identical to that under the baseline. Figure 3b shows the responses when the long interest rate channel is shut. The drops in GDP, investment and consumption become slightly smaller than those under the baseline, while the movement in the consumer confidence index is virtually the same as under the baseline. Finally, in Figure 3c, we show the responses when both the consumer confidence index and the long-term interest rate responses are forced to zero. The GDP response stays almost flat and drops significantly less than under the baseline at its peak. Investment and consumption also fall significantly less than under their baselines. Summarizing, our results suggest that the confidence channel plays a significant role in the transmission of consolidation shocks to the real economy.

7. Revenue versus spending-based consolidations

This sections explores whether, as suggested by some of the literature, responses of revenue-based consolidations differ from responses to spending-based consolidations. First, we present the responses for the baseline specification. Second, we report counterfactuals when we shut off the responses of consumer confidence and the long-term interest rate. Finally, we try to explore whether we can explain the different effects of the two types of consolidation.

7.1. Responses for the baseline model

There is some evidence in the literature (e.g., Guajardo *et al.*, 2014, and Alesina *et al.*, 2015) arguing that revenue-based consolidations are more effective and economically less harmful than spending-based consolidations. A potential argument is that spending-based consolidation is politically more costly and, hence, the decision to resort to spending-based consolidation provides a stronger signal of the government to the private sector that it intends to improve its financial situation (Ardagna, 2004).[19] However, Guajardo et al. (2014) suggests that the differences in impulse responses between revenue and spending-based consolidations can be explained by monetary policy being more accommodative in the case of spending-based consolidations. Over the largest part of the sample period the majority of the countries in our sample have either held a common currency or a stable exchange rate against the German mark. Hence, if we observe significant differences between the responses to revenue- and spending-based consolidations, it is doubtful that these can be explained by differences in monetary responses solely.

[17] Bachmann *et al*. (2012) conduct a counterfactual experiment involving the creation of hypothetical confidence shocks which fully offset the reaction of confidence to the structural spending shock at each horizon. They note that their approach produces similar results to the estimation of a restricted VAR where confidence would not react to the shocks and its autoregressive coefficients would be set to zero.

[18] We are aware that despite the usefulness of this counterfactual experiment, the approach is vulnerable to the "Lucas critique". Absent a structural model, the parameters of the baseline model are not necessarily policy-invariant, so conclusions drawn from econometric estimations should be interpreted with care.

[19] The argument is related to Cukierman and Tommasi (1988) who argue that political decisions that are at odds with the preferences of the natural constituency of a party are most credible.

This section explores if, for our set of narratively-identified consolidation announcements, the macroeconomic responses differ between revenue-based and spending-based consolidation announcements. There are different ways in which this question can be explored. Here, for the set of revenue-based announcements, and likewise the spending-based announcements, we report the responses to the full announcements, i.e. the sum of the impacts of the revenue and spending-based measures of each plan. While the responses to the spending-based announcements, reported in Figure 4b, are insignificant, the responses of the variables to the revenue-based announcements, reported in Figure 4a, are all highly significant and larger in magnitude than the baseline responses. In particular, the peak fall in GDP is now amounts to almost 0.7 percent, while the peak falls in private consumption and private investment amount to roughly 1, respectively 2 percent. The peak fall in consumer confidence is about 3.8 percent, while the peak increase in the long-term interest rate is about 35 basis points. Summarizing, our results suggest that, while spending-based consolidations have no effect on the macro-economy, in line with some of the literature revenue-based have strongly negative effects on the economy.

7.2. Counterfactuals for revenue- and spending-based consolidation plan

This subsection explores for the role of the confidence channel for the groups of revenue- and spending-based consolidations separately. Figure 5a, for revenue-based consolidations, and Figure 5b, for spending-based consolidations, show the responses when we shut off both the consumer confidence and the long-term interest rate channel. Not surprisingly, in view of the fact that the macro-economy does not respond to spending-based consolidations, we do not observe any significant differences under the counterfactual. This is different for the revenue-based consolidations, where GDP, private consumption and private investment all exhibit significantly milder drops than under the baseline, thus pointing to the role of the confidence channel in explaining the transmission of revenue-based consolidations to the macro-economy.

7.3. What drives the differences between revenue- and spending-based plans?

What drives the market differences in the responses between revenue- and spending-based consolidation plans? The announcements in our dataset are merely announcements of plans. It is conceivable that announcements of spending cuts have less negative effects on the macro-economy simply because the followed on them is on average weaker than the follow up on announced revenue increases. If this is the case, because spending-based plans are to a larger (smaller) extent concentrated on spending measures than revenue-based (spending-based) measures, we would expect the full announcements of spending-based measures to lead to milder macro-economic responses.

Our results provide some support for this conjecture. Figures 6a and 6b are based on an extension of the baseline model with government revenues, government expenditure and government investment. In addition, the total announced plan is split into its revenues-based component and its spending-based component. Figure 6a reports for the full set of announced plans the responses if we order the revenues-based component first, which thus forms the shock, and includes the spending-based component as an additional endogenous variable. As under the baseline, we observe significant falls in GDP, consumption, investment and consumer confidence, and a significant rise in the long-term interest rate. Government revenues also increase significantly and, as one may expect, on impact, since revenues measures can generally be implemented right away. Quite remarkably, government spending falls significantly. Figure 6b switches the revenues and spending components of the announcements. Now, the spending component of the announced plan forms the shock. We observe that GDP, private consumption and private investment get close to significance. Tax revenues rise, but

not as much as in the other case. Government spending falls, but remarkably, not as much as in the other case. Hence, the *actual* follow up in the case of spending-based announcements appears to be weaker than in the case of revenues-based announcements, and this might help to explain the difference in macro-economic responses.

Further support for this conjecture is obtained if we focus on revenues-based plans only and repeat the exercise in which we order the revenues-based component of the announcement first and include the spending-based component as endogenous variable (Figure A.7a in the Appendix) and we order the expenditure-based component of the announcement first and include the revenues-based component as endogenous variable (Figure A.7a in the Appendix). We observe that only in the former case, the *actual* implementation on the revenues side is significant, while the *actual* implementation on the spending side is statistically more significant than when the spending announcement is ordered first. With the revenues component of the announcements ordered first, the responses of GDP and its private components are larger and more significant.

Final support is obtained by exploring the deviations of announced revenue and spending consolidation measures from actual changes in the cyclically-adjusted revenue and spending ratios. If the announced measures are precisely followed up, then they should have a strong correspondence with the actual changes. Table 3 reports the average deviations by country. For revenues we observe an average shortfall of implementation by 0.04 % of GDP, while for spending we find an average shortfall of 0.18% of GDP, confirming that the follow-up of consolidation announcements is weaker in the case of revenues.

Table 3: Average deviation from announcement

Country	Revenues	Spending
Austria	-0,047	-0,130
Belgium	-0,035	-0,248
Denmark	0,157	-0,068
Finland	0,026	-0,253
France	0,019	-0,154
Germany	-0,017	-0,171
Ireland	-0,332	-0,169
Italy	-0,262	-0,354
Netherlands	0,099	-0,342
Portugal	-0,085	-0,107
Spain	-0,158	-0,328
Sweden	-0,029	-0,102
UK	0,157	0,035
Average	-0,039	-0,184

Summarizing, we find suggestive evidence that a better *actual* execution of revenues-based consolidation announcements, may help to explain the stronger macroeconomic effects of revenues-based plans. In other words, spending-based plans tend to have less of a negative effect on the economy simply because they tend to be actually carried out to a lesser extent. The effect of the better actual implementation of revenues-based plans may take place both directly and indirectly through the effect of private sector confidence.

8. Conclusion

In this paper we have constructed a new narrative dataset of fiscal consolidation announcements that we used to explore how announcements of fiscal consolidations affect consumer and financial market confidence, to explore the role of the confidence channel in the transmission of the announcements to the real economy, and to explore the potential differences in responses to revenues- versus spending based plans. The advantage of using our narrative dataset is that we can model the response of the economy to real-time information on consolidation news.

For the full set of announcements we find robust evidence of a fall in GDP, private consumption, private investment and consumer confidence and a rise in the long-term interest rate. Shutting off the responses of the latter two variables, yields significantly smaller drops in GDP, private consumption and private investment. This suggests a role for confidence in amplifying the effects of austerity. A split into announcements of revenues-based and spending-based consolation plans reveals that the aforementioned responses are concentrated among the revenues-based plans. Again, shutting off the responses of consumer confidence and the long-term interest rate yields significantly smaller reductions in GDP and its private components. We also tried lay bare the source of the differences in the responses to revenues- and spending-based consolation plans. We find that the follow up to announcements of revenues increases in terms of actual budgetary consolidation is better than the follow to announcements of spending reductions. The better actual follow up, and well as the expectation of it, which manifests itself in an early confidence response, is what may help to explain the different responses for revenues- and spending-based plans, because the former are predominantly composed of revenues measures, while the opposite is the case for the latter.

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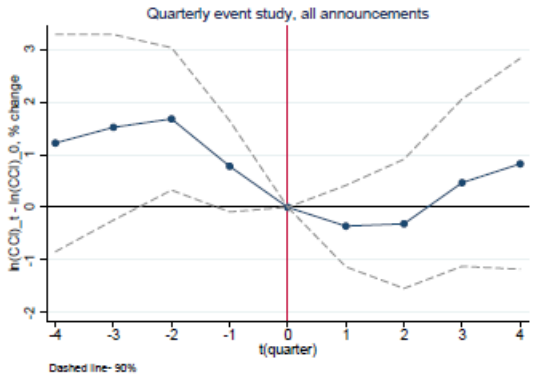
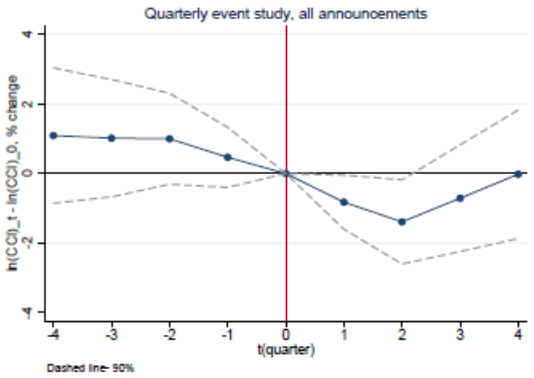
Figures:

Figure 1: The response of consumer confidence to fiscal announcements



(a) Calendar-based timing



(b) Timing shifted forward by one month

Figure 2: Impulse responses for baseline model – all announcements

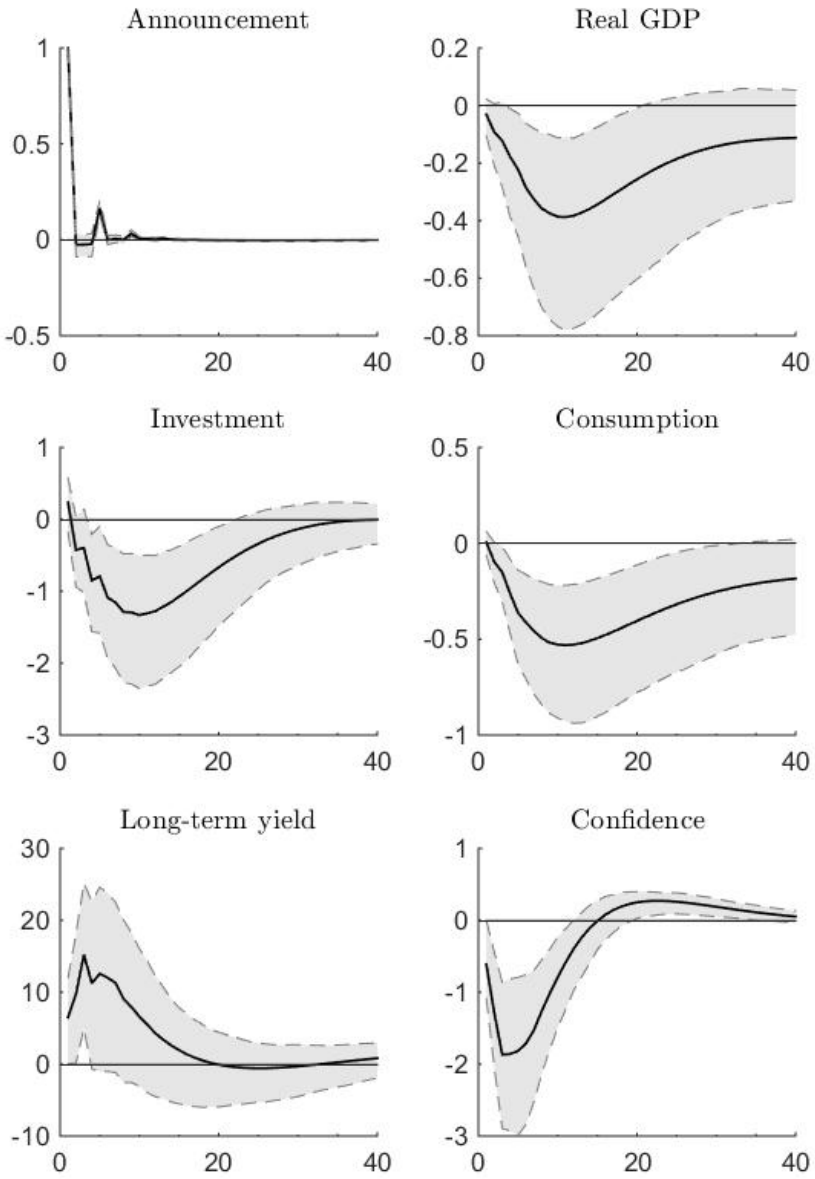


Figure 2a: Replacing long-term interest rate by long-short interest spread

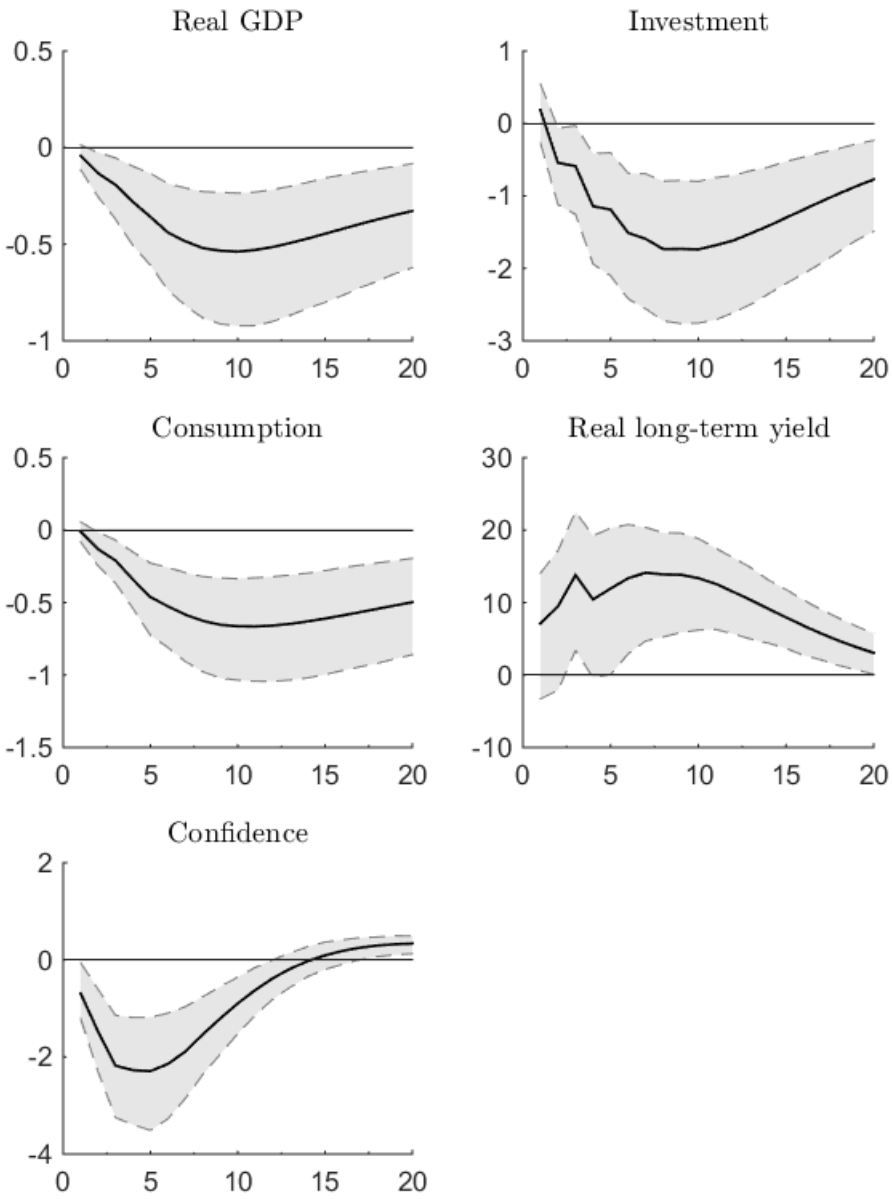


Figure 2b: Baseline based on spread of LTI with Germany

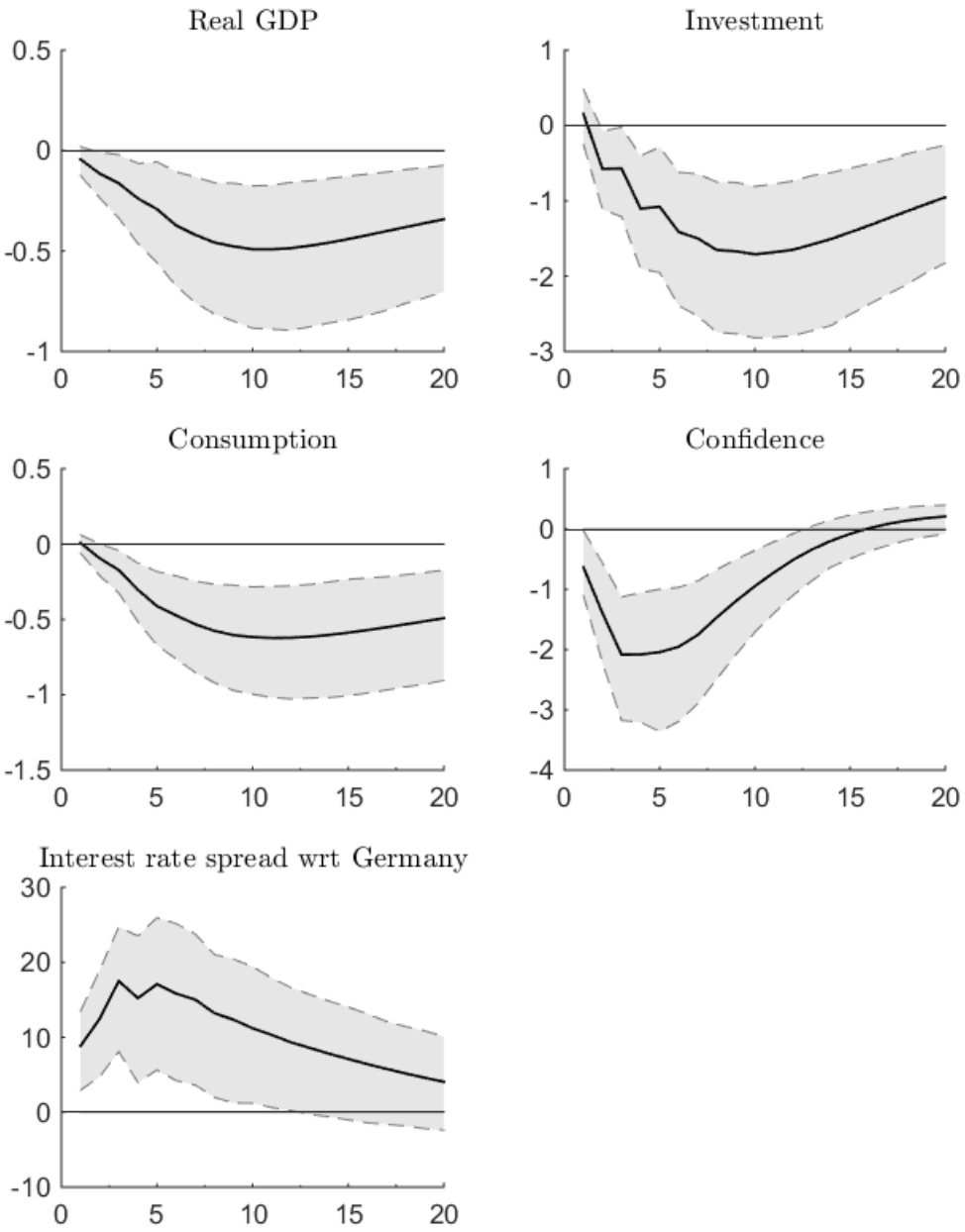


Figure 3a: Shutting off the consumer confidence channel

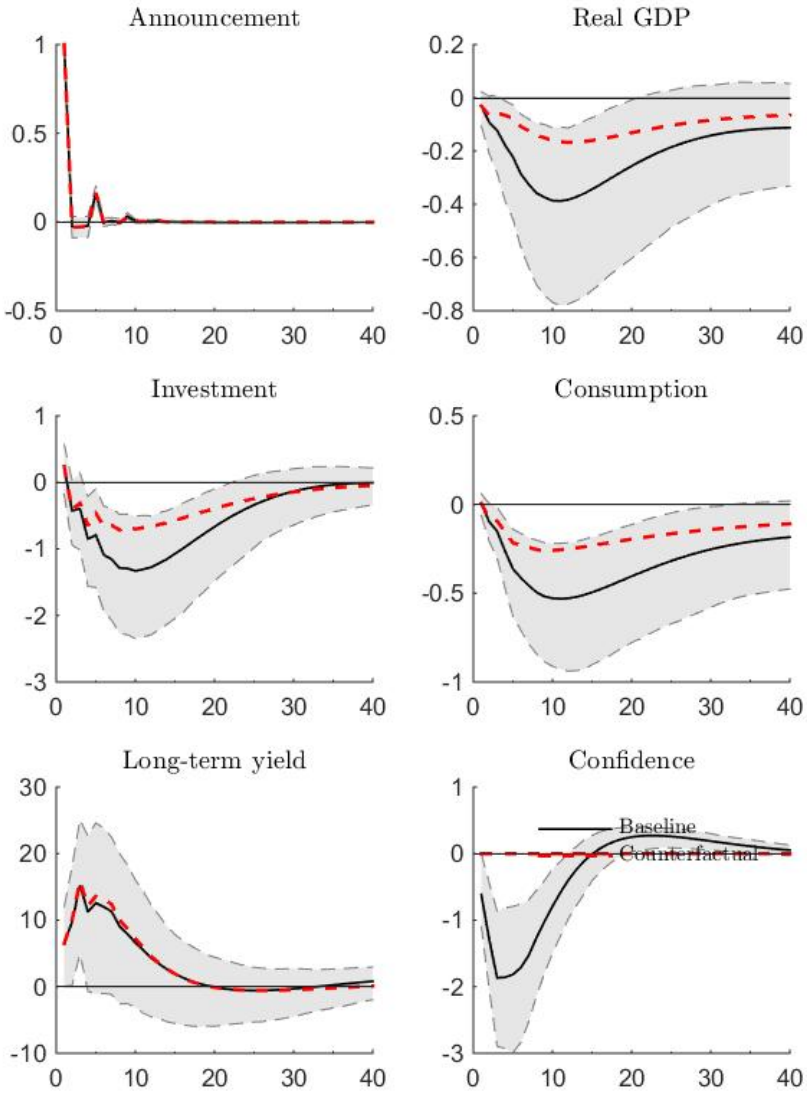


Figure 3b: Shutting off the long-term interest rate channel

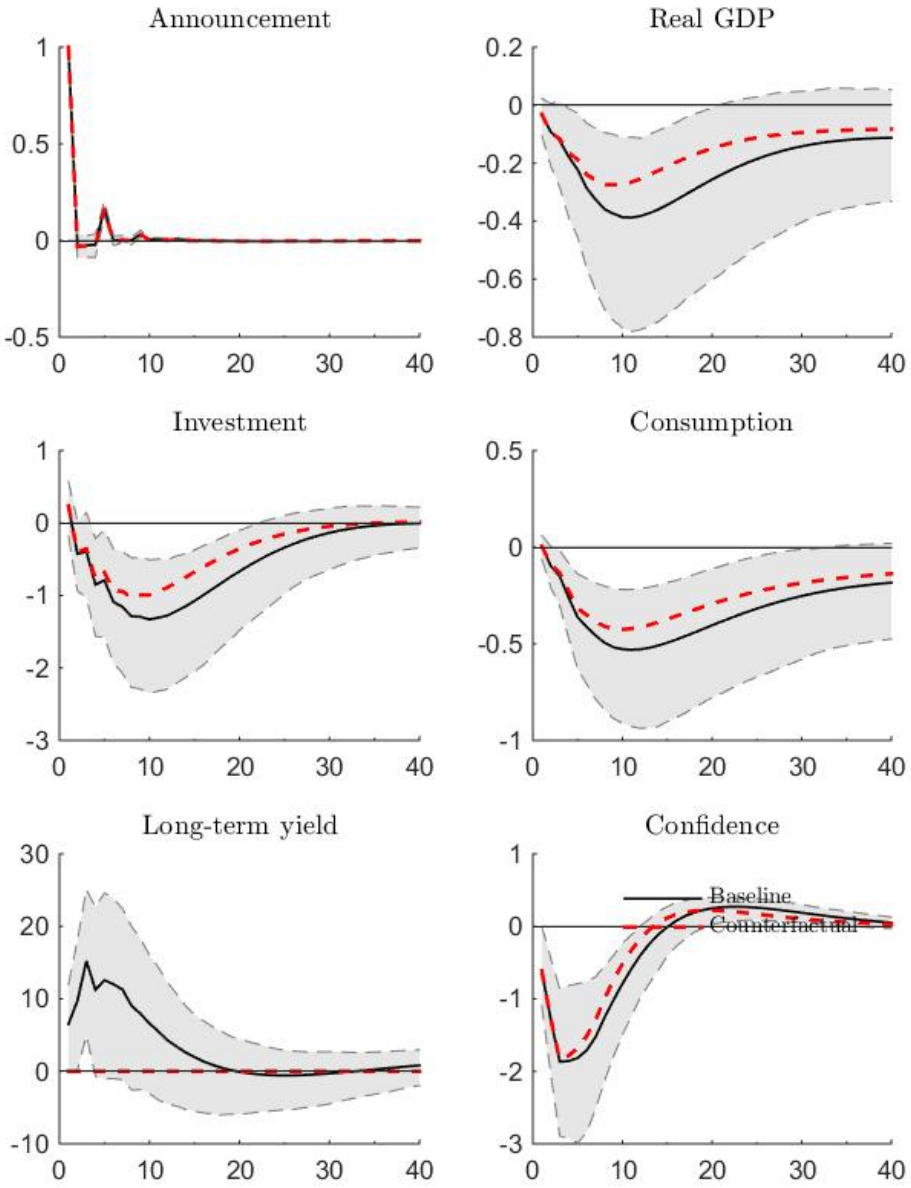


Figure 3c: Shutting off consumer confidence and the long-term interest rate

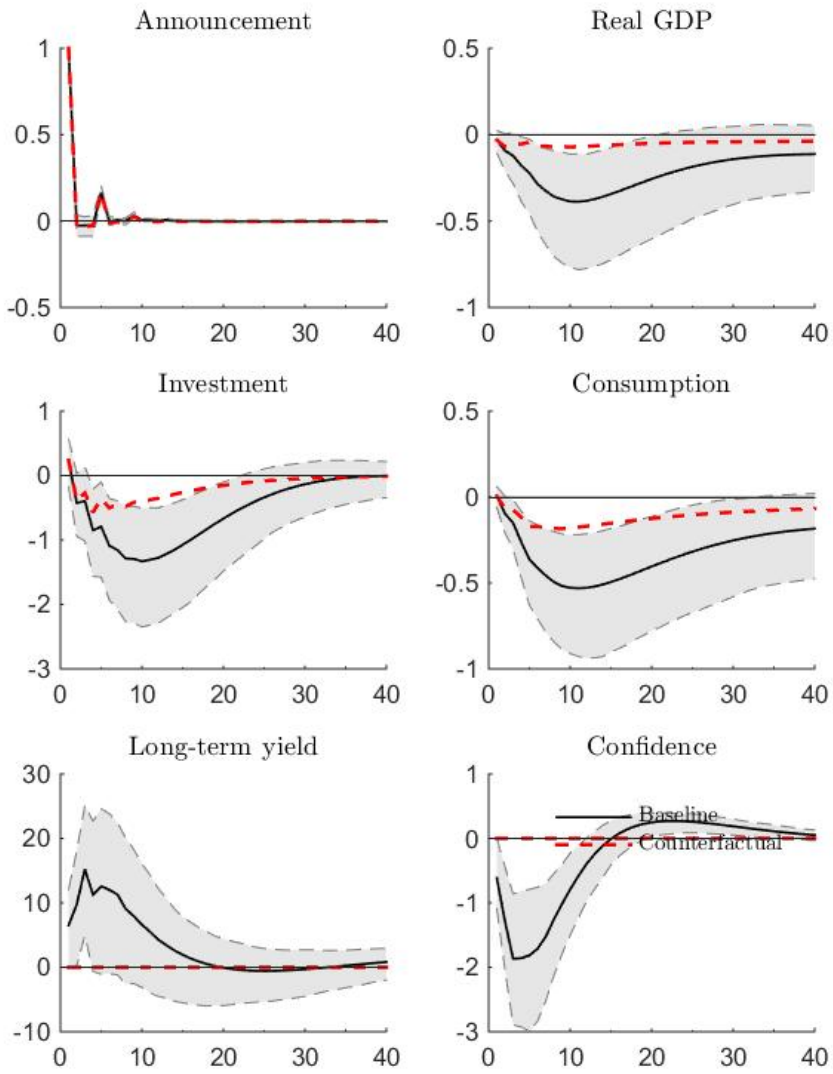


Figure 4a: Responses to revenue-based consolidations

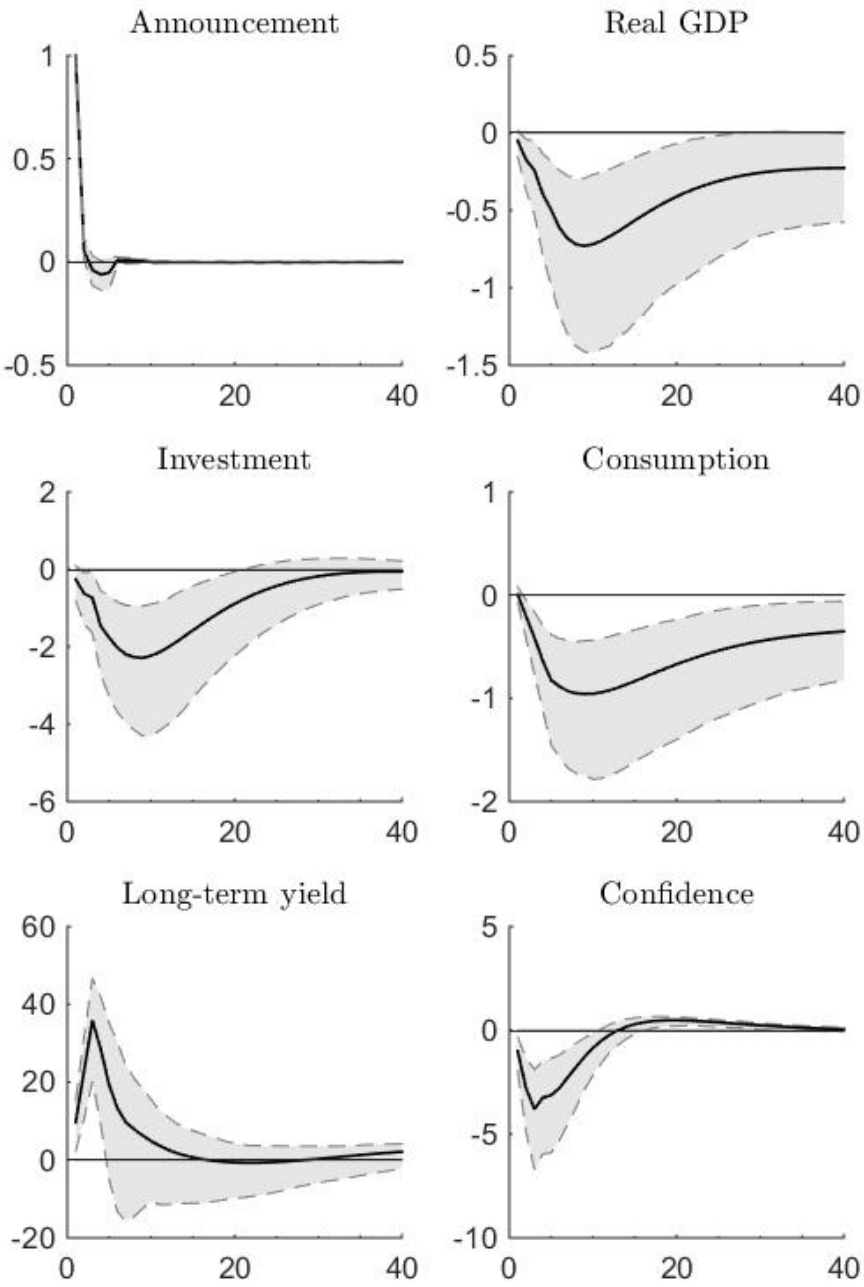


Figure 4b: Responses to spending-based consolidations

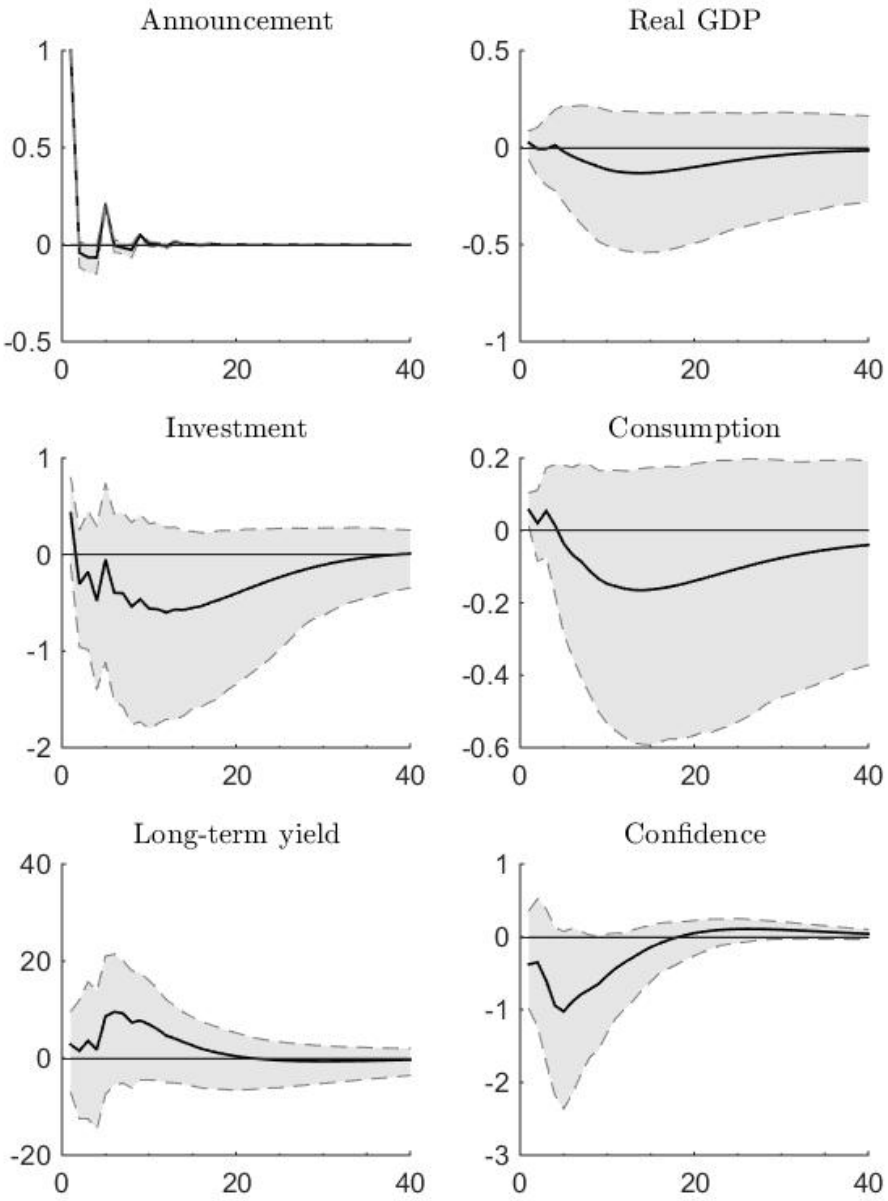


Figure 5a: Counterfactual revenue-based consolidations

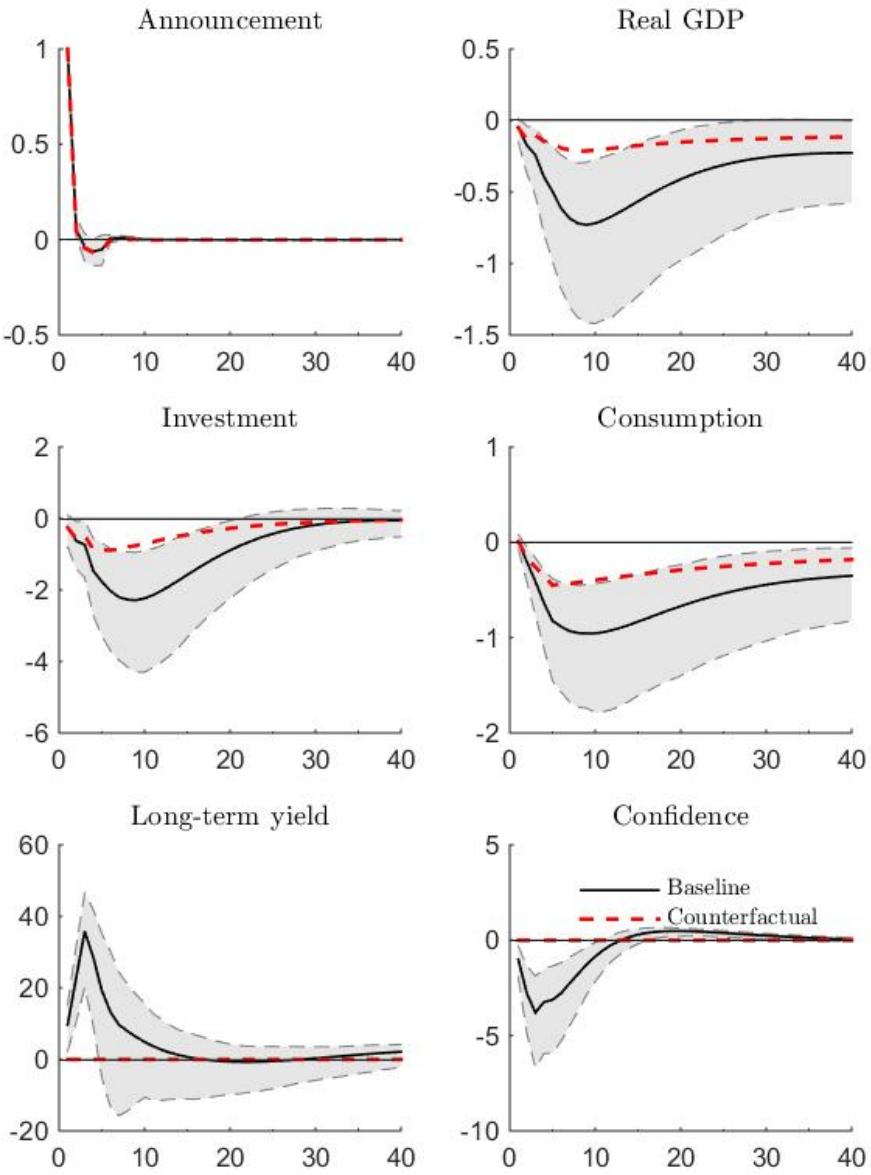


Figure 5b: Counterfactual spending-based consolidations

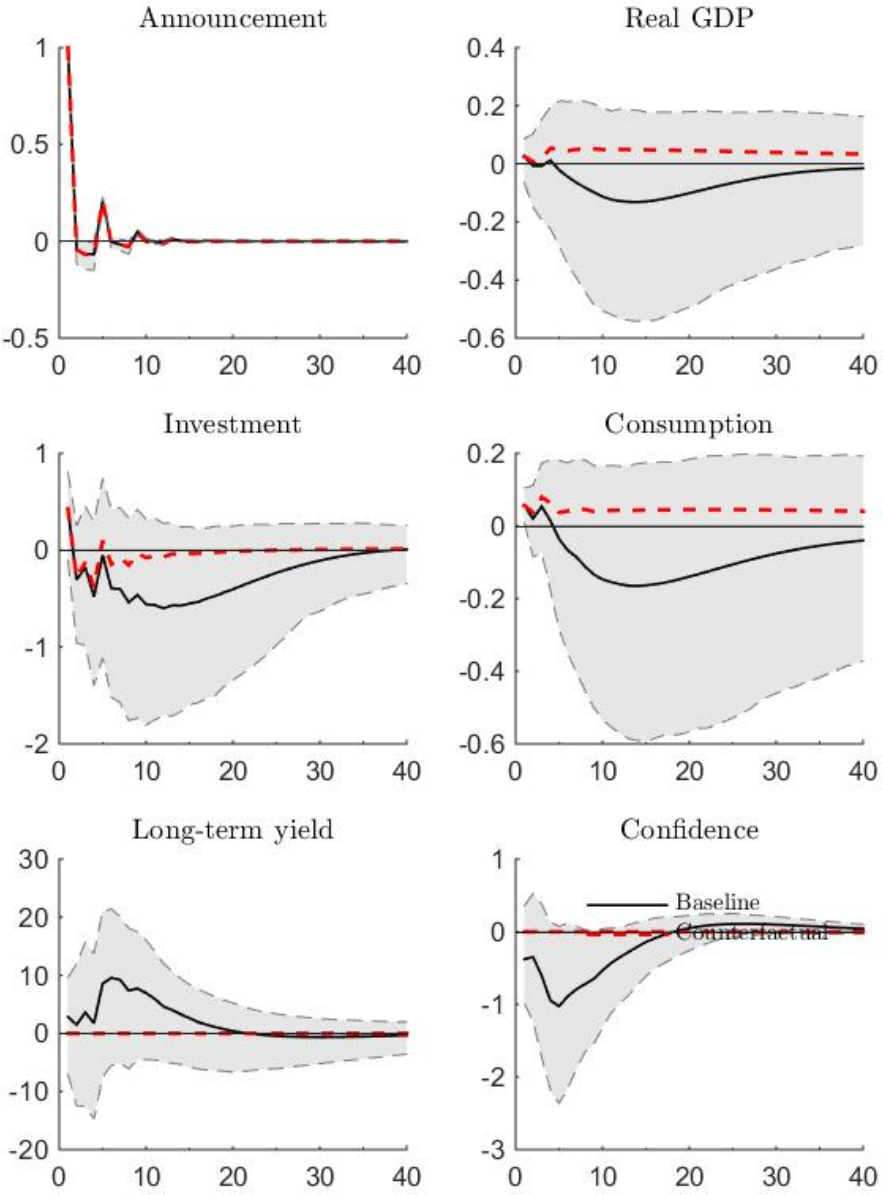


Figure 6a: Expanded model – revenues-component of announced plan forms shock
(full set of announcements)

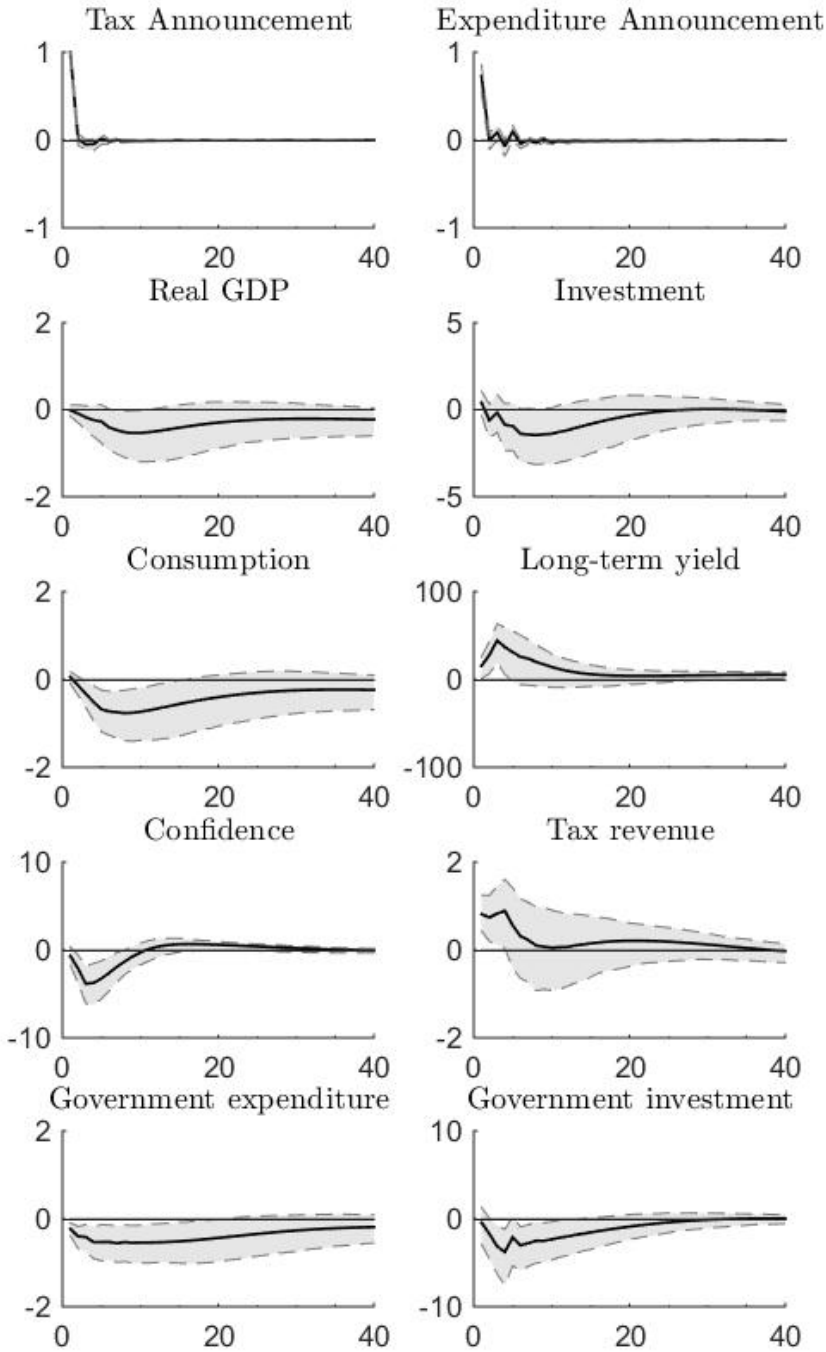
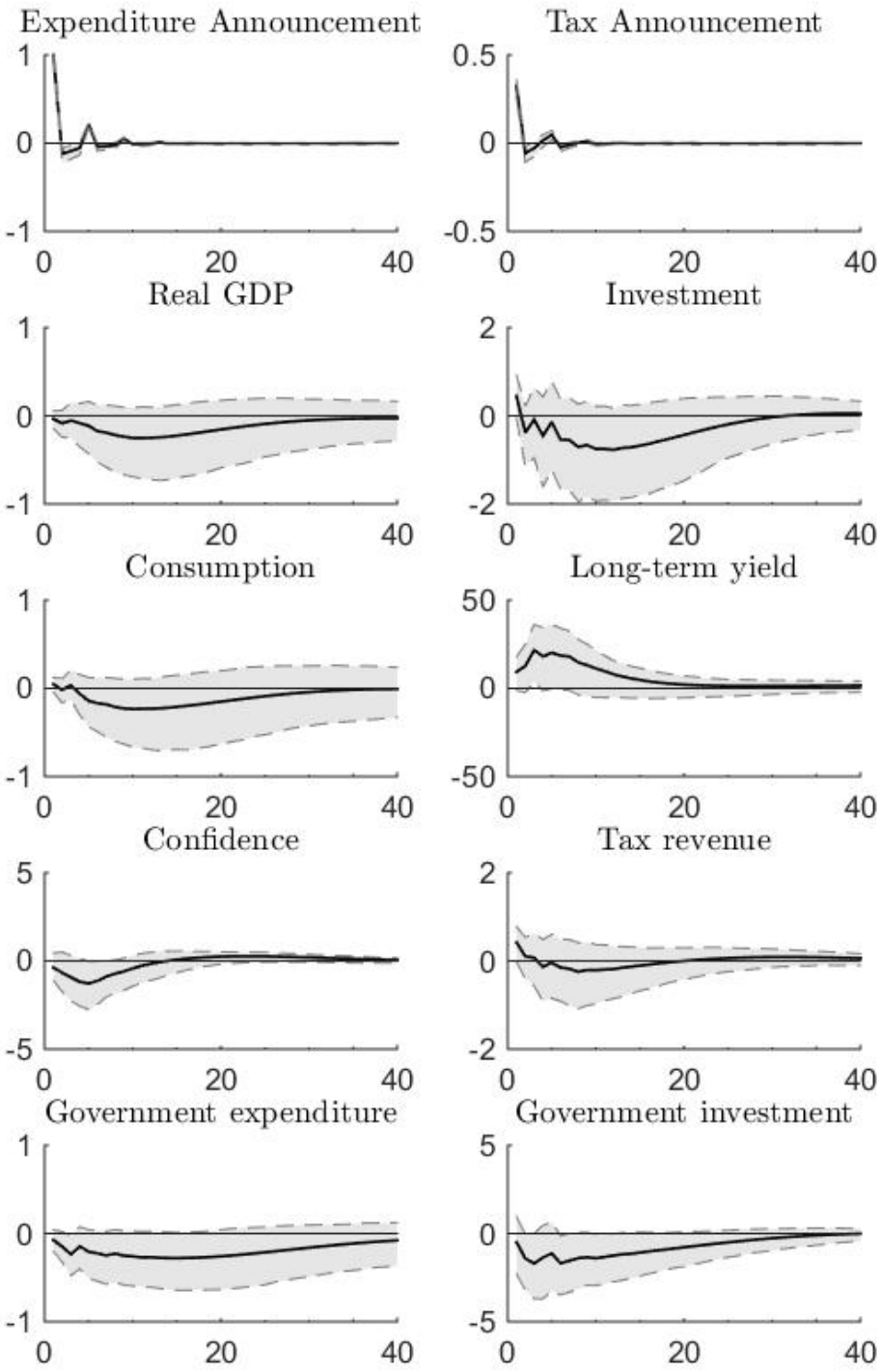


Figure 6b: Expanded model – spending-component of announced plan forms shock
(full set of announcements)



Appendix A (copied from Beetsma et al., 2015): Announcements and their dating

Regarding *what* is considered the announcement of a new consolidation, we have taken the following decisions:

- If a newly government explicitly signals its commitment to an existing fiscal plan, we consider this an announcement, the idea being that this should provide information on the likelihood that the plan will be carried out.
- We do not treat EU convergence plans as announcements involving a consolidation.
- because the OECD data do not explicitly distinguish between the announcement and the implementation of measures, we have to interpret some verbs as signaling one or the other:
  - "a new tax is introduced" is treated as the implementation of a measure introduced in the budget for that year and the corresponding moment of announcement is the moment that the budget for that year was presented.
  - "Excise duties are increased" is treated as the implementation of an earlier announced measure.
  - "The Government takes additional fiscal measures" is treated as the announcement of a new measure.

Regarding the *exact timing* of announcement, we have taken the following decisions:

- We base the timing on the existing budgetary process in the country. The dating of the announcement of measures that are part of a new budget is the moment the government presents the budget to the parliament.
- The date the Parliament votes about the budget is not considered an announcement, unless the Parliament significantly modifies the plan of the Government. The dating of the announcement of such amendments is the moment of the vote on the budget in parliament or the moment they are reported if that is earlier.
- If the Parliament adopts the budget with "minor modifications" (as is commonly stated in documents), we do not consider this a separate announcement.

The Data Construction Appendix includes the description of each consolidation from the OECD Economic Surveys. We document the classification we have applied to the elements of the consolidation and the timing, i.e. the identification of the precise month for each year.

Example 1: match of implementation in Devries *et al.* (2011) with OECD announcement information (Austria 1981):

Devries *et al.* (2011, p.13) discuss the fiscal consolidation implemented in Austria in 1981, "*the spending cuts fell on the pensions, while the tax hikes included a hike in the VAT rate on energy, a new tax on credit institutions and gasoline stations, and the suspension of part of the savings incentive system*".

The OECD describes the draft Budget for 1981, introduced in Parliament in October 1980. This comprises, among other measures, "*the cancelling of the interest subsidy scheme for investment, raise of VAT rate for energy from 8 to 13 per cent, introduction of special taxes on petrol stations and branch offices of credit institutions.*" (OECD Economic Surveys, Austria 1981, p.58).

Based on the composition of measures (VAT rise, taxes on gasoline stations and credit institutions) we identify that the policies mentioned by Devries *et al.* (2011) had first been proposed in the draft Budget for 1981, presented in October 1980.

Example 2: information from newspaper archives or national sources (Germany, 1993):

Devries *et al.* (2011, p.41) mention (in the description of the 1993 consolidation) the implementation of a VAT increase: "*there was an increase in the VAT rate from 14 to 15%, with an estimated impact of 0.39% of GDP in 1993*". This was, in fact, proposed in September 1991. See the documentation from the German Parliament: http://dip21.bundestag.de/dip21/btd/12/011/1201108.pdf

Example 3: information from newspaper archives or national sources (Spain, 1992):

"*The central government budget for 1992 projects a marked reduction in the deficit to almost 2 per cent of GDP. Budget consolidation is planned to be achieved by raising revenues in relation to GDP, with expenditure remaining at the level of 1991 (about 23 per cent of GDP) (…) The Budget includes large increases in indirect tax rates, notably the increase in the standard VAT rate by 1 percentage point to 13 per cent.*" (OECD Economic Surveys, Spain 1992, p.40).

We have checked the *El Pais* newspaper archives and in an article released on October 7, 1991, we found information that a reform involving an increase in VAT was initiated in October 1991. This was expected according to the regular budgetary procedure and we used this information to assign the announcement of the 1992 Budget to October 1991 (see http://elpais.com/diario/1991/10/07/economia/686790014_850215.html).

Appendix B: Robustness

Figure B.1: Robustness: dropping one country at a time

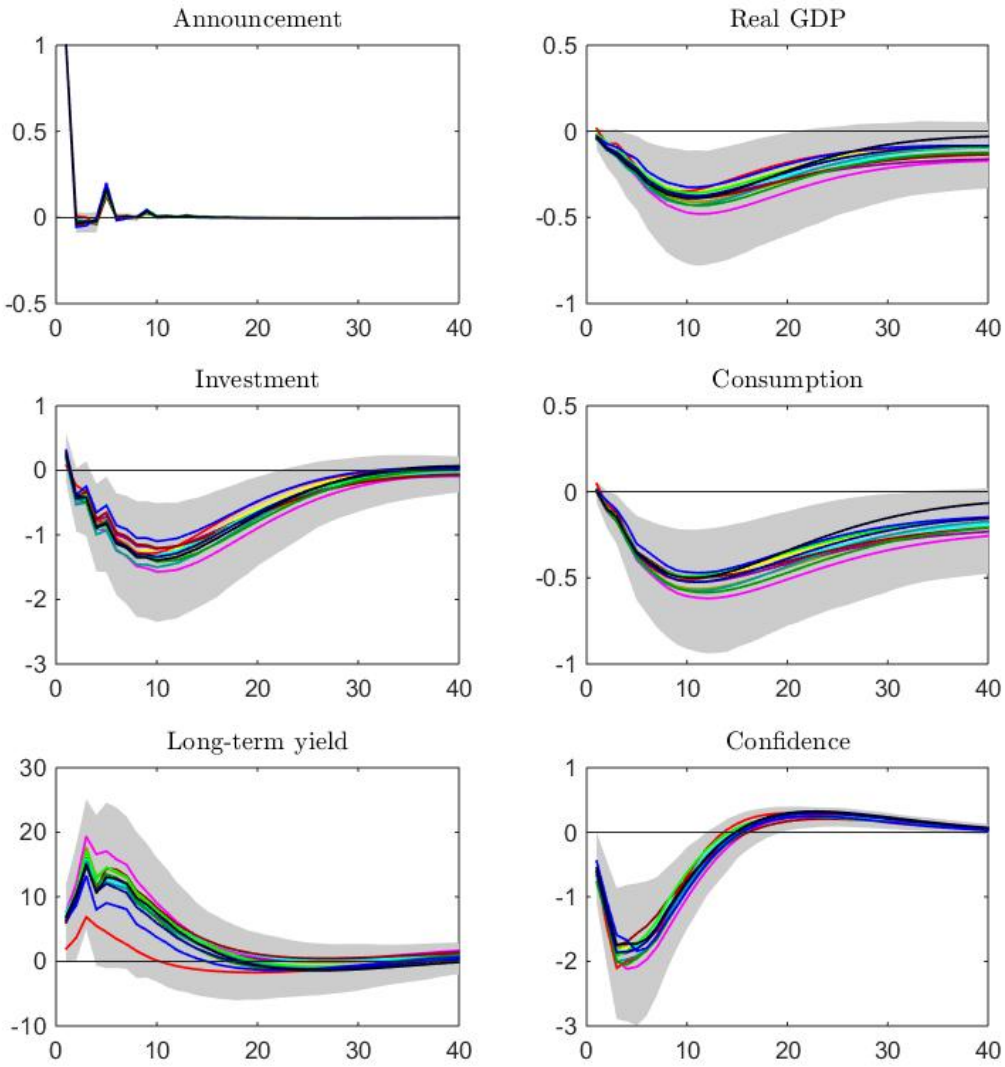


Figure B.2a: Splitting the sample period: 1994

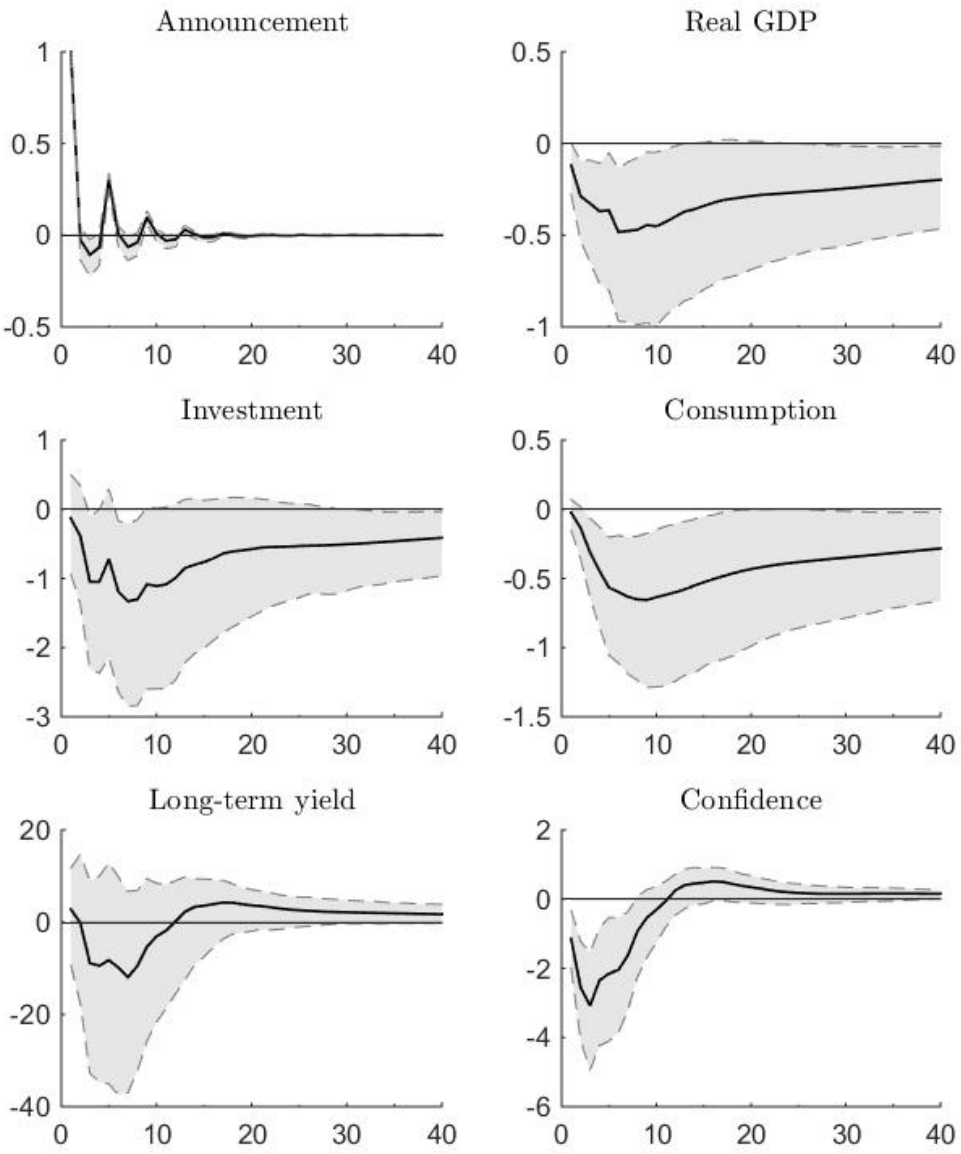


Figure B.2b: Splitting the sample period: 1995 - 2013

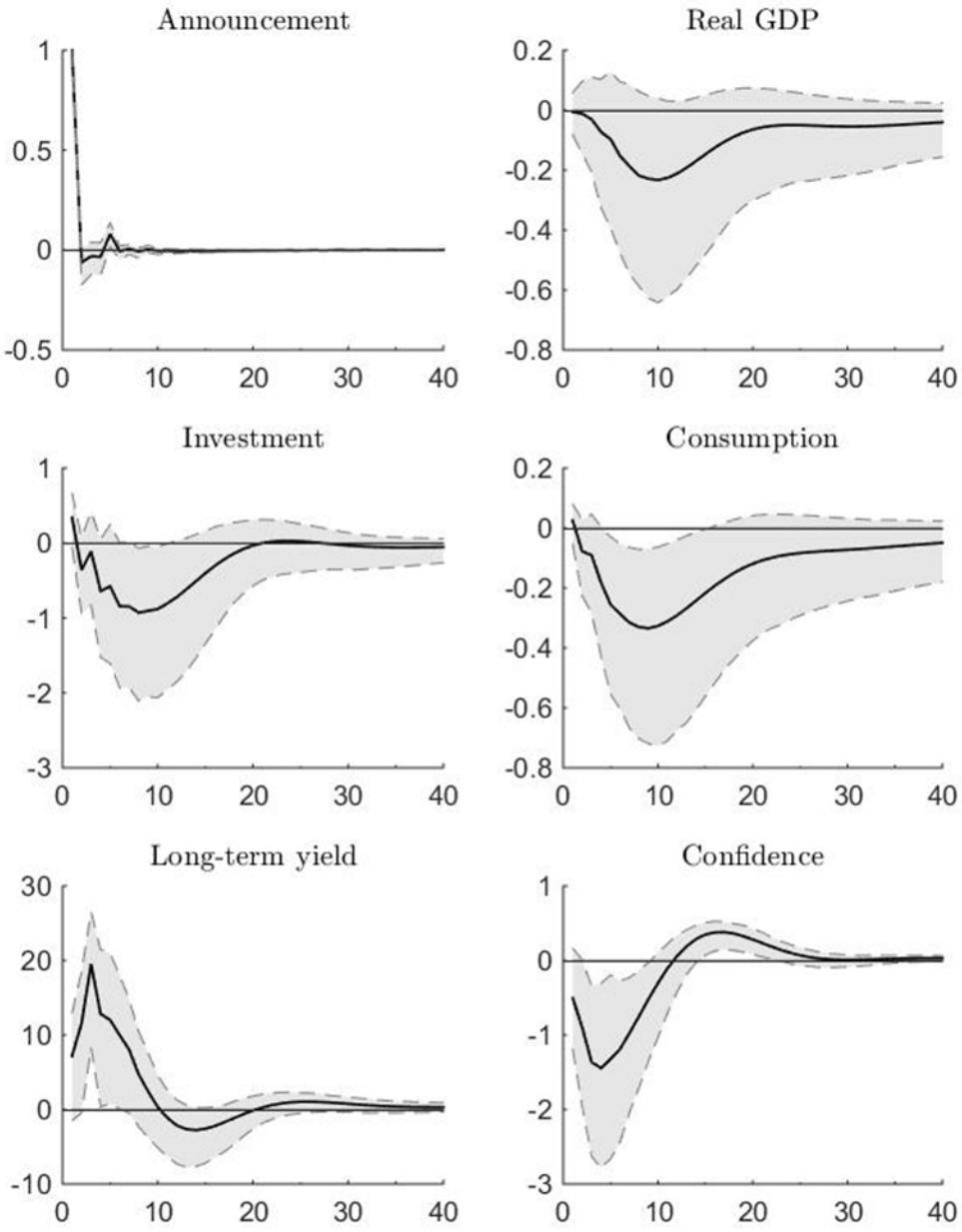


Figure B.3: Common trend instead of country-specific trend

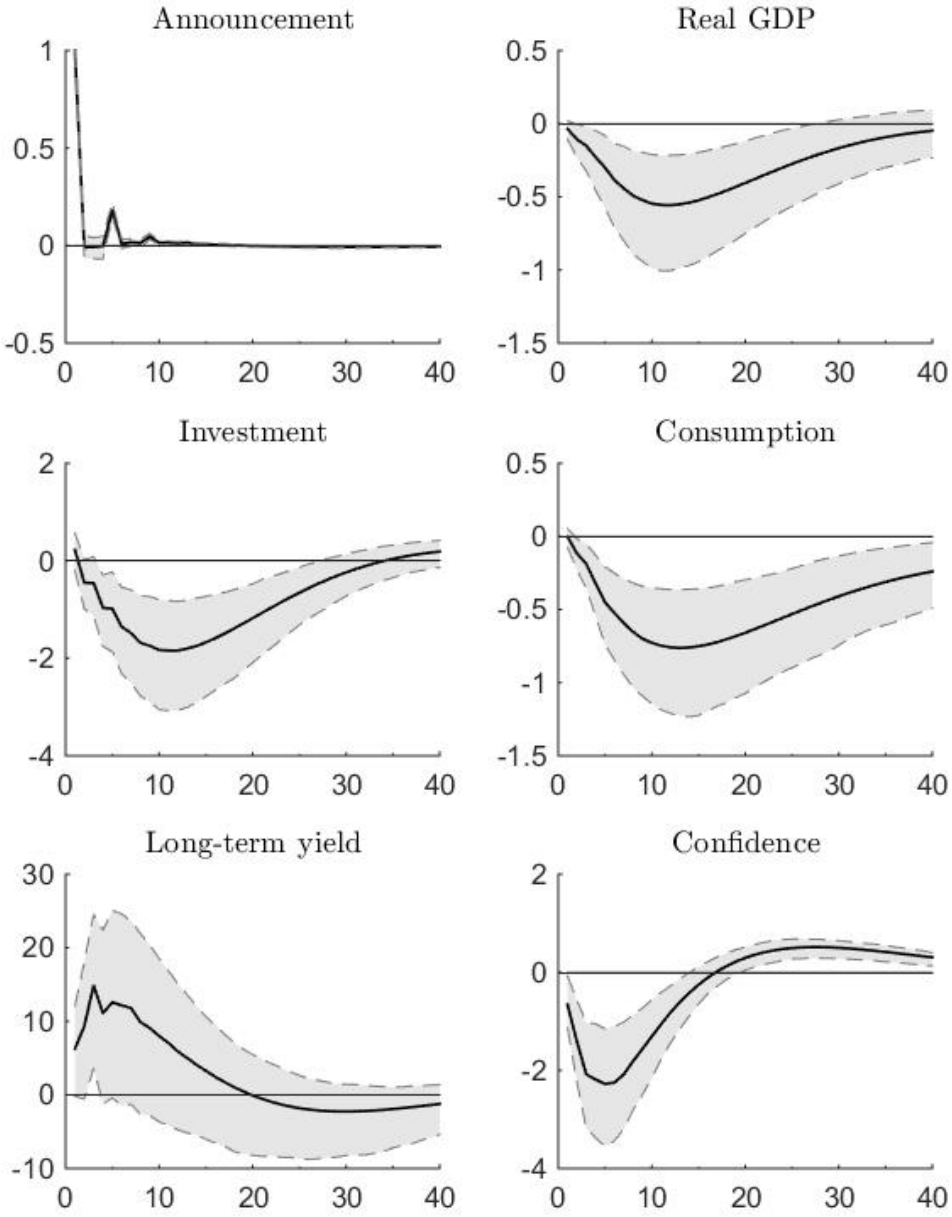


Figure B.4: Individual time effects instead of trends

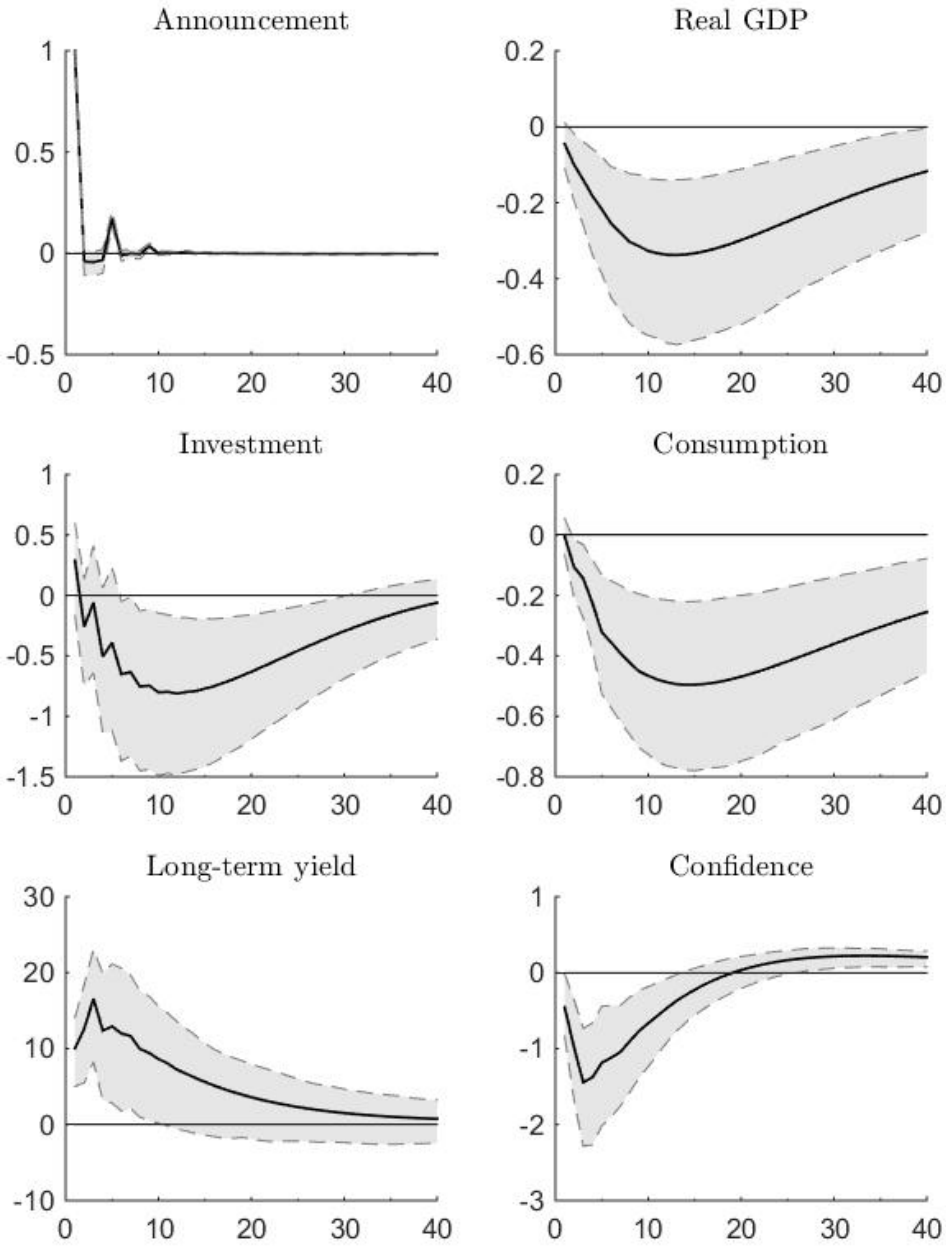


Figure B.5: Eight lags instead of four lags

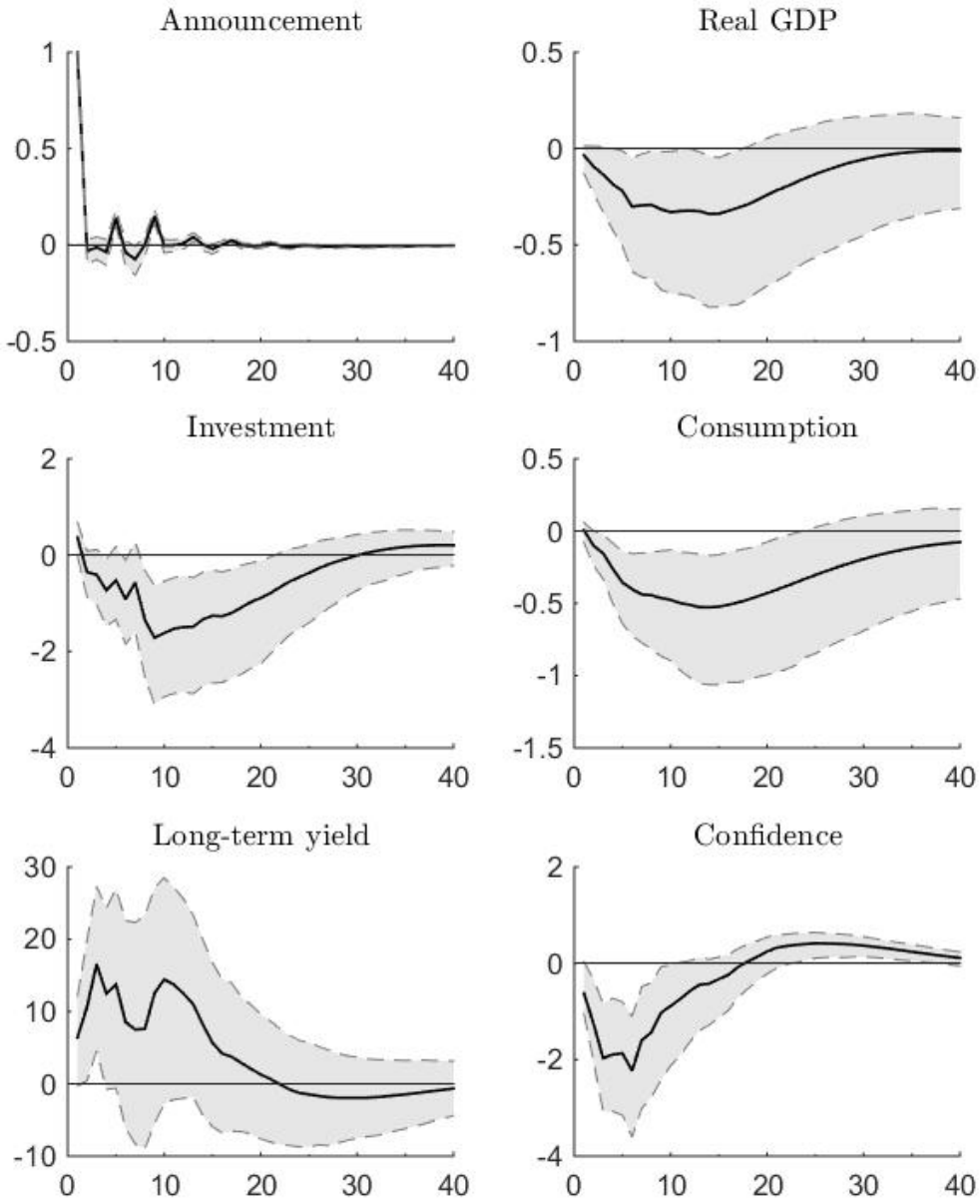


Figure B.6: Including lagged debt among the vector of exogenous variables

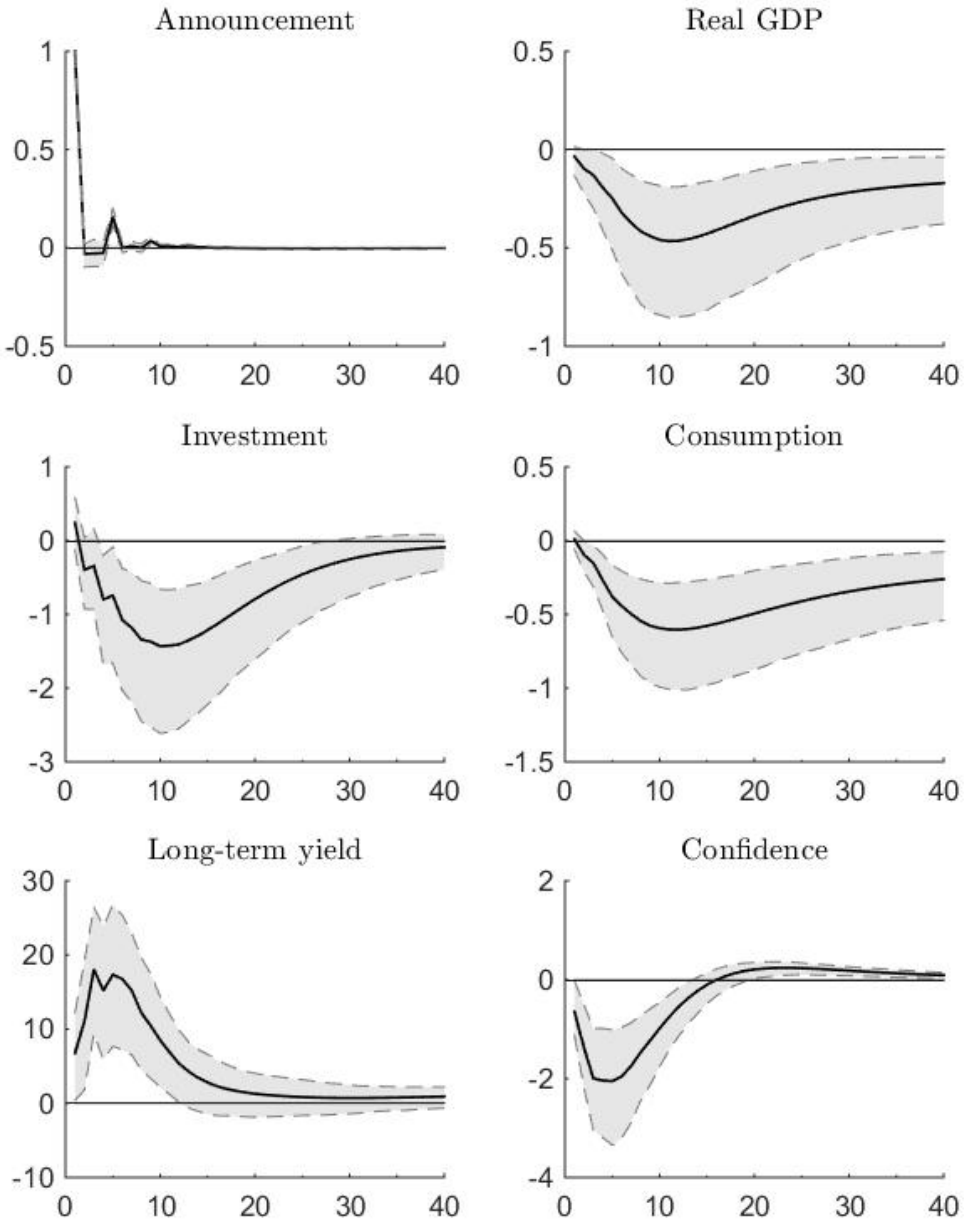


Figure B.7a: Responses to revenues component of revenues-based plans

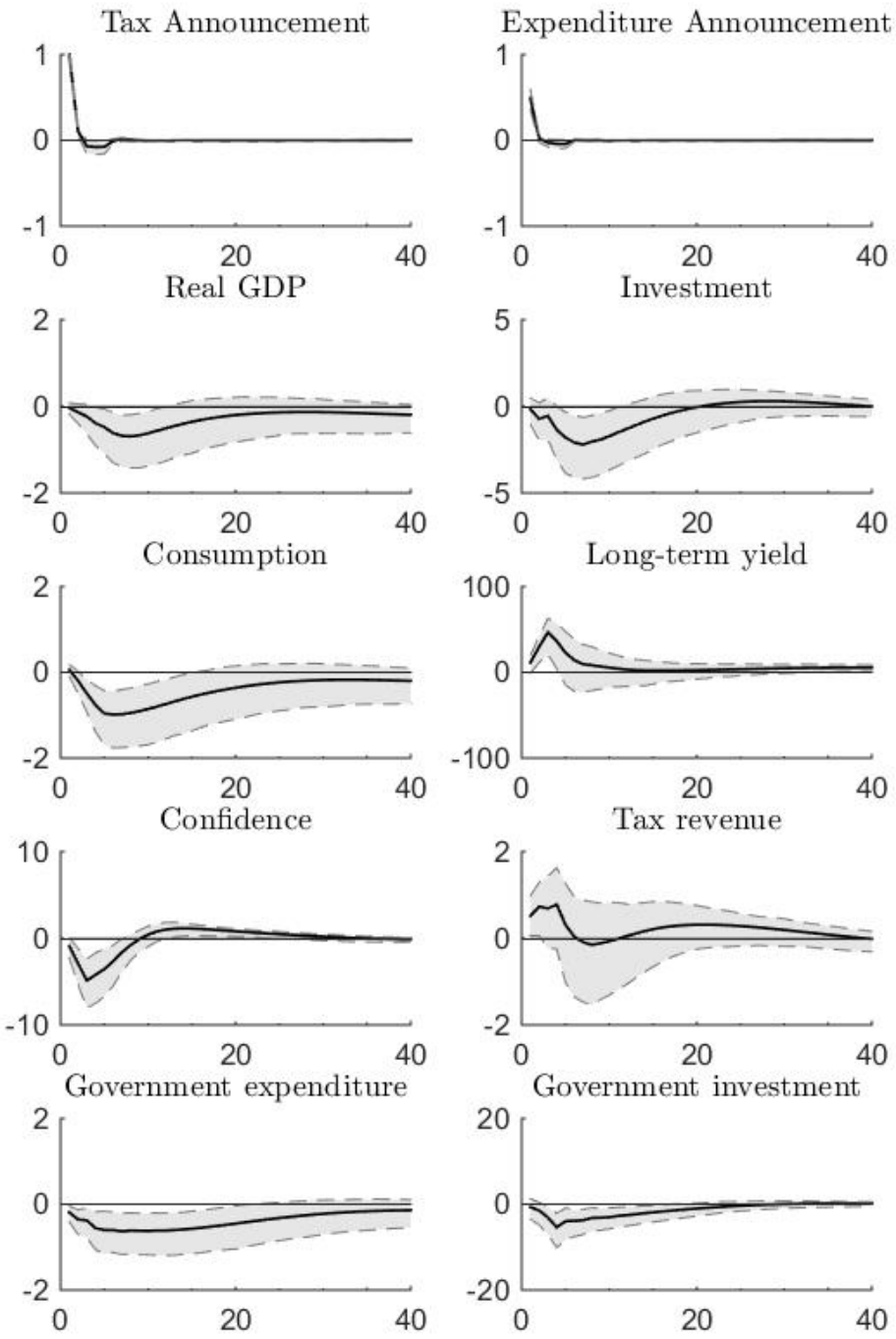
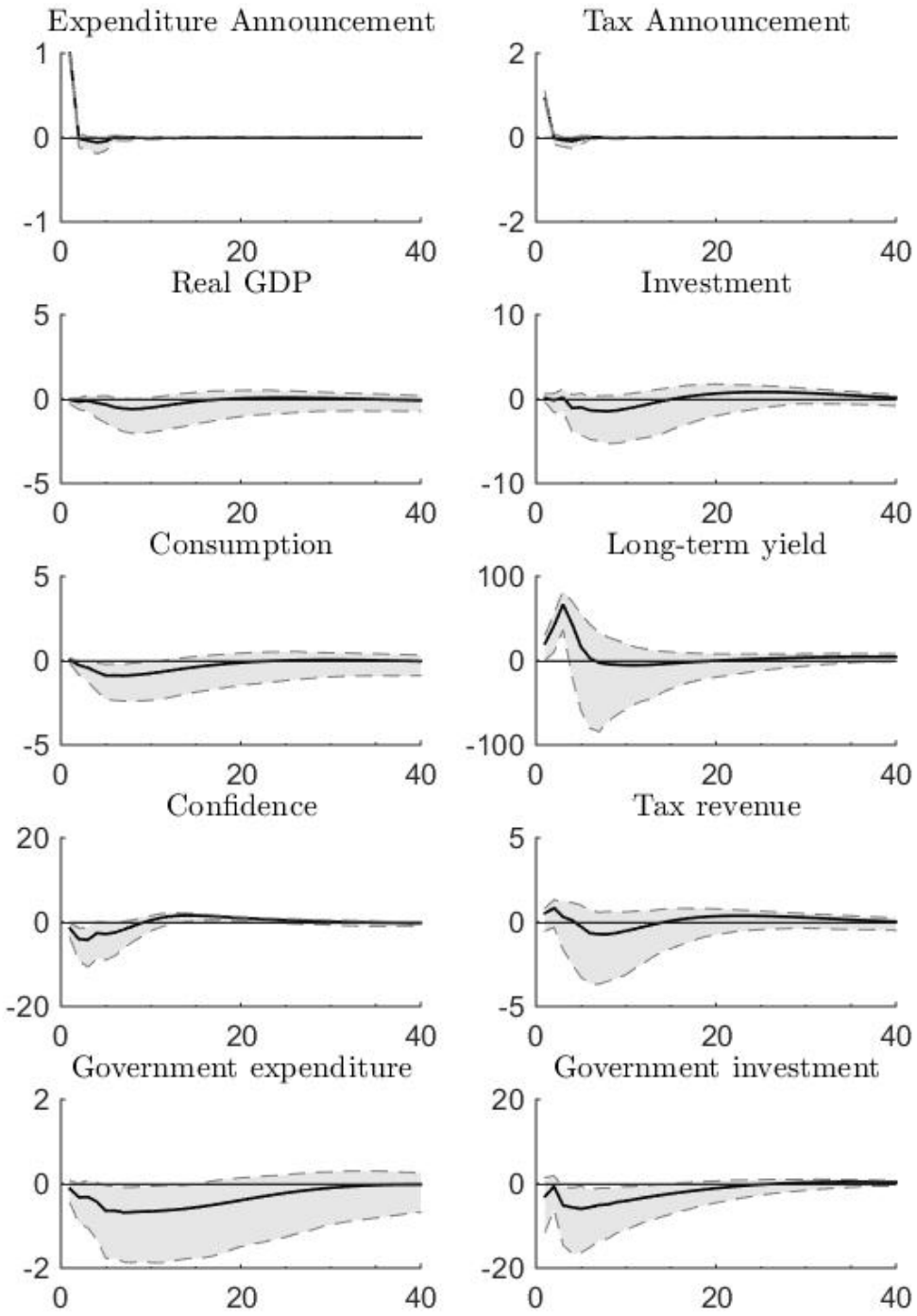


Figure B.7b: Responses to spending component of revenues-based plans


Expenditure Announcement
Tax Announcement
Real GDP
Investment
Consumption
Long-term yield
Confidence
Tax revenue
Government expenditure
Government investment