Appendices (NOT for publication, available from journal site)

Appendix A: Data sources and construction

In this paper we construct two main datasets. The first dataset is at the annual frequency and is used in Section 3 to calculate the ex-post deviations from the annual fiscal consolidation plans identified by Devries et al. (2011) for the period 1978-2008 and by Alesina et al. (2015a,b) for Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Portugal, Spain and the United Kingdom and by ourselves for Finland, Sweden and the Netherlands for the period 2009-2013. The second dataset is at the quarterly frequency and constructed for the quarterly panel VAR analysis in Section 5. It contains the announcements of fiscal consolidation plans. Hence, both datasets cover thirteen EU countries, with the sample period spanning from 1978-2013.

A.1. Budgetary annual data for ex-post deviation analysis

The budgetary data are taken from the November 2015 edition of the OECD Economic Outlook. In order to make an ex-post comparison we need to match as well as possible the concepts of revenues and spending used in the narrative dataset identified by Devries et al. (2011) and Alesina et al. (2015a,b) with OECD data on actual revenues and spending. Because there is no obvious one-to-one correspondence between the two datasets, we use alternative ex-post budgetary measures (in parenthesis the original OECD Economic Outlook code).

For public revenues we construct the following four ex-post aggregates:

1. **Total receipts, excluding gross interest receipts** = Total direct taxes (TY) + Indirect taxes (TIND) + Social security contributions received by government (SSRG) + Other current receipts by government (TOCR) + Property income received by government (YPERG) + Capital tax and transfers receipts (TKTRG) - Gross government interest receipts (GGINTR).

2. **Current receipts, excluding gross interest receipts** = Total direct taxes (TY) + Indirect taxes (TIND) + Social security contributions received by government (SSRG) + Other current receipts by government (TOCR) + Property income received by government (YPERG) – Gross government interest receipts (GGINTR).

3. **Cyclically-adjusted current receipts, excluding gross interest receipts**.

4. **Total revenues, narrow definition** = Total direct taxes (TY) + Indirect taxes (TIND) + Social security contributions received by government (SSRG).

For public spending we construct the following four ex-post aggregates:
1. **Total disbursements, excluding gross interest payments** (YPGTX) = Government final consumption expenditure, appropriation account (CGAA) + Property income paid by the government (YPEPG) + Social security benefits paid by the government (SSPG) + Other current outlays, government (YPOTG) + Government fixed capital formation, appropriation account (IGAA) + Capital transfers paid and other capital payments (TKPG) – Government consumption of fixed capital (CFKG) – Gross government interest payments (GGINTP).

2. **Current disbursements, excluding gross interest payments** = Government final consumption expenditure, appropriation account (CGAA) + Property income paid by the government (YPEPG) + Social security benefits paid by the government (SSPG) + Other current outlays, government (YPOTG) – Gross government interest payments (GGINTP).

3. **Cyclically-adjusted current disbursements, excluding gross interest payments.**

4. **Total expenditure, narrow definition** = Government final consumption expenditure, appropriation account (CGAA) + Government fixed capital formation, appropriation account (IGAA) + Social security benefits paid by the government (SSPG).

In our analysis we express all budgetary aggregates in percent of gross domestic product, with the exception of the cyclically-adjusted measures which the OECD Economic Outlook publishes directly in percent of potential gross domestic product.

A.2. Budgetary, macroeconomic and confidence quarterly data for panel VAR analysis

**Budgetary variables:**

- **Public revenues and spending:** We obtain these budgetary variables at the quarterly frequency from Eurostat. All the data have been compiled under the European System of Accounts, 2010 edition (ESA2010). To construct the appropriate quarterly data series, we make sure that the series extracted from Eurostat and the OECD Economic Outlook correspond to each other. To ensure maximum comparability of the OECD and Eurostat fiscal variables, we adopt the following procedure. First, we determine the correspondence between the budgetary components recorded at the annual frequency from the OECD with the annual data on the same components available from Eurostat. Based on the description of the data and the comparison of their numerical values, we are able to match perfectly a number of series observed at the annual frequency between the two sources. The correspondences between the codes from the two data sources are given in Table A.1.¹

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¹ There are other components of government revenues and expenditures available from both sources that cannot be matched.
Then we collect the quarterly data from Eurostat using the same variable definitions. Hence, the quarterly data match the annual data from both Eurostat and the OECD. All quarterly data are seasonally unadjusted and expressed in millions of euros or in local currency units. We multiply the series expressed in local currency units with the exchange rate against the euro and transform all the data into euros, after which we seasonally adjust the series using the X-11 procedure in EViews.

Unfortunately, we do not avail of quarterly data over the full sample period. The quarterly data have the following coverage: Austria from 2001, Belgium from 1995, Germany from 2002, Denmark from 1999, Spain from 1995, Finland from 1999, France from 1980, the UK from 1987, Ireland from 2002, Italy from 1999, the Netherlands from 1999, Portugal from 1999 and Sweden from 1995. We annualize the quarterly values by multiplying with a factor of four, deflate them using the quarterly GDP deflator and then append the resulting quarterly series to the annual series interpolated to the quarterly level for each country over the period before the quarterly data become available. We interpolate annual OECD data to the quarterly frequency by means of a cubic spline interpolation. We append the quarterly to the interpolated data by scaling the interpolated observations with the ratio of the average (annualized) quarterly Eurostat observations over the annual OECD observation in 2002. We choose 2002 because in the case of Germany and Ireland the quarterly data is only available starting in 2002. Based on the above quarterly budgetary series we construct the following two variables, which correspond to the “narrow definition” of budgetary measures constructed in A.1 above:

*Government revenues*: Total direct taxes + Indirect taxes + Social security contributions received by government.
Government expenditure: Government final consumption expenditure, appropriation account + Government fixed capital formation, appropriation account (IGAA) + Social security benefits paid by the government (SSPG).

We use these two measures both in percentage of GDP (baseline specification) and potential GDP (robustness analysis).

- Public debt: We obtain from Eurostat quarterly data of “Government consolidated gross debt, as a percentage of GDP” (General Government) from 2000Q1 until 2018Q4. For the period before 2000Q1 we obtain annual data from the OECD Economic Outlook (vol. 100, November 2016), from which we use the series “General government gross financial liabilities, as a percentage of GDP”. We use a cubic interpolation from annual to quarterly frequency. We multiply the resulting observations with the ratio of the values of 2000Q1 in which Eurostat and the interpolated OECD data overlap. For some countries the aforementioned OECD vintage does not produce long enough series and we extend the series backwards with series from another vintage (multiplying by the ratio of the common linking year). Specifically, we use for Austria link year 1995 and OECD vintage 2010, for Germany link year 2001 and OECD vintage 2002, for Ireland link year 1998 and OECD vintage 2002, and for Portugal link year 1995 and OECD vintage 2002.

Macroeconomic variables: Most of our quarterly macroeconomic variables are extracted from the OECD Economic Outlook. We retrieve the data (through Datastream) on private investment from the IMF International Financial Statistics database. 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 the quarterly frequency, ensuring that the annual value is equal to the sum of the resulting quarterly observations for the year.

We obtain the following variables:

- Nominal GDP = Gross Domestic Product (market prices), value, annual and quarterly. All series are from the November 2015 edition of the OECD Economic Outlook with some exceptions (due to data availability). Namely we use the November 2014 edition of the OECD Economic Outlook (Ireland after 2013), the May 2014 edition of the OECD Economic Outlook (Spain) and the December 2010 edition of the OECD Economic Outlook (Ireland before 2013, Germany before 1991). We transform the series

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2 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 the ecu (for the period preceding the Eurozone). Finally, we deflate all the series with the GDP deflator from the OECD Economic Outlook (2016).
into millions and deflate it with the appropriate GDP deflator (market prices). In the cases where GDP is expressed in local currency units (Denmark, Sweden, United Kingdom), we transform it into euros by multiplying with the exchange rate.

- **Real private consumption** = Private consumption expenditure, volume. The sources are the OECD Economic Outlook 96; the OECD Economic Outlook 95 (Spain); the OECD Economic Outlook 88 (Ireland, Germany before 1991). For Germany and Ireland we have to link the Economic Outlook 96 and 88 series. Ireland has 2008 as the base year in the Economic Outlook 88 series and 2012 as the base year in the Economic Outlook 96 series. Because of this, we change the base year for the observations used from the Economic Outlook 96. To do so, for both series we calculate the year average of the quarterly values in the Economic Outlook 88 base year and construct a scaling factor calculated as the resulting number for Economic Outlook 88 divided by the number for Economic Outlook 96. Then all observations appended from Economic Outlook 96 are multiplied by this scaling factor. In an analogous way we adjust all observations for Germany from Economic Outlook 88, where the base year is 2000, to the base year 2010 used in Economic Outlook 96. Before taking this step, we reconstruct the German series from Economic Outlook 88, which is based on data from West-Germany in the first part of the sample and on data from unified Germany in the latter part of the sample. We take the data for unified Germany as of 1991 and, because for that year we also have data on West-Germany, we take the ratio of the unified German and West-German figures for 1991 and apply this scaling factor to all West-German data before 1991.

- **CPI** = Consumer price index all items, change year-on-year, quarterly (OECD Main Economic Indicators).

- **GDP deflator** = Gross domestic product, deflator, market prices, annually and quarterly (OECD Economic Outlook EO96).

- **Private investment** = Private gross fixed capital formation, volume. The International Monetary Fund (IMF) IFS database provides nominal, sometimes seasonally adjusted and sometimes non-seasonally-adjusted values in local currency units before 1999 and in euros after 1999. We use the IMF’s IFS, because from the OECD the data are missing entirely for Austria, Italy, Portugal and Spain. The IFS data are processed further for two reasons. First, for Italy, before 1999 the series was in trillions of lira (we multiplied by 1000) and for Portugal it was in billions escudo (we multiplied by 1000). For Ireland the linked series was in millions of euros (we divided the entire linked series by 1000). To link two series before and after 1999, we multiply the data in local currency units by the official conversion rate to the euro prevailing in 1999. The conversion rates are the ERM bilateral central rates to be used in determining the irrevocable conversion rates for the euro (see www.ecb.int, 2 May 1998). Second, the IFS data are not compiled in the same way for all the countries: some are seasonally adjusted, some are not. The latter need to be made comparable to the former. Because
non-seasonally adjusted series are not available at all for some countries (France, Germany, Netherlands, Spain), we opt for using the seasonally-adjusted series. Those series that are only available as non-seasonally adjusted, we seasonally adjust ourselves using the X-11 procedure. Having harmonized the unit of currency and seasonally adjusted the non-seasonally adjusted series, we transform the series into real terms using the seasonally-adjusted deflator of gross fixed capital formation from the OECD.\(^3\)

- **Confidence**: A detailed description of the construction of the confidence variables is found in Beetsma *et al.* (2015). They are collected from the OECD, which in turn obtains them from other institutions, such as the national statistical institutes, and which standardizes them to make them comparable across the countries.
  - The *consumer confidence indicator* is based on questionnaires sent out to a random sample of the population. The questionnaires are based on answers to questions on whether or not the individual expects the personal and general economic situation to improve or not. The answers are aggregated to create an index.
  - The *business confidence indicator* is also obtained from the OECD and constructed by aggregating the answers to a number of questions on business tendencies. The OECD standardizes the confidence series in a number of steps. Our impulse responses show the deviations in percent from the baseline.

**Financial variables:**

- **Long-term interest rate** = Long-term interest rate on government bonds, quarterly (OECD Economic Outlook EO96). Missing observations are taken from EO88 (also quarterly): Germany before 1991 (Western Germany) and Ireland before 1990.
- **Short-term interest rate** = Short-term interest rate, quarterly (OECD Economic Outlook 96).\(^4\) Missing observations are taken from EO88 (also quarterly): Germany before 1991 (Western Germany), Ireland between 1984 and 1990, and the UK between 1977 and 1978.
- **Stock market index** = non-seasonally adjusted; obtained from BIS, IMF and OECD.
- **House price index** = non-seasonally adjusted; obtained from BIS, IMF and OECD.
- **US dollar exchange rate** = index, non-seasonally adjusted; obtained from IMF and OECD.

\(^3\) Both the GFCF deflator and the GDP deflator are discontinued for Germany in 1991. To link the two subsamples for each of these series, we take the ratio of prices for Germany (with base year 2010) and prices for Western Germany (with base year 1991), and average the ratio over the quarters of 1991. We multiply by this factor all values for the price index with base 1991 (to effectively transform their base year to 2010).

\(^4\) The short-term interest rate is usually either the three-month interbank offer rate for loans between banks with an excess of liquidity and a shortage of liquidity, or the rate associated with Treasury bills, certificates of deposit or comparable instruments, always of three month maturity. For Euro-area countries the 3-month "European Interbank Offered Rate" is used from the date the country joined the euro.
- **Exchange rates (other)** = quarterly exchange rates of Swedish krona to euro, Danish krone to euro (ECB) and British pound to Euro are obtained from WM/Reuters and Datastream.
- **Nominal effective exchange rate** = index, non-seasonally adjusted; obtained from IMF and OECD.
- **Real effective exchange rate** = index, non-seasonally adjusted; obtained from IMF and OECD.

**Open economy variables:** Quarterly data on exports and imports of goods and services are obtained from OECD. For the UK and Germany this data is available over 1978 - 2013, while the available sample for France is 1980 - 2013. For the remaining countries, the OECD data is only available from 1993 or 1995. For these countries, we extend the quarterly data backwards by splicing these with quarterly data from Eurostat, or if this is unavailable, interpolated quarterly data obtained from the World Bank database. Exports and imports are expressed as a percentage of GDP.

**Appendix B. Construction details of the consolidation announcements dataset**

This appendix is taken over with slight modification from Beetsma *et al.* (2015). Regarding what is considered the announcement of a new consolidation, we have taken the following specific decisions:

- If a newly-elected 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. Similarly, if a newly-elected government communicates a change to an existing plan, we consider this an announcement. However, in most of these cases no figure is available for the future budgetary implications and, hence, these announcements cannot included in the estimation.
- We do not treat EU stability and 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 (not for publication) 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 of the year in which the announcement is made. Below we provide some examples.

**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](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 País* 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 C: Sources of imperfect follow-up

This appendix offers two (potentially complementary) explanations for the weaker follow-up of spending than of revenue consolidation announcements. The first is what we refer to as “passive” non-follow-up and results from over-optimistic output growth forecasts. For standard estimates of elasticities and over-optimism in growth forecasts, this can explain one-third to almost one-half of the average difference in follow-up between spending and revenue announcements. The second is what we refer to as “active” non-follow-up. It is the result of at most partially implemented announcements. A potential explanation is that political resistance to consolidation plans is uncertain, but is more likely to be prohibitive for spending than for revenue plans when it comes to actual implementation. Data on general strikes in Western Europe do indeed suggest that announcements of spending cuts are more frequently followed by socio-political unrest than announcements of revenue increases.

C.1. “Passive” non-follow-up

A first explanation is based on over-optimistic GDP growth forecasts at the time when consolidation measures are devised. For lack of a better name, because governments may be deliberately over-optimistic, we refer to this phenomenon as “passive” non-follow-up. In this case, the lack of follow-up does not follow from an active decision not to carry out a plan. Using a back-of-the-envelope calculation, we show that systematically over-optimistic GDP growth forecasts account for a substantial fraction of the observed difference in follow-up between revenue- and spending-based consolidation plans. The starting point is equation (1). Because we merely want to provide an order-of-magnitude of the role of over-optimism in GDP forecasts in this regard, we keep our set-up as simple as possible, and focus on the case of one-year ahead consolidation plans (hence, \( h = t - 1 \)), while assuming that for a generic variable \( z \).

\[
\frac{z_{t-1}^n}{z_{t-1}^n} = \frac{z_{t-1}^n}{z_{t-1}^n}, \quad \text{which implies that nowcast estimates (i.e. estimates for the current year) are equal to ex-post measures.}
\]

Because forecasting accuracy increases with the horizon over which the forecast is made, the back-of-the-envelope numbers for the shortfalls that we calculate likely form a lower bound. In particular, there is evidence that budgetary forecasts in the EU are systematically more over-optimistic the further they reach into the future (e.g., Beetsma et al., 2009). Under the above assumptions, the difference between the ex-post and planned change (1) reduces to \( \left( \frac{x_t^e}{y_t^e} \right) - \left( \frac{x_{t-1}^e}{y_{t-1}^e} \right) \), for \( X = T, G \). In Beetsma et al. (2013) we show that this expression can be decomposed into a “growth effect” and a “denominator effect”, using the following approximation:⁵

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⁵ There is also a so-called “base effect”, which is zero, however, under our assumptions that nowcast estimates are equal to ex-post measures, and there is a residual effect that we ignore, because it is of second-order importance – see Beetsma et al. (2013) for a discussion.
Here $x_{t-1}^e$ is the planned growth in period $t-1$ of nominal revenues ($X = T$) or nominal expenditure ($X = G$) for period $t$. Further, $x_t^e$ is the corresponding ex-post growth rate over the same period. Finally, $y_{t-1}^e$ is the projected nominal income growth rate in period $t-1$ for period $t$ and $y_t^e$ is the period-$t$ ex-post nominal income growth rate. Assuming that the elasticities $e_T$ and $e_G$ of revenues, respectively expenditures, with respect to output are constant, we have $x_t^e = e_T y_t^e$ and $x_{t-1}^e = e_T y_{t-1}^e$ (with $X = T, G$).

Frankel (2011) finds that the average optimism bias in nominal output growth projections for EU countries is around 0.5%. Using the information in Table A.3 of Mourre et al. (2014), we are able to compute the average revenue and expenditure elasticities with respect to output of the thirteen EU countries in our sample. The resulting elasticities are $e_T = 1.11$ and $e_G = -0.16$. Finally, based on the ex-post measures available in the OECD Economic Outlook (November 2015), we find that the ratios of total nominal revenues (narrow definition) and total nominal expenditure (narrow definition) over nominal GDP are $T^e_t/Y^e_t = 0.39$ and $G^e_t/Y^e_t = 0.39$, respectively. On the basis of this calibration, assuming an average ex-post nominal GDP growth rate $y^e_t$ of 4.5% and (for consistency) an average nominal GDP growth forecast $y_{t-1}^e$ of 5%, we can now calculate the average shortfall for both revenues and expenditure. In the case of revenues the shortfall is, in percent of GDP, $[0.39/((1+0.045)(1+0.050))][1.11*(-0.5)] \approx -0.20$ (growth effect) minus $[0.39/((1+0.045)(1+0.050)))(-0.5) \approx -0.18$ (denominator effect), hence -0.02 percent of GDP. In other words, the ex-post revenue ratio of GDP is on average 0.02 percent lower than planned as a result of the over-optimistic nominal GDP growth forecast. In the case of expenditure the shortfall is, in percent of GDP, $[0.39/((1+0.045)(1+0.050))][(-0.16)*(-0.5)] \approx 0.03$ (growth effect) minus $[0.39/((1+0.045)(1+0.050))][(-0.5)] \approx -0.18$ (denominator effect), hence 0.21 percent of GDP. In other words, the ex-post spending ratio of GDP is on average 0.21 percent of GDP higher than planned. The above back-of-the-envelope calculations suggest that systematic biases in the GDP growth forecasts lead to systematically larger shortfalls from plans for spending reductions than for revenue increases, which can explain a non-negligible fraction of the empirically-observed average difference between the shortfalls.

The intuition why the shortfalls from plans for spending reductions are larger than for revenue increases is the following. Expression (C.1) shows that the contribution of the denominator effect to the shortfall is the same for both revenue and spending plans. However, the growth effects differ. A negative denominator effect, due to an overoptimistic growth projection, is, due to the high revenue elasticity, slightly more than offset by revenues being lower than projected (the negative growth effect slightly more than offsets the negative denominator effect). Hence, the growth and denominator effects work in opposite directions,
Elasticities

C.2. Here, 

A word of caution is needed with respect to this comparison. The elasticities used here are based on the effects on spending and revenues of changes in the business cycle, while output growth from one period to the other is the combination of a change in potential output and a change in the business cycle position. Elasticities with respect to the first component may differ from those with respect to the latter component.

C.2. “Active” non-follow-up

Our second explanation concerns “active” non-follow-up, which refers to the possibility that announced consolidation measures are at most partially carried out. It is conceivable that at the moment a consolidation plan is constructed, it is unclear how large the political costs associated with the plan are. As actual implementation approaches, it may be that spending reductions are more likely to be politically prohibitive and, hence, take place with a lower frequency than revenue increases – the latter tend to be less concentrated among specific groups than the former and, hence, feature a less favorable trade-off between the expected benefits and costs of specific groups to engage in efforts to block the planned consolidation measures.

Here, we provide some indirect data support for the hypothesis that actually implementing spending cuts may be politically more prohibitive than actually increasing revenues. Hamann et al. (2013, 2016) document on 159 episodes of general strikes in fifteen countries in the European Union plus Norway over the period 1980-2006. The data contain information about the country where the strike occurs, the exact date of the strike, the main governing party, the issue in dispute and the outcome of the strike in terms of concessions. Examples of issues in dispute are “Labour law reform”, “Austerity”, “Pensions”, “Economic policy” and “Public spending”. In a number of instances the description of the issue in dispute makes it quite clear whether the strike is associated with public spending cuts or tax increases. However, in many instances this is not clear. For example, when the issue in dispute is “Austerity”, this can be result of spending cuts, revenues increases or both. Hence, we check all strikes to get more information, especially in cases where the motivation is “Economic policy”, “Public spending” and “Austerity”. In particular, we look for newspaper articles documenting the strike and try to deduce what its motivation is. A substantial number of disputes are about pensions. We classify them as “spending cut motivated”, as we expect that pension measures that lead to strikes are typically aimed at reducing expenditures on public pensions. Indirectly, this is also the case for (planned) increases in the retirement age, which will also result in

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6 We assume that the protests are never against expansionary budgetary measures. For example, if the issue in dispute is “Public spending”, we assume that the protests are against public spending cuts and not spending expansions.
reduced spending on pension benefits, ceteris paribus. In cases where the strike was against an austerity budget comprising changes in both revenue and spending, we have characterized the protest as against both categories of measures. At the end of this appendix we provide a few examples of the assignment of issues in dispute in the strikes.

The dataset on strikes considers a slightly larger set of countries than our consolidation announcement data and it also includes an outlier in terms of the number of general strikes: out of the total of 159 episodes, 69 are registered in Greece. We start by analyzing the dataset in full and then restrict our attention to the country sample matching our 13 sample countries.

Out of the 159 episodes of general strikes, we find that 69 are spending-cut motivated, 43 after excluding those where the issue in dispute is pensions, while the number of revenue-raise motivated strikes is only 7. Hence, disputes motivated by spending-cuts occur with a substantially higher frequency than disputes motivated by revenue increases. We also observe 34 strikes against austerity in general, hence aimed at adjustments in both revenues and spending. Excluding Greece, Luxembourg and Norway, 85 strike episodes remain, of which 40 are motivated by spending cuts (23 upon exclusion of the pension-related disputes), 6 are motivated by revenue increases and 8 are motivated by both revenue increases and spending cuts. The information is summarized in Figures C.1(a) and C.1(b).

**Figure C.1: Strikes in Western Europe by issue in dispute**

(a) Absolute numbers

(b) Percentages
As a next step, we select only those strikes that took place before 2014 in our country sample, leading to data of general strikes in eight countries: Austria, Belgium, Finland, France, Italy, Netherlands, Portugal, Spain. After removing the strikes that cannot be assigned specifically to austerity measures, we are left with twenty strikes that can be matched with the consolidation announcements in our dataset on the basis of the narrative description of the strike and the consolidation (one in Finland, one in France, one in Spain, one in the Netherlands, two in Portugal, four in Belgium and ten in Italy). Out of the twenty strikes, three were undertaken in reaction to the same austerity announcement (in December 2011 in Italy). Three were undertaken in response to revenue-based announcements (namely in Italy in September 2011, December 2011 and October 2013) and 17 in response to spending-based announcements. Moreover, out of these 17 spending-based announcements eight have a revenue component of zero. From Table C.1 we observe that the spending-reduction component in the consolidation plan is on average relatively larger for consolidation announcements that can be matched to a general strike than for the other consolidation announcements.

Table C.1: Links between strikes and announcements in our dataset

<table>
<thead>
<tr>
<th>Strike following announcement</th>
<th>Average reduction in spending</th>
<th>Average increase in revenues</th>
<th>Total value of announcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0.82 (64.6%)</td>
<td>0.52 (35.4%)</td>
<td>1.34</td>
</tr>
<tr>
<td>Yes</td>
<td>0.94 (72.7%)</td>
<td>0.29 (27.3%)</td>
<td>1.23</td>
</tr>
</tbody>
</table>

Notes: In brackets we report the share of the total value of the announcement accounted for on average by the spending or the revenue component.
Interestingly, for some of the general strikes we consider, newspaper articles and online sources that discuss them contain information that participants in a strike have a preference for tax increases relative to government spending cuts. For example, in November 1992, Finnish unions countered a government proposal of reduced unemployment benefits with the threat of a general strike. The conflict remained unresolved until the centre-right government "agreed not to reduce the unemployment benefits, and instead reluctantly accepted the union's demand for increased taxes" (Sundberg, 1993, quoted in Uwe Becker - The Changing Political Economies of Small West European Countries, p. 51). Another example concerns a pension reform initiated in 2004 in Italy. It seems the protesters perceived tax cuts as a more efficient electoral tool and felt that the pension reform was undertaken to create the possibility for tax cuts in view of the election. “The conservative government of the prime minister, Silvio Berlusconi, has already watered down the pension reform bill to try to appease the unions while still aiming to save more than £6bn a year. Union leaders say the government only wants to save on pensions so it can reduce taxes to boost its chances at the polls.” (https://www.theguardian.com/world/2004/mar/26/italy; http://www.corriere.it/Primo_Piano/Cronache/2004/03_Marzo/26/sciopero.shtml).

*Examples of assignment of issues in dispute in the strikes:*

Here, we provide some examples of how we assign issues in dispute to public spending cuts, revenue increases, a combination of both, or some other matter.

**Example 1:** Greece, 8 December 2016, issue in dispute is “Labour law reform”. On the basis of additional information from www.aljazeera.com/news/2016/12/greeks-strike-repressive-austerity-161208081056974.html we classify “Greece's leading unions have launched a general strike that shut down several key sectors in protest over planned new pay cuts and taxes called for by international creditors” as “both spending cut and revenue increase”.

**Example 2:** Belgium, 24 June 2016, issue in dispute is “Austerity”. On the basis of additional information from www.telesurtv.net/english/news/Thousands-Continue-Strikes-Across-Belgium--20160601-0001.html “Workers are protesting against the government's social and economic policies, which includes budget cuts. A number of trade unions have been protesting against government changes to labor laws including plans to increase the retirement age; to make it easier for companies to employ workers on part-time and short-term contracts; and to extend the working-week to 45 hours”. We classify this as “spending cut motivated”.

**Example 3:** Finland, 18 September 2015, issue in dispute is “Austerity”. On the basis of additional information from http://www.bbc.com/news/business-34287816 “Strikers are protesting against government cutbacks, including limits to benefits and overtime pay. The plans included cutting back
holidays, reducing pensioners' housing allowances, and reductions in employees' overtime and Sunday pay.” We classify this as “spending cut motivated”.

Appendix D: Bayesian estimation of the panel VAR model

The panel VAR model is defined in equation (3).

Priors

The prior is implemented using $T_d$ dummy observations $Y_D$ and $X_D$ where $Y_D = \begin{pmatrix} Y_{D1} \\ Y_{D2} \end{pmatrix}$ and $X_D = \begin{pmatrix} X_{D1} \\ X_{D2} \end{pmatrix}$

The prior on the VAR autoregressive coefficients and error covariance is implemented via the dummy observations

$$Y_{D1} = \begin{pmatrix} \text{diag}(f_0, \ldots, f_N) \\ 0_{N(L-1) \times N} \\ \vdots \\ \text{diag}(\sigma_L, \ldots, \sigma_N) \\ 0_{L \times 1} \end{pmatrix}$$

$$X_{D1} = \begin{pmatrix} \text{diag}(1, \ldots, L) \otimes \text{diag}(\sigma_L, \ldots, \sigma_N) \\ 0_{N \times NE} \\ \vdots \\ 0_{1 \times NE} \end{pmatrix} \begin{pmatrix} 0_{N \times 1} \\ 0_{N \times 1} \\ \cdots \\ \varepsilon \times I_{EX} \end{pmatrix}$$

where $f$ denotes the mean of the prior, $\sigma_i$ are scaling factors set using preliminary AR(1) regressions, $\tau$ is the tightness of the prior for the autoregressive coefficients, while $\varepsilon$ controls the prior for the exogenous regressors (i.e. fixed effects and coefficients on seasonal dummies, with the total number of coefficients on such regressors given by $EX$). In our application $\tau = 1$ and $c=1/10000$, implying a fairly loose prior.

Following Bańbura et al. (2010), we also incorporate a prior belief for the sum of coefficients on the lagged dependent variables. This is implemented via the dummy observations:

$$Y_{D2} = \frac{\text{diag}(\gamma_{01}, \ldots, \gamma_{0N})}{\lambda}$$

$$X_{D2} = \begin{pmatrix} \mu_{1} \times \text{diag}(\gamma_{01}, \ldots, \gamma_{0N}) \\ \mu_{1} \times 0_{N \times 1} \end{pmatrix}$$

Where $\mu_{i}$ denotes the sample mean for the $i$th endogenous variable. As in Bańbura et al. (2010), the tightness parameter is set as $\lambda = 10\tau$. 
Gibbs Algorithm

The posterior distribution is approximated via a standard Gibbs algorithm that samples from the following conditional posterior distributions (denote \( B = \text{vec}(\alpha, \beta, \gamma, \delta) \)) and let \( X \) denote all the regressors on the right-hand side of the VAR equation).

1. \( G(B|\Omega) \): this conditional posterior is based on a normal density \( N(B^*, \Omega \otimes (X^*X^*)^{-1}) \), where \( B^* = (X^*X^*)^{-1}X^*Z^* \). Note that \( Z^* = \left( \begin{array}{c} Z \\ F_{d} \end{array} \right) \), \( X^* = \left( \begin{array}{c} X \\ X_{d} \end{array} \right) \) represents the actual data stacked on top of the dummy observations.

2. \( G(\Omega|B) \): this conditional posterior is inverse Wishart \( IW(S^*, NT + T_B - K) \), where \( S^* = (Z^* - X^*B)(Z^* - X^*B)^\prime \) and \( K \) denotes the number of regressors in each VAR equation. The algorithm uses 25000 iterations with a burn-in of 15000 iterations. The figure below shows that the inefficiency factors are low. This provides evidence in favour of convergence of the algorithm.
Appendix E: Division in fixed and floating regimes

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1999Q1 -</td>
</tr>
<tr>
<td>Belgium</td>
<td>1978Q1 -</td>
</tr>
<tr>
<td>Denmark</td>
<td>1999Q1 - 2001Q4</td>
</tr>
<tr>
<td>Finland</td>
<td>1978Q1 - 1992Q3; 1995Q1 -</td>
</tr>
<tr>
<td>France</td>
<td>1987Q1 -</td>
</tr>
<tr>
<td>Germany</td>
<td>1999Q1 -</td>
</tr>
<tr>
<td>Ireland</td>
<td>1978Q1 – 1979Q1; 1996Q4 -</td>
</tr>
<tr>
<td>Italy</td>
<td>1997Q1 -</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1983Q2 -</td>
</tr>
<tr>
<td>Portugal</td>
<td>1993Q3 -</td>
</tr>
<tr>
<td>Spain</td>
<td>1994Q2 -</td>
</tr>
<tr>
<td>Sweden</td>
<td>-</td>
</tr>
<tr>
<td>UK</td>
<td>1990Q4 – 1992Q3</td>
</tr>
</tbody>
</table>

Notes: classification is based on Reinhart and Rogoff (2002) as well as internet sources. We classify pegs, currency unions and exchange rate bands as “fixed”. The remaining regimes are “floats”, which thus also include crawling pegs, crawling bands, moving bands, etcetera. Quarters featuring both a fixed and a floating regime are assigned to the fixed rates sample if the largest part of the quarter is characterized as a fixed regime. Otherwise, the quarter is characterized as a float.
Appendix F: additional regressions:

Figure F.1: baseline extended with stock price index

Notes: See Notes to Figure 2.
Figure F.2: baseline extended with house price index

Notes: See Notes to Figure 2.
Figure F.3: baseline extended with private investment

Notes: See Notes to Figure 2.
Figure F.4: baseline with private investment and business confidence replacing consumption and consumer confidence

Notes: See Notes to Figure 2.
Figure F.5: baseline extended with exports, imports and nominal effective exchange rate

Notes: See Notes to Figure 2.
Figure F.6: baseline extended with exports, imports and local currency/dollar exchange rate

Notes: See Notes to Figure 2. Further, an increase in the local currency/ dollar exchange rate corresponds to a depreciation of the local currency against the dollar.
Figure F.7: Differences in responses between actual and counterfactual – open economy

Notes: See Notes to Figure 5.
Figure F.8: Setting the response of the short-term rate to zero

Notes: See Notes to Figure 2.
Figure F.9: Counterfactual multipliers.

Notes: Revenue (spending) based multiplier calculated holding response of spending (revenue) fixed at 0 for K=8 quarters.
References