COMPANION APPENDIX TO
Spending-based austerity measures and their effects on output and unemployment
(intended for online publication)

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A  F.O.C. from the household’s problem

Equations (2), (3), (6), can be summarized as:

\[ n_{t+1}^p = (1 - \sigma^p)n_t^p + \psi_t^{hpS}(1 - s_t^S)u_t^S + \psi_t^{hpL}(1 - s_t^L)u_t^L \]  
(A1)

\[ n_{t+1}^g = (1 - \sigma^g)n_t^g + \psi_t^{hgS}s_t^Su_t^S + \psi_t^{hgL}s_t^Lu_t^L \]  
(A2)

\[ u_{t+1}^S = \sigma^p n_t^p + \sigma^g n_t^g + (1 - \epsilon)u_t^S - \left[ \psi_t^{hpS}(1 - s_t^S) + \psi_t^{hgS}s_t^S \right] u_t^S \]  
(A3)

The problem of the household is to maximize (9) subject to (10), the budget constraint and the three equations above. In order to derive a relative price for public goods, \( p_t^g \), we assume that households decide on the usage of public goods and pay a price for the public goods. This implies that their budget constraint is determined by:

\[ c_t^p + \tilde{y}_t^p + \frac{\tilde{q}_t^g}{p_t} \tilde{y}_t^g + \frac{B_{t+1}}{p_t R_t} \leq [r_t^p - \tau_k(r_t^p - \delta^p)]k_t^p + (1 - \tau_n)(w_t^pn_t^p + w_t^qn_t^q) + bu_t + \frac{B_t}{p_t} + \Pi_t^p - T_t \]

If we denote by \( \lambda_{ct} \), \( \lambda_{npt} \), \( \lambda_{ngt} \), \( \lambda_{ust} \) the multipliers in front of the budget constraint, and equations (A1)-(A3), the first-order conditions from the optimization problem are:

[wrt \( c_t^p \)]

\[ (c_t^p + \eta y_t^g)^{-\eta} = \lambda_{ct} \]  
(A4)

[wrt \( y_t^g \)]

\[ z (c_t^p + \eta y_t^g)^{-\eta} = \lambda_{ct} \frac{p_t^g}{p_t} \]  
(A5)

[wrt \( K_{t+1}^p \)]

\[ \lambda_{ct} \left[ 1 + \omega \left( \frac{K_{t+1}^p}{K_t^p} - 1 \right) \right] = \beta E_t \lambda_{ct+1} \left\{ 1 - \delta^p + [r_{t+1}^p - \tau_k(r_{t+1}^p - \delta^p)] + \frac{\omega}{2} \left[ \left( \frac{K_{t+2}^p}{K_{t+1}^p} \right)^2 - 1 \right] \right\} \]  
(A6)

[wrt \( B_{t+1} \)]

\[ \lambda_{ct} \pi_{t+1} = \beta E_t \lambda_{ct+1} R_t \]  
(A7)
[wrt $n^j_{t+1}$]

$$\lambda_{njt} = \beta E_t \left[ \lambda_{ct+1} (1 - \tau_n)w^j_{t+1} + \lambda_{njt+1} (1 - \sigma^j) + \lambda_{u^s_{t+1}} \sigma^j - U_{l,t+1} \right] \text{ for } j = p, g$$  \hfill (A8)

[wrt $u^S_{t+1}$]

$$\lambda_{u^S_t} = \beta E_t \{ \lambda_{ct+1} b + \lambda_{n^T_{t+1}} \psi^{hpS}_{t+1} (1 - s^S_{t+1}) + \lambda_{n^s_{t+1}} \psi^{bgS}_{t+1} s^S_{t+1} \}
+ \lambda_{us_{t+1}} \left[ 1 - \xi - \psi^{hpS}_{t+1} (1 - s^S_{t+1}) - \psi^{bgS}_{t+1} s^S_{t+1} \right] - U_{l,t+1} \} \quad (A9)$$

[wrt $u^L_t$]

$$\lambda_{np^T_{t}} \psi^{hpL}_{t} (1 - s^L_{t}) + \lambda_{n^s_{t}} \psi^{bgL}_{t} s^L_{t} + \lambda_{cd} b = U_{l,t} \quad (A10)$$

[wrt $s^S_t$]

$$ (\lambda_{np^T_{t}} - \lambda_{u^S_{t}}) \psi^{hpS}_{t} = (\lambda_{n^s_{t}} - \lambda_{u^S_{t}}) \psi^{bgS}_{t} \quad (A11)$$

[wrt $s^L_{t}$]

$$\lambda_{np^T_{t}} \psi^{hpL}_{t} = \lambda_{n^s_{t}} \psi^{bgL}_{t} \quad (A12)$$

where $U_{l,t} \equiv \Phi l_{t}^{-\psi}$ is the marginal utility from leisure (labor market non-participation). Equations (A4)-(A7) are standard and include the arbitrage conditions for the returns to private consumption, the public good, private capital and bonds. Notice that (A4)-(A5) imply that \( \frac{p^g}{p^t} = z \). Equation (A8) relates the expected marginal value from being employed to the after-tax wage, the utility loss from the reduction in leisure, and the continuation value, which depends on the separation probability. Equation (A9) associates the expected marginal value from being short-term unemployed with the expected marginal values of being search active (rather than non-participating), \( \lambda_{ct+1} b \), of being employed, \( \lambda_{n^T_{t+1}} \), weighted by the job finding probabilities, \( \psi^{hpL}_{t+1} \), of being short-term unemployed weighted by the respective probability, \( \psi^{hpS}_{t+1} (1 - s^S_{t+1}) - \psi^{bgS}_{t+1} s^S_{t+1} \), and finally with the utility loss from the reduction in leisure. Equation (A10) states that the value of being search active (rather than non-participating), \( \lambda_{cd} b \), plus the expected marginal values of being employed, \( \lambda_{n^s_{t}} \), weighted by the job finding probabilities, \( \psi^{hjL}_{t+1} \), and the respective share of outside jobseekers should equal the marginal utility from leisure, \( U_{l,t} \). Equations (A11)-(A12) are arbitrage conditions according to which the choice of shares \( s^S_t \) and \( s^L_t \) is such that the expected marginal values of being employed, weighted by the job finding probabilities, are equal across the two sectors. Notice
that in the case of the share of short-term unemployed seeking a public-sector job the expected marginal values of being employed are expressed net of the expected marginal value of being short-term unemployed.

B Derivation of the private wage

Substituting (15) and (21) in (26) we get:

$$(1-\vartheta) \left( \frac{1-\tau_{nt}}{(c_t^p + zy_t^g)^\eta} \right) \left[ x_t (1-\varphi) \frac{y_t^p}{n_t^p} - u_t^p + \frac{(1-\sigma^p)\kappa}{\psi_t^p} \right] = \vartheta \left[ \frac{(1-\tau_{nt})}{(c_t^p + zy_t^g)^\eta} u_t^p - U_{t,t} + (1-\sigma^p)\lambda_{npt} + \sigma^p \lambda_{ut} \right]$$

$$\Rightarrow w_t^p = (1-\vartheta) \left[ x_t (1-\varphi) \frac{y_t^p}{n_t^p} + \frac{(1-\sigma^p)\kappa}{\psi_t^p} \right] - \vartheta \left( \frac{(c_t^p + zy_t^g)^\eta}{(1-\tau_{nt})} \right) \left[ -U_{t,t} + (1-\sigma^p)\lambda_{npt} + \sigma^p \lambda_{ut} \right]$$

Evaluating (26) for the next period, and taking expectations given today’s information set, we get:

$$(1-\vartheta)(1-\tau_{nt})E_t \Lambda_{t,t+1} V_{npt+1}^F = \vartheta E_t (c_t^p + zy_t^g)^\eta V_{npt+1}^H$$

which, by using the FOC of the households and (20) and (21) for the left-hand side, becomes:

$$\frac{(1-\vartheta)\kappa}{\psi_t^p} = \frac{\vartheta \lambda_{npt}}{(1-\tau_{nt}) (c_t^p + zy_t^g)^{-\eta}}$$

(B1)

Using (B1) we get:

$$w_t^p = (1-\vartheta) \left[ x_t (1-\varphi) \frac{y_t^p}{n_t^p} + \frac{(1-\sigma^p)\kappa}{\psi_t^p} \right] - (1-\sigma^p) \frac{(1-\vartheta)\kappa}{\psi_t^p} \left[ -U_{t,t} + \sigma^p \lambda_{ut} \right]$$

$$\Rightarrow w_t^p = (1-\vartheta) x_t (1-\varphi) \frac{y_t^p}{n_t^p} - \frac{\vartheta (c_t^p + zy_t^g)^\eta}{(1-\tau_{nt})} \left[ -U_{t,t} + \sigma^p \lambda_{ut} \right]$$

Using (A10) it follows:

$$w_t^p = (1-\vartheta) x_t (1-\varphi) \frac{y_t^p}{n_t^p} - \frac{\vartheta (c_t^p + zy_t^g)^\eta}{(1-\tau_{nt})} \left[ -\left( \lambda_{npt} \psi_t^{hp} (1-s_t^{O}) + \lambda_{npt} \psi_t^{hp} s_t^{O} + \lambda_{a} b \right) + \sigma^p \lambda_{ut} \right]$$
Using (A12) we get:

\[ w^p_t = (1 - \vartheta) x_t (1 - \varphi) \frac{y^p_{t_t}}{n^p_t} - \frac{\vartheta (c^p_t + z y^g_t)^\eta}{(1 - \tau_n)} \left( -\lambda_{n^p t} \psi^{hpO}_t - \lambda c t b + \sigma^p \lambda_{u^t t} \right) \]

Using (A4) we get:

\[ w^p_t = (1 - \vartheta) x_t (1 - \varphi) \frac{y^p_{t_t}}{n^p_t} + \frac{\vartheta b}{(1 - \tau_n)} + \frac{\vartheta \lambda_{n^p t} \psi^{hpO}_t}{(1 - \tau_n) (c^p_t + z y^g_t)^{\eta}} - \frac{\vartheta \sigma^p \lambda_{u^t t}}{(1 - \tau_n) (c^p_t + z y^g_t)^{\eta}} \]

Using (B1) we get:

\[ w^p_t = (1 - \vartheta) x_t (1 - \varphi) \frac{y^p_{t_t}}{n^p_t} + \frac{\vartheta b}{(1 - \tau_n)} + \frac{(1 - \vartheta) \kappa}{\psi^{fp}_t \psi^{hpO}_t} - \frac{\vartheta \sigma^p \lambda_{u^t t}}{(1 - \tau_n) (c^p_t + z y^g_t)^{\eta}} \]

\[ \Rightarrow w^p_t = (1 - \vartheta) \left[ x_t (1 - \varphi) \frac{y^p_{t_t}}{n^p_t} + \frac{\kappa}{\psi^{fp}_t \psi^{hpO}_t} \right] + \frac{\vartheta b}{(1 - \tau_n)} - \frac{\vartheta \sigma^p (c^p_t + z y^g_t)^\eta \beta E_t V^H_{u^t t+1}}{(1 - \tau_n)} \]

C Steady state calculations and calibration

We calibrate the labor-force participation rate, the unemployment rate, and the share of public employment in total employment to match the observed average values from the US data \((1 - l = 0.65, \frac{u}{n + u} = 0.06, \frac{n^g}{n} = 0.16)\). Then we get \(u, n, \frac{n^p}{n}, n^p, n^g\) as follows:

\[ u = \frac{u}{n + u} (n + u) \overset{(1)}{=} \frac{u}{n + u} (1 - l) \]

\[ n = 1 - l - u \]

\[ \frac{n^p}{n} = 1 - \frac{n^g}{n} \]

\[ n^j = \frac{n^j}{n} \]

We set the following values for the separation rates, \(\sigma^p = 0.025\) and \(\sigma^g = 0.018\). Then we get \(m^j\) from (2) at the steady state:

\[ m^j = \sigma^j n^j \]
Following Shimer (2010), we calibrate the private job finding rate, $\psi^{hp}$ to equal to 0.83. According to Barnichon and Figura (2011) having an unemployment spell lasting six months reduces $\psi^{hp}$ by 1-1.5 percentage points. Hence assuming that $\frac{\psi^{hpS}}{\psi^{hpL}} = 1.015$ and the definition of the aggregate private job finding rate we get:

$$\psi^{hp} = \psi^{hpL} + \psi^{hpS}, \quad \psi^{hpL} = \frac{\psi^{hp}}{1 + \frac{\psi^{hpS}}{\psi^{hpL}}} \quad \text{and} \quad \psi^{hpS} = \frac{\psi^{hpS}}{\psi^{hpL}} \psi^{hpL}$$

Also by definition:

$$u^p = \psi^{hp}$$
$$u^g = u - u^p$$
$$\psi^{hg} = \frac{m^g}{u^g}$$

Since there is no exact estimate for the value of the private vacancy-filling probability, $\psi^{fp}$, in the literature, we use what is considered as standard by setting it equal to 0.54 and then we assume that $\psi^{fp} = \psi^{fg}$. Hence, we get $\theta^j, v^p$ from (6) after using (4)-(5):

$$\theta^j = \frac{\psi^{hj}}{\psi^{jj}}$$
$$v^j = \theta^j u^j$$

Long-term unemployment, defined as the share of unemployed with a spell lasting longer than 27 weeks, represents 16% of total unemployment according to CPS data, i.e. $\frac{u^L}{u} = 0.16$, so we get:

$$\frac{u^S}{u} = 1 - \frac{u^L}{u}$$
$$u^L = \frac{u^L}{u} u \quad \text{and} \quad u^S = \frac{u^S}{u} u$$

We set the capital depreciation rates, $\delta^j$, equal to 0.025. Then we derive $\frac{\psi^p}{k}, \frac{\psi^g}{k}$ from (10) and (29):

$$\frac{i^j}{k^j} = \delta^j$$
Following the literature, we set the discount factor, $\beta$, equal to 0.99. We set the average tax rates $\tau_k = 0.15$ and $\tau_n = 0.25$. Next, we get $r^p$ and $R$ from (A6) and (A7), respectively:

$$r^p = \frac{1}{(1 - \tau_k)} \left( \frac{1}{\beta} - 1 \right) + \delta^p$$

$$R = \frac{1}{\beta}$$

The elasticity of demand for intermediate goods, $\varepsilon$, is set equal to 11, which implies a gross steady-state markup, $\varepsilon - 1$, equal to 1.1, and the price of the final good is normalized to one. Then $x$ is determined from (25):

$$x = \frac{\varepsilon - 1}{\varepsilon}$$

We set the capital share in the production function of the private good equal to 0.36. Then we obtain $y^p_{k^p}$ from (19):

$$y^p_{k^p} = \frac{r^p}{\varphi x}$$

We set the shares of public capital in public production, $\mu$, equal to 0.36 and of the public good in private production, $\nu$, equal to 0.2. Further, using data from Kamps (2006) we set $k^g_{k^p} = 0.31$, equal to the mean value for 1970-2002. Since we restrict our case to a deterministic steady state, we normalize the productivity shock to one. Then from (16) and (28) $k^p$ is determined by:

$$k^p = \left[ \frac{y^p_{k^p}}{k^p} \left( \varepsilon A n^p \right)^{(1-\mu)} \left( \varepsilon A n^g \right)^{\mu - \nu} \left( \frac{k^g}{k^p} \right)^{-\mu \nu} \right]^{\frac{1}{\mu + \mu \nu - 1}}$$

and then we get by definition $i^p$, $y^p$, $k^g$, $i^g$:

$$i^p = \frac{i^p}{k^g \k^p}, \quad y^p = \frac{y^p}{k^p \k^p} \quad \text{and} \quad k^g = \frac{k^g}{k^p \k^p}$$

$$i^g = \frac{i^g}{k^g \k^g}$$

and $y^g$ from (28):

$$y^g = (\varepsilon A n^g)^{1-\mu} (k^g)^{\mu}$$
We set the preference parameter for the public good, \( z \), equal to 0.2 and we derive total output in the steady state from (36):

\[
y = y^p + zy^g
\]

Following Hagedorn and Manovskii (2008), Galí (2011), and Brückner and Pappa (2012), we calibrate the cost of posting a vacancy, \( \kappa \), by targeting vacancy costs per filled job as a fraction of the real private wage, \( \frac{\kappa}{w^p} \), choosing 0.045 as a target as in Galí (2011). Also, we set the replacement rate, \( \frac{b}{w^p} \), equal to 0.3 (in accordance with the range \([0.2, 0.4]\) in Petrongolo and Pissarides (2001)). Then, we can get \( w^p \) from (20):

\[
w^p = x(1 - \varphi)\frac{y^p}{n^p} \left(1 + \frac{\sigma^p}{w^p} \frac{\kappa}{w^p} \right)^{-1}
\]

and it follows that \( \kappa \) and \( b \) are given by:

\[
\kappa = \frac{\kappa}{w^p} w^p
\]

\[
b = \frac{b}{w^p} w^p
\]

We set the steady-state public-wage premium and the output share of public consumption spending equal to the observed average values from the data, \( \frac{w^g}{w^p} = 1.16 \) and \( \frac{c^g}{y} = 0.165 \). It follows from (30) and (35):

\[
w^g = \frac{w^g}{w^p} w^p
\]

\[
c^g = \frac{c^g}{y}
\]

\[
c^p = y^p - i^p - c^g - i^g - \kappa(y^p + i^g)
\]

We set the steady-state debt to GDP ratio, \( \frac{B}{y} \), equal to 60%, so that by definition:

\[
B = \frac{B}{y}
\]

Next, we calibrate the steady state value for lump-sum transfers, \( T \), equal to 0.05 so that in the steady state the deficit to GDP ratio is 3%. From the definition of the government deficit
in (24) we have:

$$DF = \epsilon g + i g + u^g n^g + bu + \kappa v g - T - \tau_k (r^p - \delta^p) k^p - \tau_n (w^p n^p + w^g n^g)$$

We set the intertemporal elasticity of substitution, $\frac{1}{\eta}$, equal to 1, the Frisch elasticity of labor supply, $\frac{1}{\varphi}$, equal to 0.25 (in the range of Domeij and Floden (2006)), and the bargaining power, $\vartheta$, by the Hosios condition equal to 0.6, which is the value we use for the matching elasticity, $\alpha$. Then we get from (A4) and (27):

$$\lambda_c = (\epsilon p + z y g)^{-\eta}$$

$$\lambda_{u^s} = \frac{\lambda_c}{\sigma p} \left\{ b + \frac{(1 - \tau_n)}{\varphi} \left[ -u^p + (1 - \vartheta) \left( x(1 - \varphi) \frac{y^p}{n^p} + \kappa \frac{\varphi}{y^p \psi^{h p L}} \right) \right] \right\}$$

and then from the household’s FOCs at the steady state:

$$\lambda_{n^p} = \frac{\lambda_c [(1 - \tau_n) w^p - b] + \sigma p \lambda_{u^s}}{\psi^{h p L} - 1 + \sigma p + \frac{1}{\beta}}$$ [see (A8) after using (A10), (A11)]

$$\Phi = (\lambda_c b + \lambda_{n^p} \psi^{h p L}) l^\varphi$$ [see (A10) after using (A12)]

$$\psi^{h g L} = \frac{\lambda_{n^p} \psi^{h p L}}{\lambda_{n^s}}$$ [see (A12)]

Using the definition of the aggregate public job finding rate we get:

$$\psi^{h g S} = \psi^{h g} - \psi^{h g L}$$

Dividing $m^{ps}_t$ by $m^{ps}_t$ implies from (4)-(5) after using (6):

$$\frac{u^g S}{w^{ps}} = \frac{v^p}{v^g} \left( \frac{\psi^{h g S}}{\psi^{h p S}} \right)^{1/\alpha}$$ and $$\frac{u^g L}{w^{ps}} = \frac{v^p}{v^g} \left( \frac{\psi^{h g L}}{\psi^{h p L}} \right)^{1/\alpha}$$

$$u^S = u^{ps} + u^{gs} \Rightarrow u^{ps} = \frac{u^S}{1 + \frac{u^{gs}}{w^{ps}}} \text{ and } u^L = u^{ps} + u^{gL} \Rightarrow u^{gL} = \frac{u^L}{1 + \frac{u^{gL}}{w^{ps}}}$$

$$u^{gs} = u^S - u^{ps} \text{ and } u^{gL} = u^L - u^{gL}$$
Then the matching efficiencies are given by (4) after using (6):

\[
\rho_m^S = \psi^{hpS} \left( \frac{u^{pS}}{u^{p'}} \right)^\alpha \quad \text{and} \quad \rho_m^L = \psi^{hpL} \left( \frac{u^{pL}}{u^{p'}} \right)^\alpha
\]

The probability of a short-term unemployed becoming in the next period long-term unemployed, \( \xi \), is determined by (3) in the steady state after using (2) and (6):

\[
\xi = \psi^{hp} \frac{u^p}{u^S} + \psi^{hg} \frac{u^g}{u^S} - \psi^{hpS} \frac{u^{pS}}{u^S} - \psi^{hgS} \frac{u^{gS}}{u^S}
\]

Finally, the model’s steady state is independent of the degree of price rigidities, the monetary policy rule, the debt-targeting rule for lump-sum taxes, the size of the capital adjustment costs, and the elasticity of public wages with respect to private wages. We set the probability that a firm does not change its price within a given period, \( \chi \), equal to 0.75, the Taylor rule coefficient, \( \zeta_\pi \), equal to 1.5, the coefficient on the debt-targeting rule, \( \zeta_B \), equal to 2.0, the adjustment costs parameter, \( \omega \), equal to 0.8, and the public wage elasticity equal to 0.94. Finally, we set the parameters for the persistence of the fiscal shocks and the public wage shock, \( \psi^{g^\psi} \) and \( \psi^{w^g} \), equal to 0.8, and the parameters for the persistence of the productivity and the monetary policy shocks, \( \psi^A \) and \( \psi^R \), equal to 0.95 and 0.65, respectively.
Data sources and definitions

All data are quarterly and come from the OECD Economic Outlook No. 90. Real per capita variables are deflated by the GDP deflator and divided by the population. A description of the variables follows.

Population: Population (hist5), all ages, persons

GDP: Gross domestic product

GDP Deflator: Gross domestic product, deflator (2005=100)

SSRG: Social security contribution received by general government

SSPG: Social security benefits paid by general government

TSUB: Subsidies

Net Tax Revenue: Direct Taxes + Indirect Taxes + SSRG – SSPG – TSUB

Indirect Taxes: Taxes on production and imports

Total Government Expenditure: Government final consumption expenditure, GDP expenditure approach

Government Wage Expenditure: Government final wage consumption expenditure

Gross Fixed Investment: Gross government fixed capital formation

Average Public Wage: Government final wage consumption expenditure divided by public employment

Public Employment: General government employment

Total Employment: Total employment

Unemployment Rate: number of unemployed persons as a percentage of the labor force (the total number of people employed plus unemployed)

Labor Force Participation Rate: ratio of the labor force to the working age population, expressed in percentages

Average Private Wage: Wage rate of the private sector

Interest Rate: Short-term interest rate

Oil prices: OECD crude oil import price, CIF, USD per barrel
### Table E1: Subsample analysis: pre- and post-1980s

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### Table E2: Robustness analysis

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Fig. E1 Impulse responses in other OECD countries
Fig. E1 Impulse responses in other OECD countries (continued)
Fig. E2 Subsample impulse responses for the US
Fig. E3  Impulse responses to different fiscal shocks in the US, controlling for expectations
Fig. E4 Comparison of theoretical output, unemployment and deficit-to-GDP multipliers
F Alternative VAR specification

In the attempt to analyze the effects of various fiscal policy shocks, the benchmark VAR becomes quite large and one may doubt the accuracy of the results. Therefore, we check here whether a more parsimonious specification allowing for more degrees of freedom yields substantial differences in the results. To this end, we repeat the analysis using a VAR system with a constant, a linear trend and five endogenous variables: the log of real per capita GDP, the log of real per-capita net tax revenues, the log of real per capita government expenditure in either (a) goods purchases, defined as government expenditures minus government wage expenditures, (b) gross fixed investment, (c) the log of average real (GDP deflated) public wage per job or (d) the log of government employment, and a measure of the short term interest rate. Finally, we also include a labor market variable in the system that alternates between (i) the log of total employment, (ii) the unemployment rate, (iii) the labor force participation rate, or (iv) the log of average real (GDP deflated) private wage per job. The results are depicted in the table below. A more parsimonious VAR does not change substantially the essence of our benchmark results, neither in a qualitative nor a quantitative way.

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Fig. F1 Impulse responses from the alternative VAR
Canada | public vacancy cut  | Japan | UK | US
--- | --- | --- | --- | ---

Fig. F1 Impulse responses from the alternative VAR (continued)
G  A narrative perspective

Despite the fact that results are quite robust, some readers might still find hard to believe our evidence for government vacancy and wage shocks. To provide further evidence on the issue we identify government vacancy shocks using a narrative approach.\(^1\) The suspension of conscription can be thought of as a positive government vacancy shock, since the abolition of the compulsory military draft implies an increase in government recruitment for national defense.\(^2\) Many European countries have adopted reforms that decreased or even suspended mandatory military service during the last 20 years. We restrict the analysis to military draft reforms that occurred in 29 European countries, presented in Table G1. To perform our experiment we adopt a standard approach with the following model:

\[
X_{i, post} - X_{i, pre} = \alpha_0 + \alpha_1 D_i + \alpha_2 X_{i, pre} + \varepsilon_{i,t}
\]

where \(X\) is either real per capita GDP, real compensation per employee (proxy of the wage rate) or real per capita public employment expenditure, and \(D_i\) is a dummy variable taking the value 1 if a country has abolished military conscription and 0 otherwise. We control for bias in the estimation of the parameter \(\alpha_1\) including the initial condition \(X_{i, pre}\) for country \(i\) as a regressor. Thus, countries that have adopted a draft reform form the treatment group, while countries that have not undergone any reforms form our control group. The variables \(X_{i, pre}\) and \(X_{i, post}\) correspond to values one year before and one after the draft reform, respectively. For countries in the control group, \(X_{i, post}\) and \(X_{i, pre}\) are set according to the average year of reforms of the treatment sample. We focus on the sign and significance of the dummy’s coefficient, \(\alpha_1\). Table G2 indicates that reforms in conscription increased GDP and the government wage bill significantly, while they did not have a significant effect on the real wage. The coefficient on the dummy is statistically significant and positive when \(X_i\) is GDP or the government wage bill, while it is not statistically significant when the real wage is the dependent variable. Hence, the increase in the public wage bill follows the increase in public employment, which subsequently increases output. Interestingly, the initial conditions never turn out significant for those variables suggesting that reforms were exogenous to the macroeconomic conditions.

\(^1\) We tried to identify similar episodes for government wage bill reforms with little success.

\(^2\) Conscription is the compulsory enlistment of people in some sort of national service, most often military service.
prevailing in these economies. We take the results of Table G2 as additional evidence suggesting that government vacancy shocks have large and significant effects on output.

Table G1: Changes in conscription

<table>
<thead>
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<th>Countries with changes in conscription</th>
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<td>Hungary</td>
<td>November 2004</td>
<td>Germany (suspended November 2010)</td>
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<tr>
<td>Italy</td>
<td>December 2004</td>
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<tr>
<td>Latvia</td>
<td>January 2007</td>
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Table G2: Effects of conscription reforms

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Note: p-values are in parenthesis

We have also run regressions controlling for the terminal condition to examine whether changes in conscription take place because policymakers expect high output growth. The terminal condition is never significant.
References


