

Fiscal Consolidation and Firm Dynamics: Theory and Evidence

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What we do

- Novel empirical evidence on the transmission of fiscal shocks to the firm's employment, investment and balance sheet.
- We identify tax multipliers by including unanticipated narrative tax shocks in panel VAR model.
- Panel includes sectoral level data (2-digit NACE classification) for six EU countries (BE, DK, DU, FI, FR and IT).
- We provide evidence of heterogeneous responses across credit constrained and unconstrained firms.
- Provide simple theory to explain these findings.

Main findings

- Tax based fiscal consolidations lower firm level employment and investment, but raise labor productivity.
- Fiscal consolidations lead to higher firm leverage and also raise cash holdings (liquid assets).
- However, financially constrained firms deleverage.
- Fiscal consolidations lowers investment by small and financially constrained firms mostly.
- Evidence suggestive of cleansing effects of fiscal consolidations, à la Caballero and Hammour (1994).

Some related literature

There is a large literature studying the household effects of fiscal shocks, but much less looking at firm level data.

- For example, [Giavazzi and McMahon \(2012\)](#), and [Cloyne and Surico \(2016\)](#), study the households effects of fiscal shocks, and find evidence of substantial heterogeneity;
- [Briganti et al. \(2018\)](#), study how fiscal shocks propagate on the industrial network (upstream and downstream). Tax shocks propagate downstream (supply shocks).

In contrast, lots of work on heterogeneous effects of monetary policy shocks (recent HANK models and earlier empirical work).

Panel VARX model

Baseline model

$$\begin{cases} m_{c,t} &= \Gamma_{11}(L) m_{c,t-1} + \alpha S_{c,t} + \Psi_{c,t} + \epsilon_{c,t}^m \\ X_{sc,t} &= \Gamma_{21}(L) m_{c,t-1} + \Gamma_{22}(L) X_{sc,t-1} + \beta_1 S_{c,t} + \Omega_{sc,t} + \epsilon_{sc,t}^x \end{cases}$$

where $S_{c,t}$ is the narrative based shocks, and with

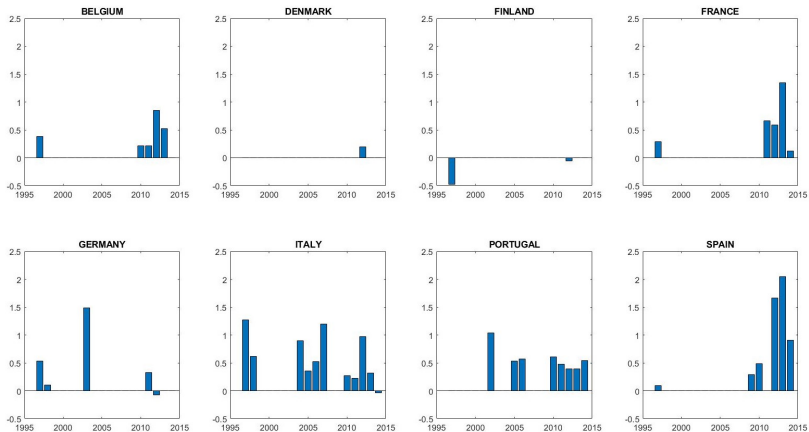
$$m_{c,t} = [\Delta \tau_{c,t} \quad \pi_{c,t} \quad u_{c,t} \quad g_{c,t}]',$$

and $X_{sc,t}$, a vector of country and sector variables including:

- employment and labor productivity growth;
- investment ratio;
- cash ratio (liquid assets) and leverage growth;

Finally, sector, country and time effects collected in $\Omega_{sc,t}$.

Fiscal consolidation shocks (Alesina et al., 2019)



The CompNET dataset

European dataset combining data from existing firm-level datasets available at the national level.

National firm level data is aggregated at the sectoral level, using a common methodology for the harmonization of variable definitions, industry coverage and sampling procedure across countries.

This yields an unbalanced panel at the 2-digit NACE sectoral level (55 sectors), for 6 countries and covering the period 2002-2013.

The 2-digit NACE classification \Rightarrow 55 sectors (example Manufacturing)

Detail

- C MANUFACTURING [Detail](#)
 - + 10 Manufacture of food products [Detail](#)
 - + 11 Manufacture of beverages [Detail](#)
 - + 12 Manufacture of tobacco products [Detail](#)
 - + 13 Manufacture of textiles [Detail](#)
 - + 14 Manufacture of wearing apparel [Detail](#)
 - + 15 Manufacture of leather and related products [Detail](#)
 - + 16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials [Detail](#)
 - + 17 Manufacture of paper and paper products [Detail](#)
 - + 18 Printing and reproduction of recorded media [Detail](#)
 - + 19 Manufacture of coke and refined petroleum products [Detail](#)
 - + 20 Manufacture of chemicals and chemical products [Detail](#)
 - + 21 Manufacture of basic pharmaceutical products and pharmaceutical preparations [Detail](#)
 - + 22 Manufacture of rubber and plastic products [Detail](#)
 - + 23 Manufacture of other non-metallic mineral products [Detail](#)
 - + 24 Manufacture of basic metals [Detail](#)
 - + 25 Manufacture of fabricated metal products, except machinery and equipment [Detail](#)
 - + 26 Manufacture of computer, electronic and optical products [Detail](#)
 - + 27 Manufacture of electrical equipment [Detail](#)
 - + 28 Manufacture of machinery and equipment n.e.c. [Detail](#)
 - + 29 Manufacture of motor vehicles, trailers and semi-trailers [Detail](#)
 - + 30 Manufacture of other transport equipment [Detail](#)
 - + 31 Manufacture of furniture [Detail](#)
 - + 32 Other manufacturing [Detail](#)
 - + 33 Repair and installation of machinery and equipment [Detail](#)

Estimated baseline model

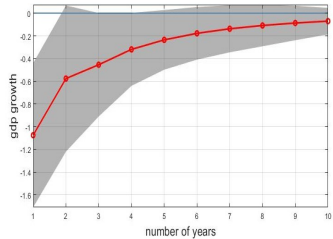
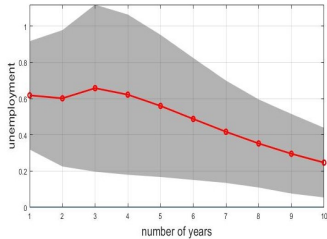
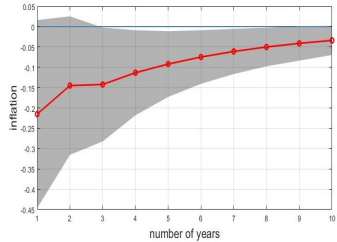
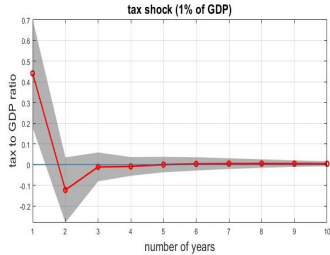
Table 1: Baseline model

	1. $\Delta\tau_{t-1}$	2. π_t	3. u_t	4. g_t	5. EMP growth _t	6. INV _t	7. ALP growth _t	8. CASH growth _t	9. LEV growth _t
SHOCK	0.441** (2.36)	-0.215 (-1.19)	0.618*** (3.01)	-1.075** (-2.17)	-0.205** (-2.00)	-0.750** (-2.29)	0.115 (0.38)	1.773*** (3.33)	0.840*** (4.29)
$\Delta\tau_{t-1}$	-0.118 (-0.81)	0.125 (1.36)	-0.365** (-2.35)	0.384 (1.63)	0.709*** (5.42)	1.123*** (4.91)	-0.090 (-0.44)	0.202 (0.43)	-0.224 (-1.57)
π_{t-1}	-0.227 (-1.32)	-0.166 (-1.12)	0.456** (2.34)	-1.462*** (-3.67)	-0.722*** (-5.17)	0.001 (0.00)	0.730** (2.41)	-1.075** (-2.13)	0.832*** (3.84)
u_{t-1}	0.020 (0.39)	-0.090*** (-2.88)	0.804*** (16.21)	-0.189** (-2.29)	-0.019 (-0.34)	0.094 (0.63)	-0.058 (-0.55)	0.544* (1.75)	0.173* (1.66)
g_{t-1}	0.123* (1.86)	0.168*** (3.18)	-0.338*** (-4.23)	0.877*** (5.72)	0.141** (2.01)	0.389*** (2.81)	-0.428*** (-3.21)	0.316 (1.08)	0.066 (0.63)
EMP growth _{t-1}					0.265*** (12.80)	0.117** (2.45)	0.001 (0.02)	0.348** (2.18)	0.008 (0.19)
INV _{t-1}					0.025*** (3.16)	0.609*** (8.43)	-0.045** (-2.51)	-0.028 (-0.83)	0.079*** (4.43)
ALP growth _{t-1}					0.021*** (2.58)	0.053** (2.12)	-0.016 (-0.57)	-0.086 (-1.38)	0.005 (0.30)
CASH growth _{t-1}					-0.011* (-1.86)	0.004 (0.32)	0.014 (1.33)	-0.194*** (-4.33)	0.005 (0.44)
LEV growth _{t-1}					-0.044*** (-4.48)	0.077** (2.33)	0.042* (1.66)	-0.177** (-2.41)	0.136*** (3.54)
Observations	144	144	144	144	2989	2989	2989	2989	2989

t statistics in parentheses, based on robust standard errors.

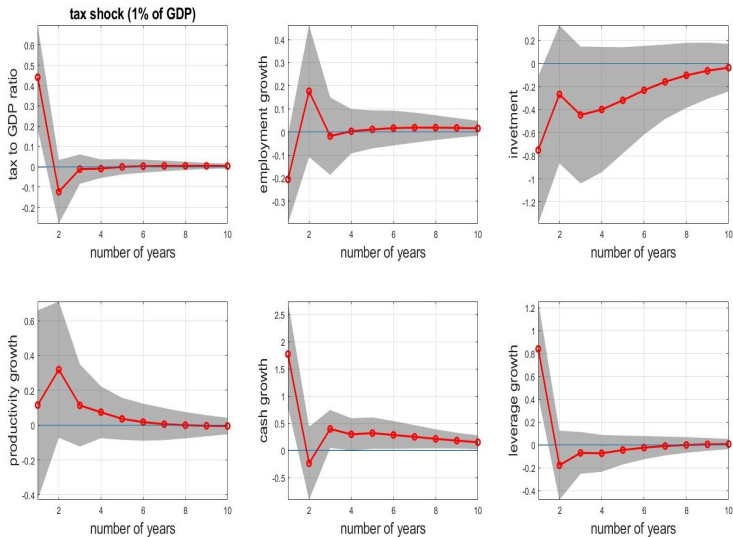
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Fiscal Consolidation and the Aggregate Economy



note: 90% coverage confidence intervals obtained using the wild bootstrap method.

Fiscal Consolidation and Firm Level Adjustment



note: 90% coverage confidence intervals obtained using the wild bootstrap method.

Panel VARX model

Heterogeneous effects of fiscal consolidation

$$X_{isc,t} = \mathbf{\Gamma}_2(L) \begin{bmatrix} m_{c,t-1} \\ X_{sc,t-1} \end{bmatrix} + \beta_1 S_{c,t} + \beta_2 (S_{c,t} D_i) + \delta D_i + \Omega_{sc,t} + \epsilon_{isc,t}^x,$$

where D_i is an indicator variable, which selects particular types of firms.

We consider heterogeneous effects along the following dimensions:

- large and small firms;
- financially constrained and unconstrained firms.

Small, medium and large firms (based on employment)

	(1) small firms	(2) medium firms	(3) large firms
EMP	29.17 (1.511)	83.98 (8.267)	458.63 (69.230)
INV	0.24 (0.128)	0.26 (0.136)	0.29 (0.142)
CASH	0.07 (0.052)	0.05 (0.028)	0.03 (0.018)
DIVIDENDS	0.01 (0.012)	0.01 (0.010)	0.01 (0.011)
LEVERAGE	0.29 (0.213)	0.27 (0.223)	0.23 (0.231)
COLLATERAL	0.23 (0.176)	0.20 (0.163)	0.17 (0.118)
<i>N</i>	638	634	583

mean coefficients; sd in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

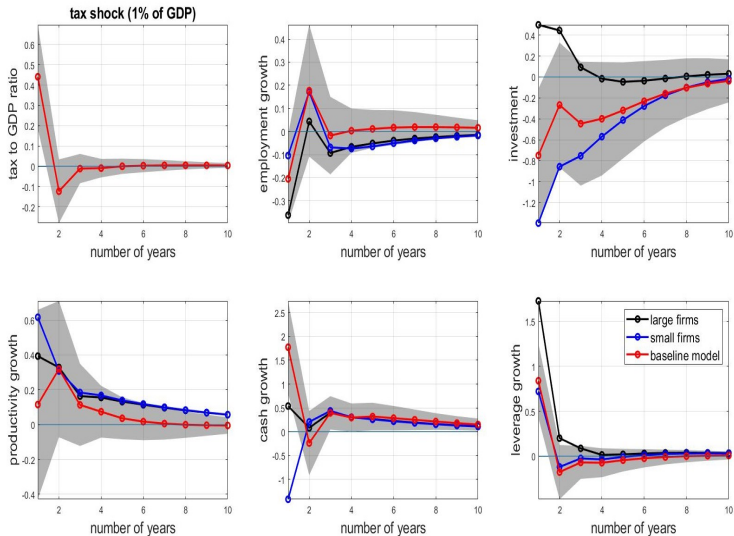
Financially constrained and unconstrained firms (based on survey response)

	(1) constrained	(2) unconstrained
EMP	38.20 (33.260)	49.67 (37.950)
INV	0.23 (0.182)	0.25 (0.145)
CASH	0.01 (0.009)	0.06 (0.049)
DIVIDENDS	0.00 (0.002)	0.02 (0.018)
LEVERAGE	0.60 (0.217)	0.24 (0.207)
COLLATERAL	0.23 (0.169)	0.23 (0.155)
<i>N</i>	2074	3728

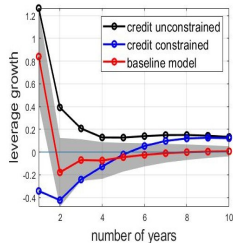
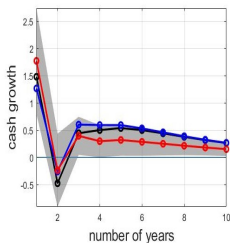
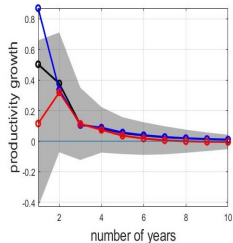
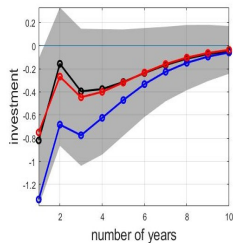
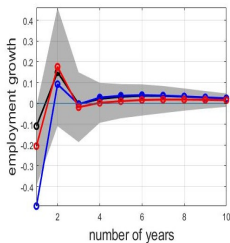
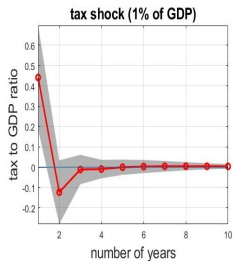
mean coefficients; sd in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fiscal Consolidation and Firm Level Adjustment (Small and Large Firms)



Fiscal Consolidation and Firm Level Adjustment (Financially Constrained Firms)



Simple model

We propose simple model with the following ingredients:

- Heterogeneous firms (with endogenous exit dynamics);
- Debt financed working capital requirements.
- Borrowing constraints à la Kiyotaki and Moore (1997);

Fiscal consolidation leads to:

- Lower labor demand and employment;
- Higher labor productivity (reallocation across firms);
- Higher leverage for unconstrained firms;
- Cleansing effects (endogenous exit of least productive firms);

Firm's problem

Heterogeneous plants face the problem

$$v(x_t^i; a^i, k^i) = \max_{n, \ell} \left[\lambda (x_{t+1}/p) + (1 - \lambda) v(x_{t+1}^i; a^i, k^i) \right],$$

subject to budget, working capital and borrowing constraints:

$$\begin{aligned} x_{t+1}^i &= \max \left\{ x_t^i; x_t^i + (1 - \tau) \pi_t^i \right\}, \\ \ell + x_t^i &\geq n, \\ \ell &\leq \phi k^i, \end{aligned}$$

with $\mu > 0$, the cost of external liquidity, $\phi, \lambda \in (0, 1)$, and

$$\pi_t^i = p (a^i k^i)^{1-\alpha} n^\alpha - \varrho - n - \mu \ell.$$

Firm's employment

$$n_t^i = \begin{cases} \eta a^i k^i, & \text{if unconstrained \& unleveraged;} \\ \chi \eta a^i k^i, & \text{if unconstrained but leveraged, with } \chi \in (0, 1); \\ x_t^i + \phi k^i, & \text{if firm is credit constrained;} \\ 0, & \text{if plant exits;} \end{cases}$$