DIW BERLIN

German Advisory Group Ukraine

Fiscal Policy in a Recession

Philipp Engler (DIW Berlin and German Advisory Group Ukraine)

Joint work with J. Tervala: „Hysteresis and Fiscal Policy“

and M. Klein „Austerity measures amplified crisis in Spain, Portugal, and Italy”

Kiev, 11 April 2017

Overview

1. Motivation
2. Austerity and Private Debt
3. Hysteresis and Fiscal Policy
   - Simulation results
   - Conclusions
4. Austerity and Structural Reforms
5. Conclusion

Motivation

Stylized Fact I:

Spain, Portugal and Italy experienced long-lasting, „double-dip“ recessions

Stylized Fact II:

Spain, Portugal and Italy started massive austerity policies when the second „dip“ started

Stylized Fact III:

Spain and Portugal went through massive private household deleveraging in parallel to austerity

Stylized Fact IV:

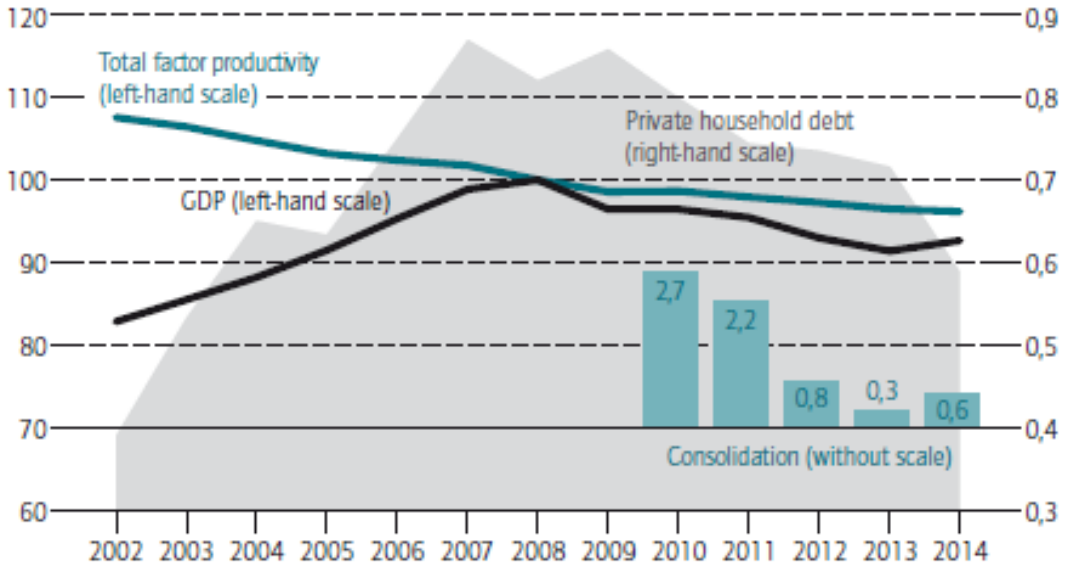
Italy and Portugal experienced a permanent drop in the level of total factor productivity in parallel to austerity

Stylized Fact I: Spain, Portugal and Italy went through long-lasting, „double-dip“ recessions

Spain:

Fiscal consolidation and selected economic indicators for Spain, 2002 to 2014

Private household debt relative to GDP (right-hand scale), GDP in Euro, Total Factor Productivity, 2008=100 (left-hand scale), consolidation measures in percent of GDP



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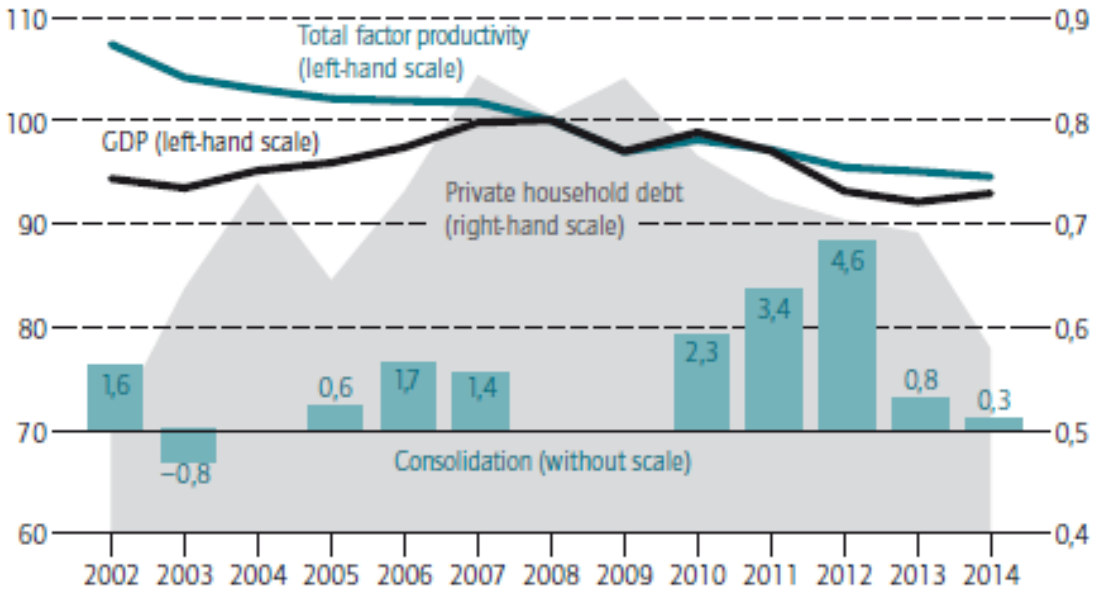

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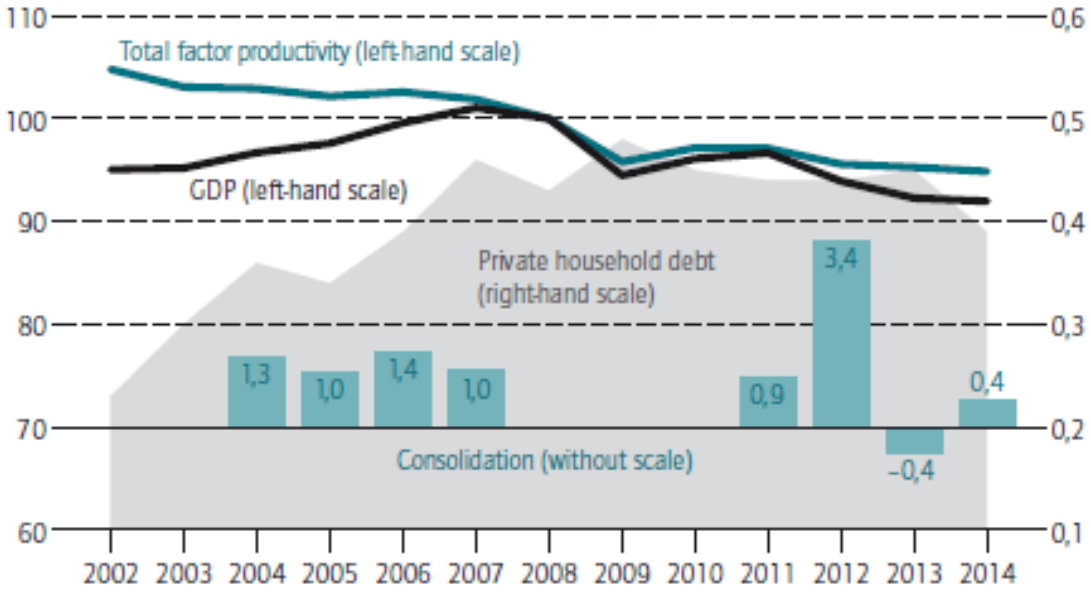

Stylized Fact II: Spain, Portugal and Italy started massive austerity policies when the second „dip“ started

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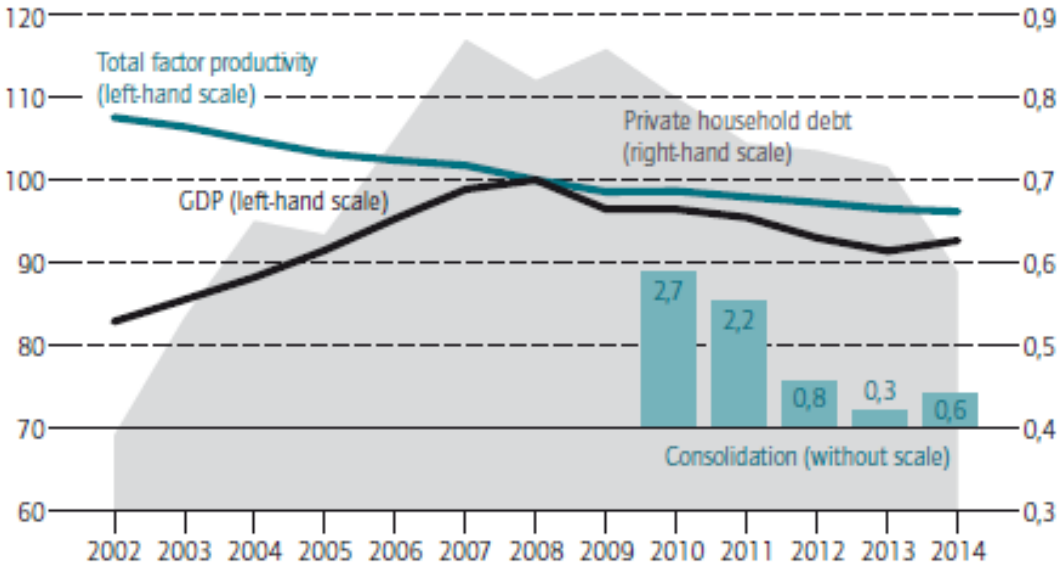

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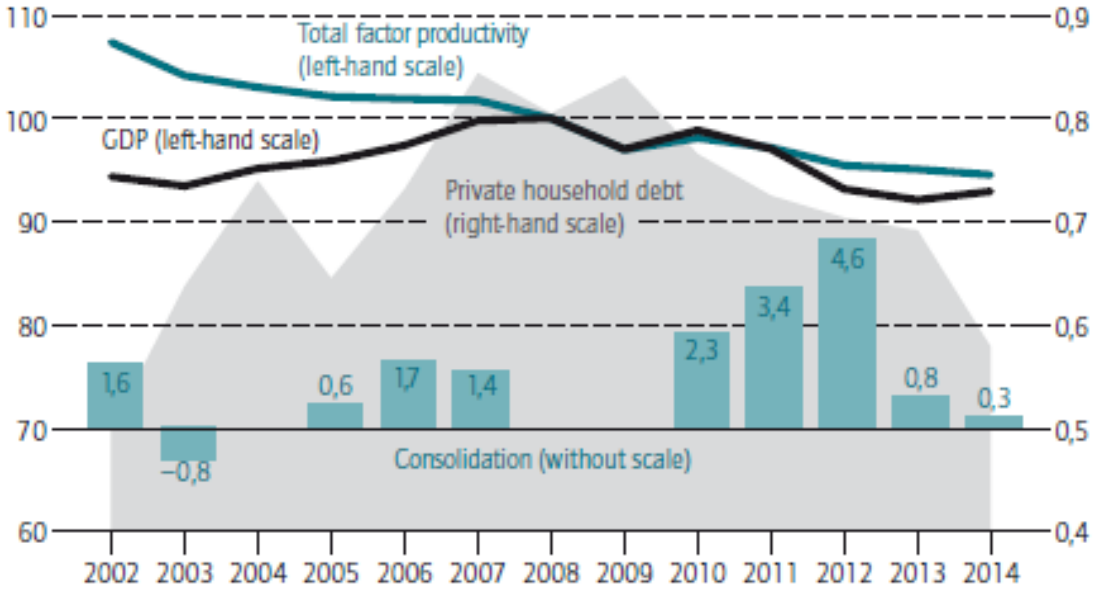

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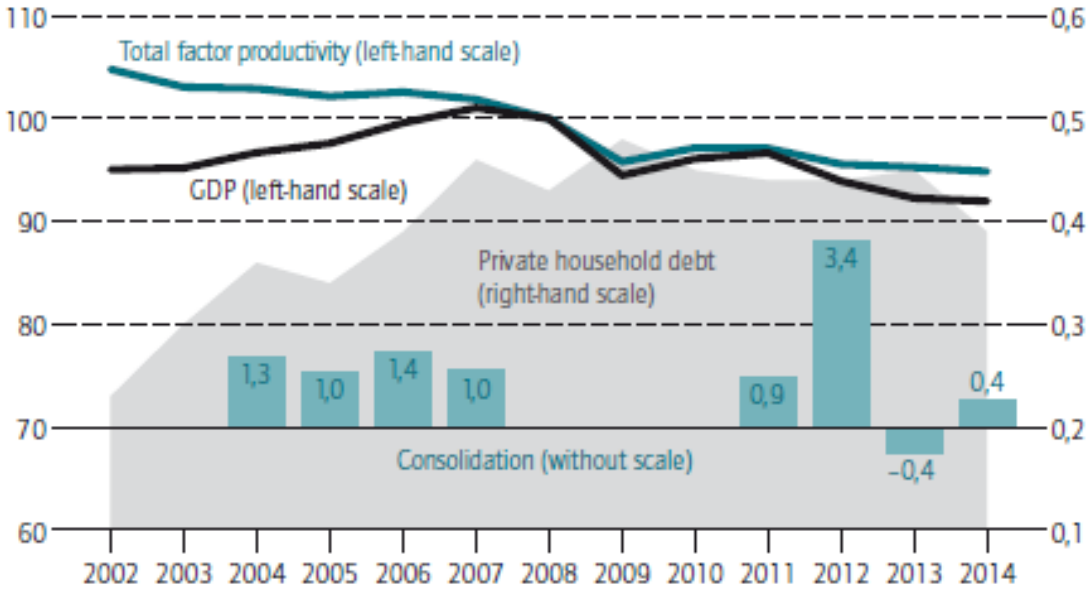

Stylized Fact III: Spain and Portugal went through massive private household deleveraging in parallel to austerity

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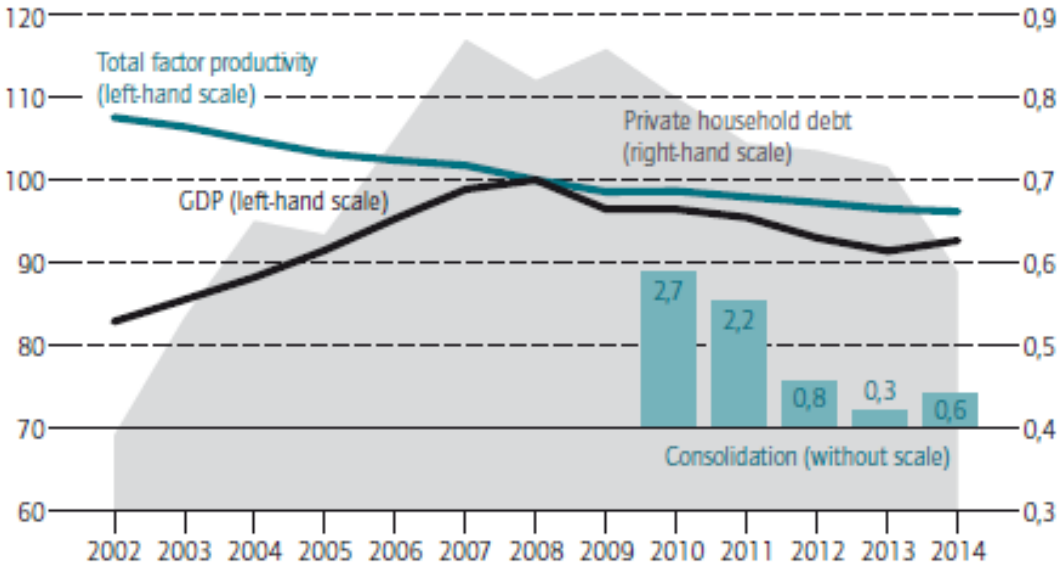

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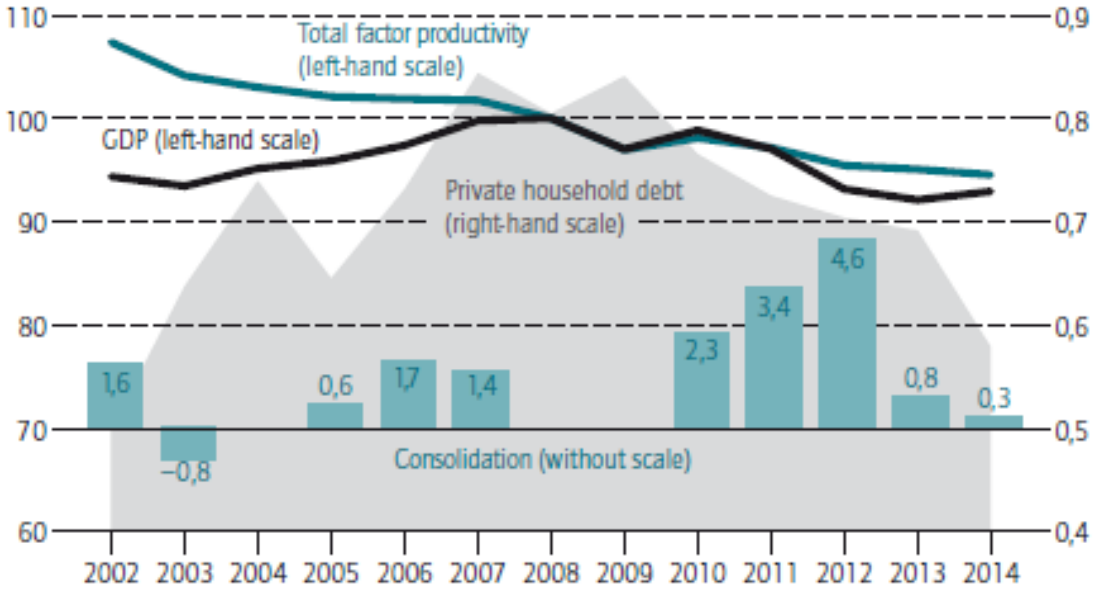

Stylized Fact IV: Italy and Portugal experienced a permanent drop in the level of total factor productivity (TFP) in parallel to austerity

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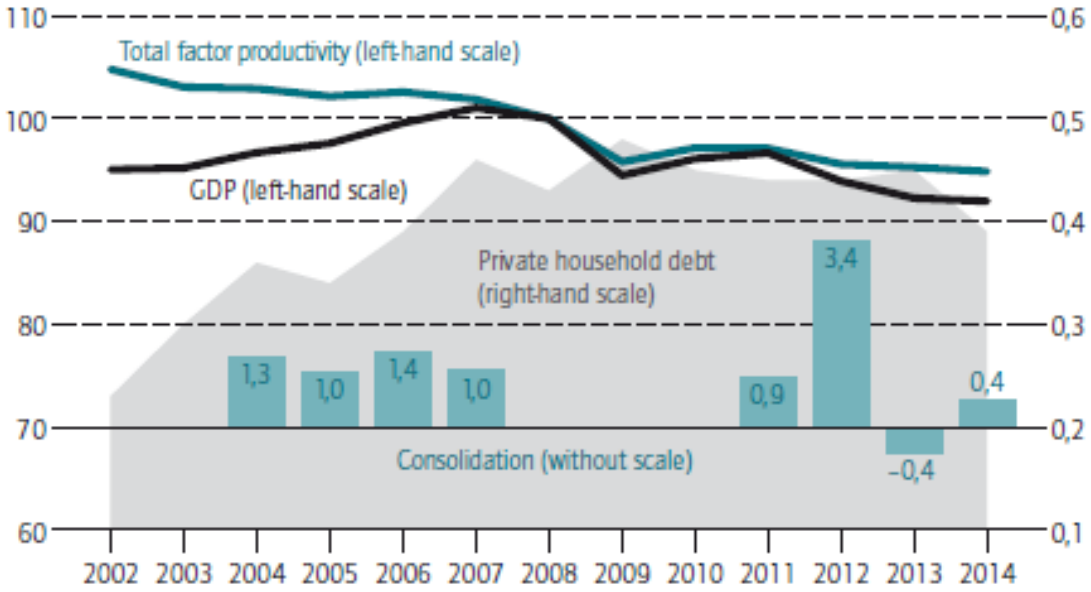

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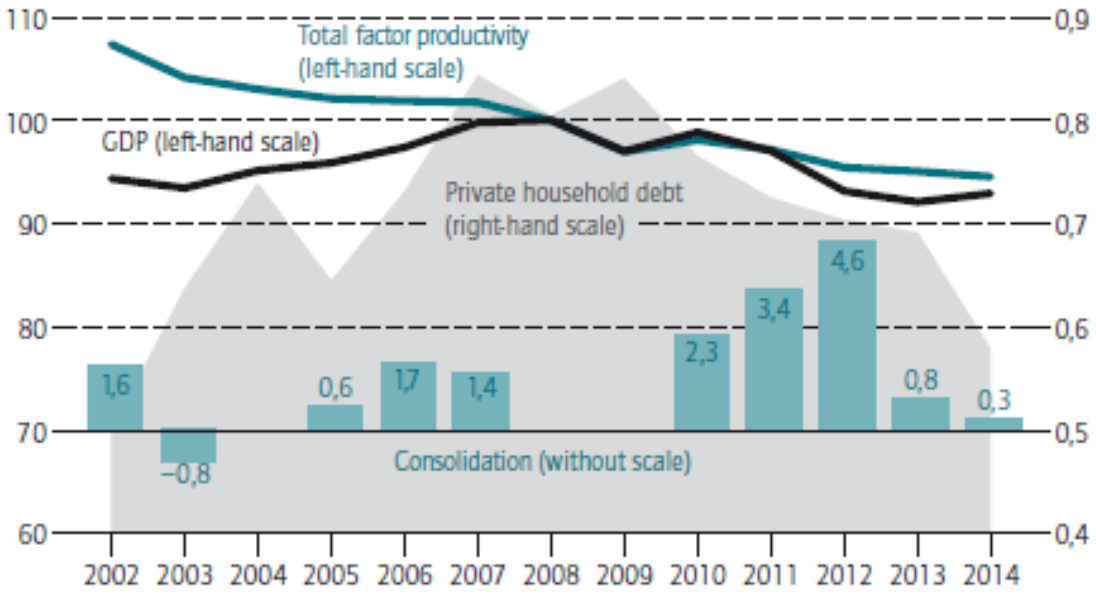
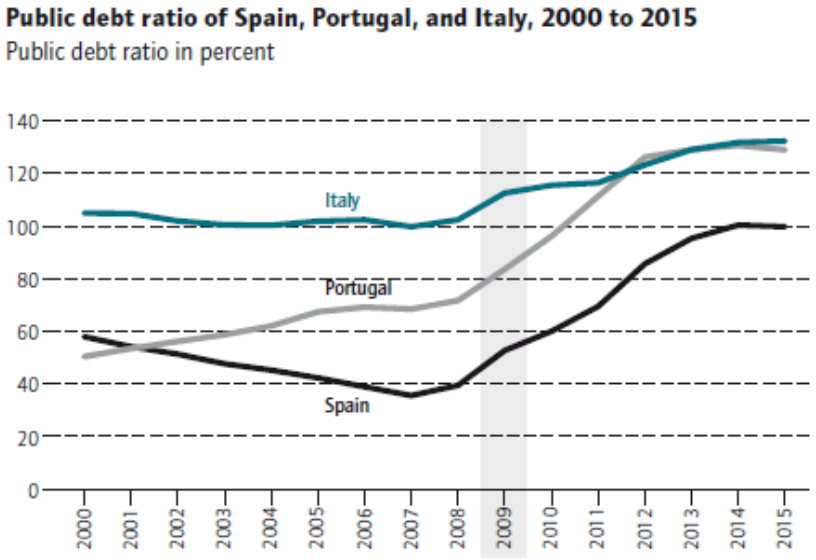


We argue that austerity…

1. …was not successful in reducing the gov't debt burden,..



2. …caused the (second) recessions and…
3. …that it was so harmful because of the specific environment at the time (deep recession and deleveraging)

Austerity and Private Debt

M. Klein (2017): "Austerity and Private Debt,"
DIW DP 1611 and *Journal of Money, Credit and Banking* (forthc.):

Punchline:
Fiscal multiplier rises when consolidation occurs in times of high private household debt
=> Austerity causes recession, debt-to-GDP and sovereign default risk rise

Data used: Sample of 12 OECD countries with data for 1980-2014

Method used: Local projections

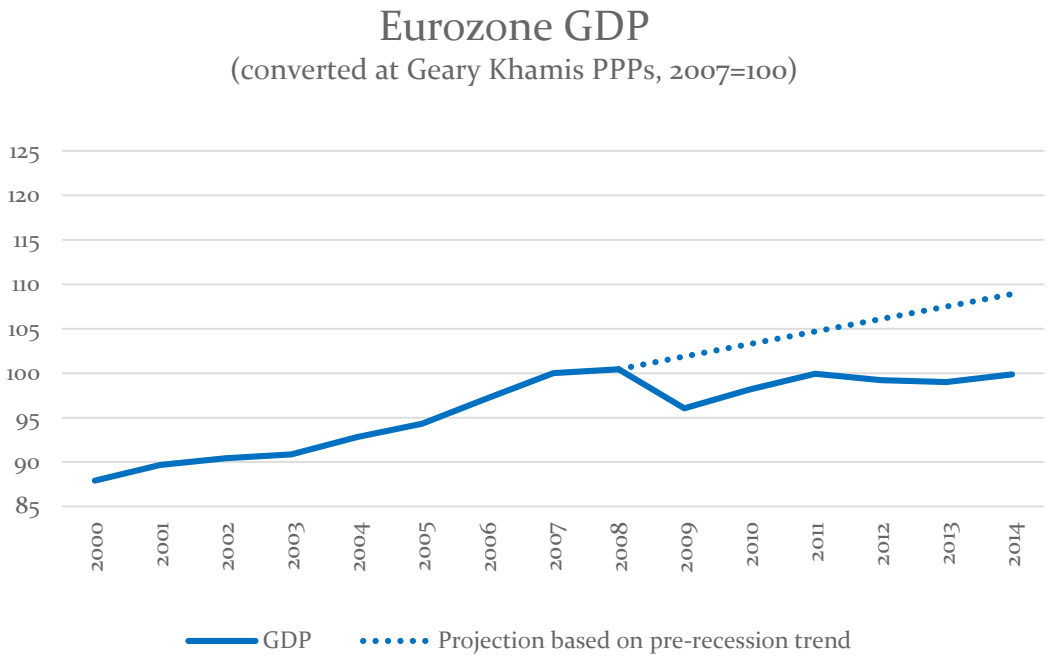
P. Engler and J. Tervala (2016): „Hysteresis and Fiscal Policy“,
DIW DP 1631

Storyline in a nutshell:

- Most recessions have permanent effects on output („Hysteresis“)
- Mechanism: TFP drops permanently with employment
- Expansionary fiscal policy reduces duration of recession because it boosts employment and thereby TFP
- Corollary: Austerity is self-defeating
- Approcach: 2-country DSGE model, calibrated for EU and US in great recession

Stylized fact: Recessions have permanent effect on output:

- **Ball (2014):** Evidence for most countries in global recession of 2008/09 (sample: 23 OECD countries)
- **Blanchard et al. (2015):** Two thirds of countries suffered from hysteresis over past 50 years (sample: 23 OECD countries)

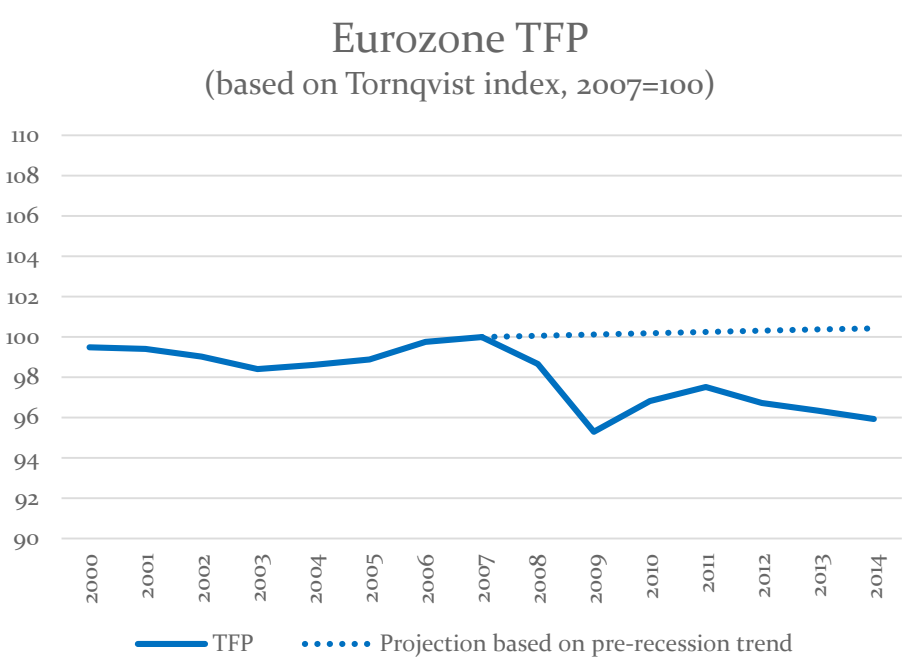


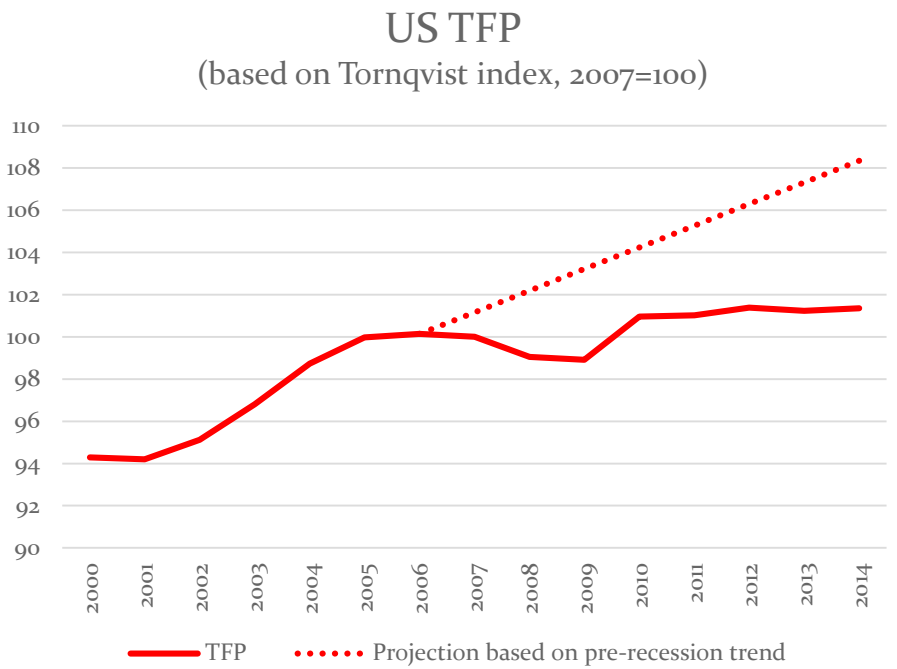
Potential Mechanisms behind permanent effects:

- Firms reduce R&D expenditure in recessions, reducing growth permanently (Stadler, 1990)

- „Hysteresis“ in unemployment: Temporary unemployment turns into permanent unemployment (Blanchard and Summers, 1986)

Mechanism in recent recession? Unclear, but…:

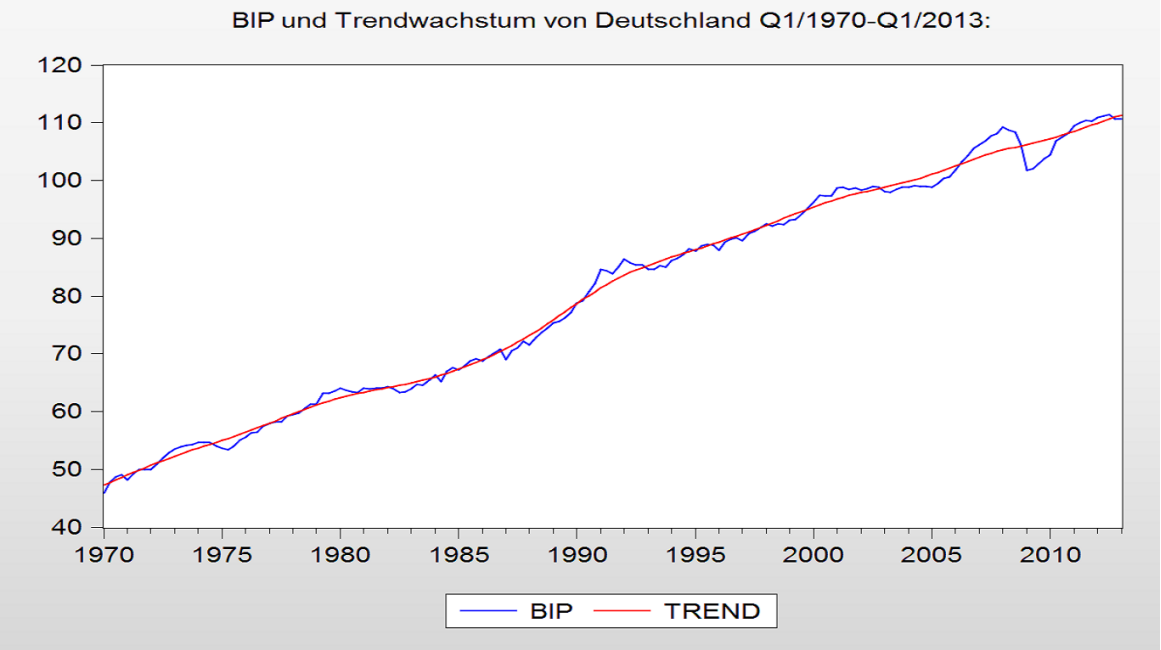




…total factor productivity (TFP) level declined

Hysteresis poses challenge for mainstream DSGE model:

- Dichotomy between trend growth and cyclical fluctuations!
  - From my lecture on Macroeconomics:



=> Need for unit roots or strong persistence in output growth!

Less clear: Does fiscal policy have permanent effects on output?

Evidence:

Fiscal consolidation in Europe after global recession had long-lasting effect on GDP (Fatas and Summers, 2016)

Potential mechanism:

Fiscal spending shocks affect labor productivity (Linnemann et al., 2016)

Our approach: Endogenous TFP („learning by doing“) in otherwise standard DSGE model

TFP/Labor productivity

Firm specific production

$$y_t(z) = a_t(z)\ell_t(z)$$

with

$$\hat{a}_t(z) = \phi\hat{a}_{t-1}(z) + \mu\hat{\ell}_{t-1}(z)$$

and

$$\hat{a}_t = da_t/a_0.$$

Consequences:

- Past hours affect TFP => temporary recession with lasting effect on potential and actual output.

- Fiscal policy has lasting effects on output through hours and TFP

Scenario:

- Recession hits US economy: US aggregate savings rise, consumption demand falls…
- …and spills over to EU economy through falling exports.
- EU output suffers from persistent decline in TFP
- Expansionary fiscal policy implemented by government spending

Preview of Results:

- Fiscal multipliers significantly larger when hysteresis is included
- Back of the envelope: 2011-13 austerity in Eurozone will reduce potential output by 0.6% in 2020.
- Most effective: Timely and temporary fiscal expansion!

The Simulation: Multipliers

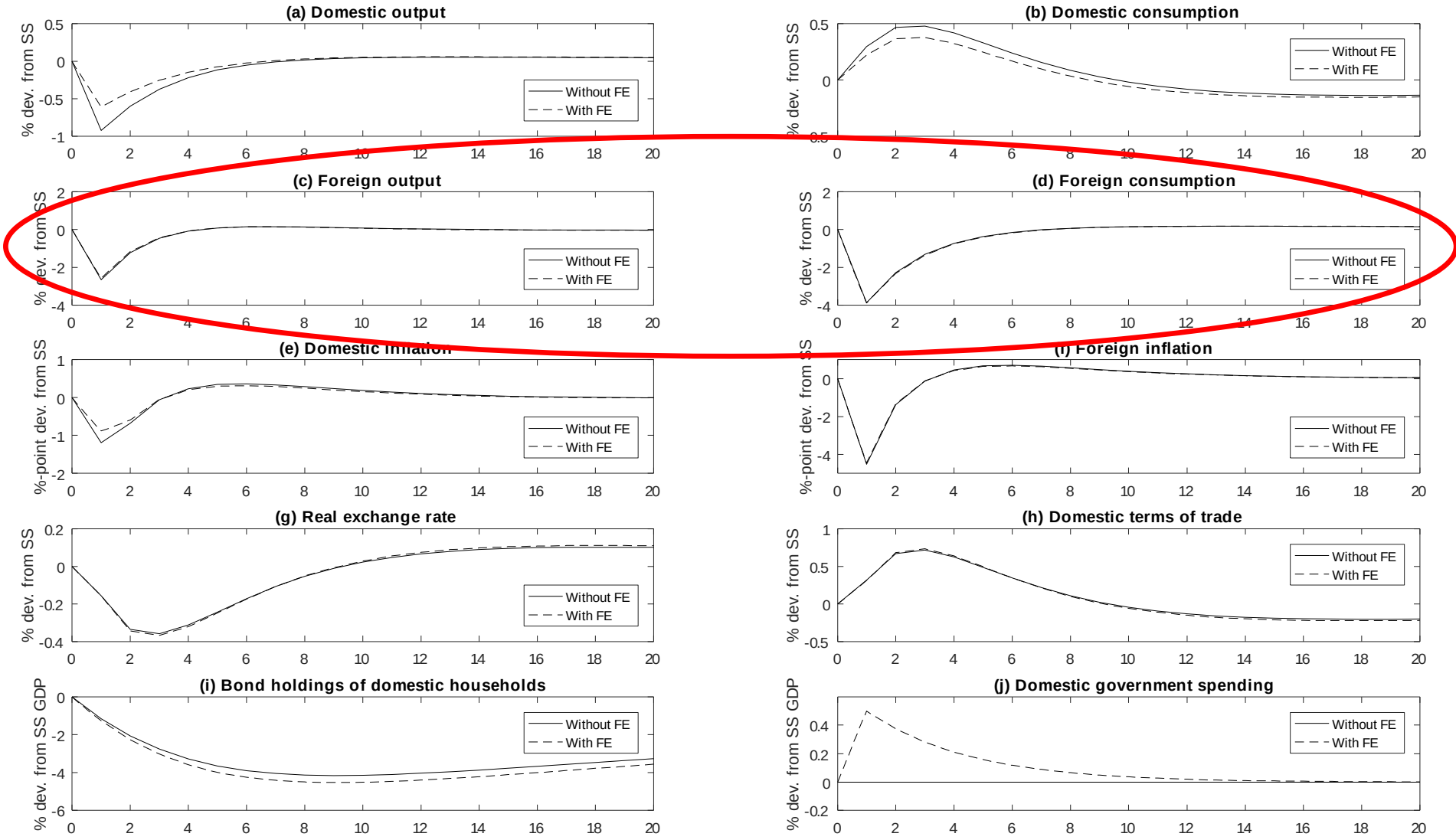
Output WITH Fiscal Expansion

Output WITHOUT Fiscal Expansion

Cumulative multiplier: $$CM = \frac{\sum_h \hat{Y}_{t+h}^{FE} - \sum_h \hat{Y}_{t+h}^{WFE}}{\sum_h \hat{G}_{t+h}^{FE}}.$$

Net present value multiplier: $$NPVM = \frac{\sum_{s=t}^{h} \beta^{s-t} \hat{Y}_s^{FE} - \sum_{s=t}^{h} \beta^{s-t} \hat{Y}_s^{WFE}}{\sum_{s=t}^{h} \beta^{s-t} \hat{G}_s^{FE}}.$$

The Simulation: Results **NO** hysteresis



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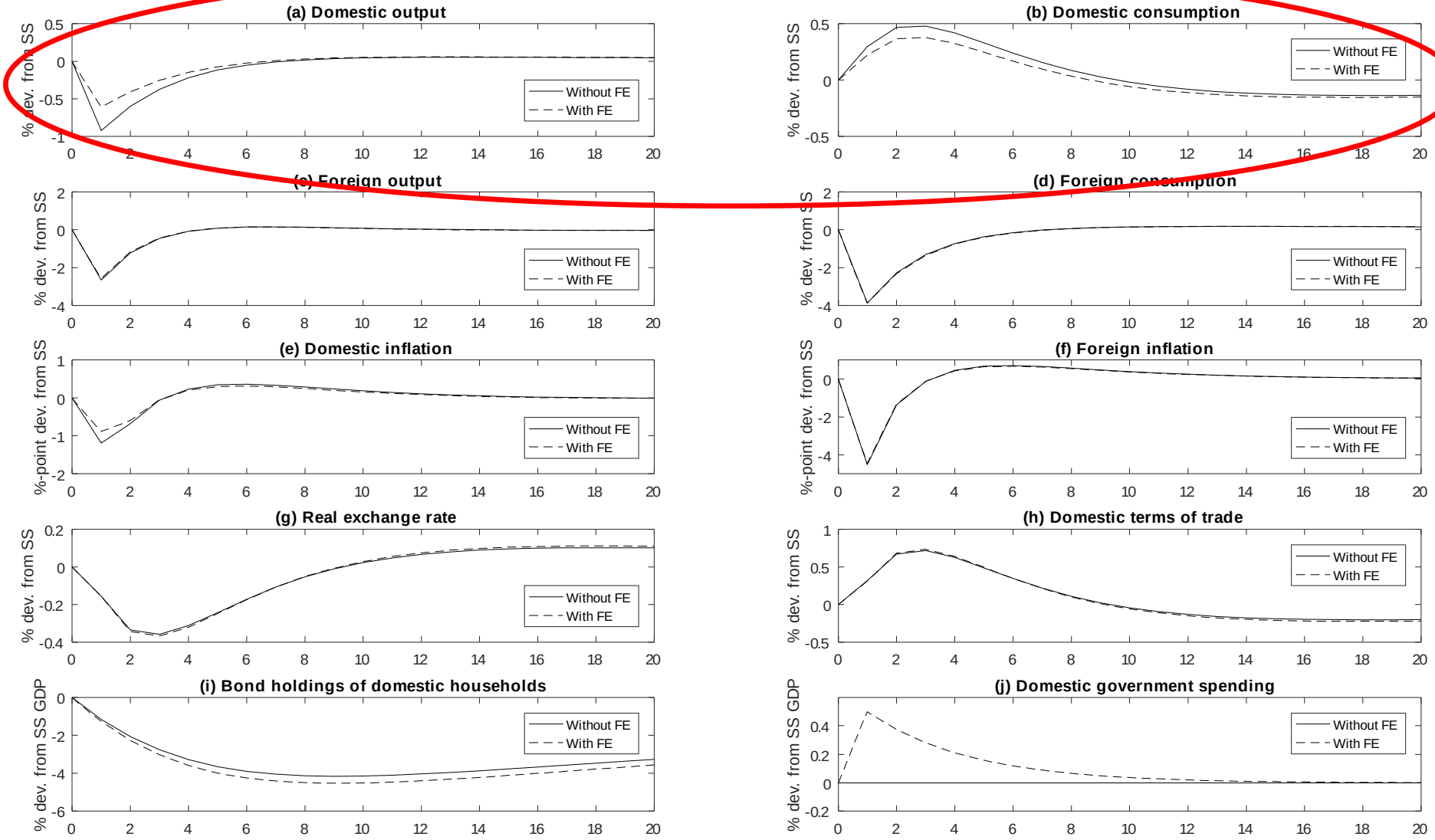


The Simulation: Results NO hysteresis

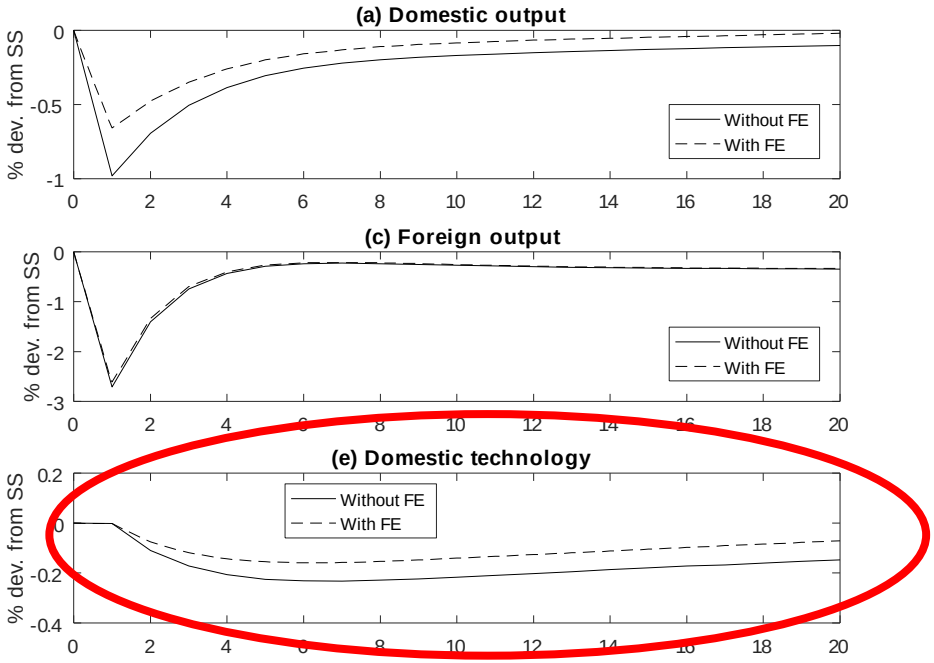
Model mechanics (briefly here, more in backup slides):

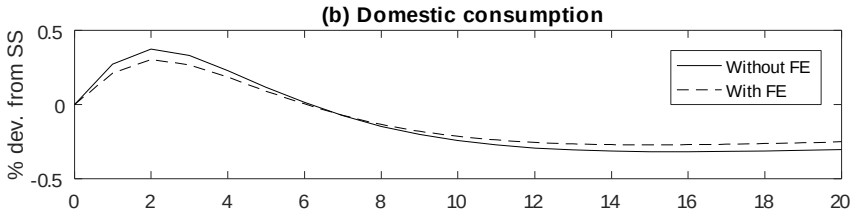
- Foreign recession reduces domestic exports, output, inflation
- Central bank reduces interest rate, consumption rises

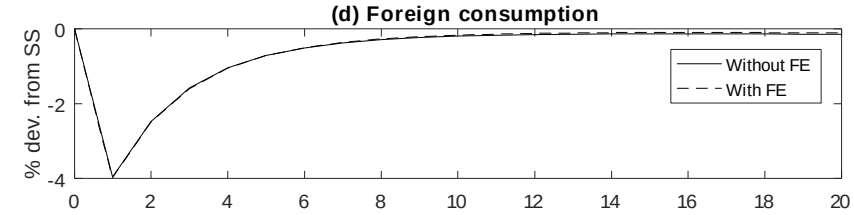
But:

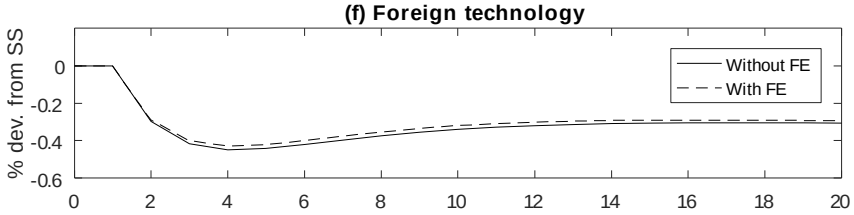
- Recession not long-lasting, after two years, it‘s over!
- Fiscal expansion mitigates recession: Boosts output but crowds out consumption through higher long-term real rates

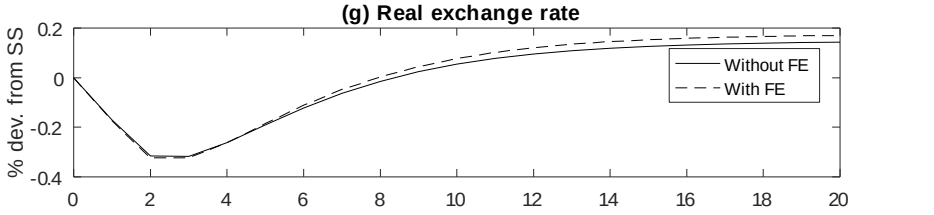
The Simulation: Results WITH hysteresis

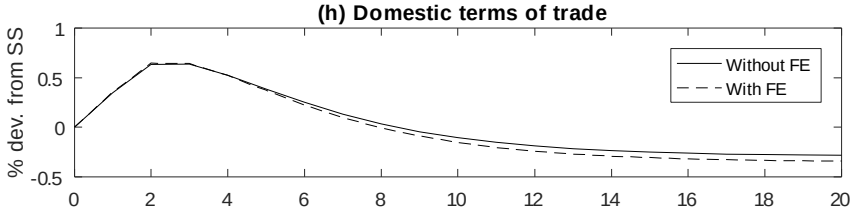


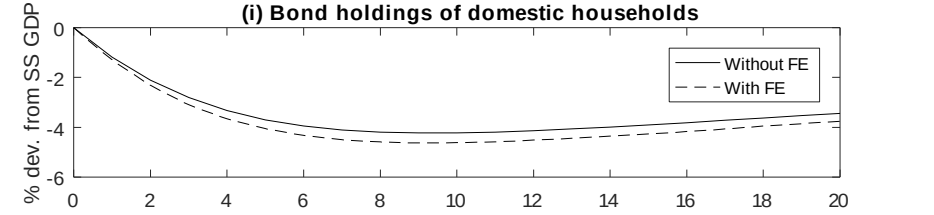


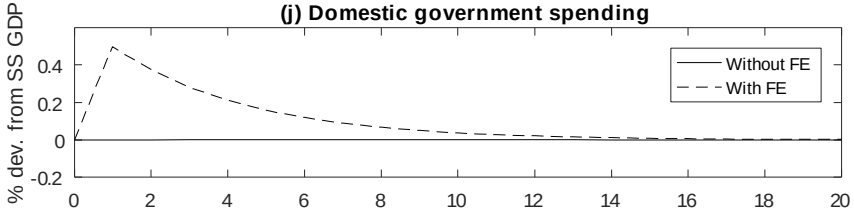












The Simulation: Results WITH hysteresis

Model mechanics:

- Same as above + productivity decline => longer lasting recession

Increase in gov't spending:

- Much more effective! Additional channel: Mitigation of productivity decline

The additional fiscal transmission mechanism:

- Gov‘t spending boosts hours today, TFP and deflation next period; long-term real rate falls more (c.p.), lifetime consumption rises.

$$\hat{a}_t(z) = \phi \hat{a}_{t-1}(z) + \mu \hat{\ell}_{t-1}(z)$$

=> Rather than incurring negative wealth effect, fiscal expansion induced monetary policy reaction boosts wealth!

The Simulation: Multipliers

Cumul. multiplier	Net present value multipl.	Welfare multiplier $\nu = 0$	$\nu = 0.4$	$\nu = 1$
Without hysteresis				
0.4	0.5	-1	-0.6	-0.01
With hysteresis				
0.9	2.9	1.1	1.5	2.0

Hysteresis raises effect of fiscal spending

- Cumulative and NPV multipliers rise significantly
- Welfare multipliers rise to >1 from <0

Conclusion hysteresis and fiscal policy paper

- Recessions tend to be highly persistent
- Important mechanism: Persistent decline in productivity

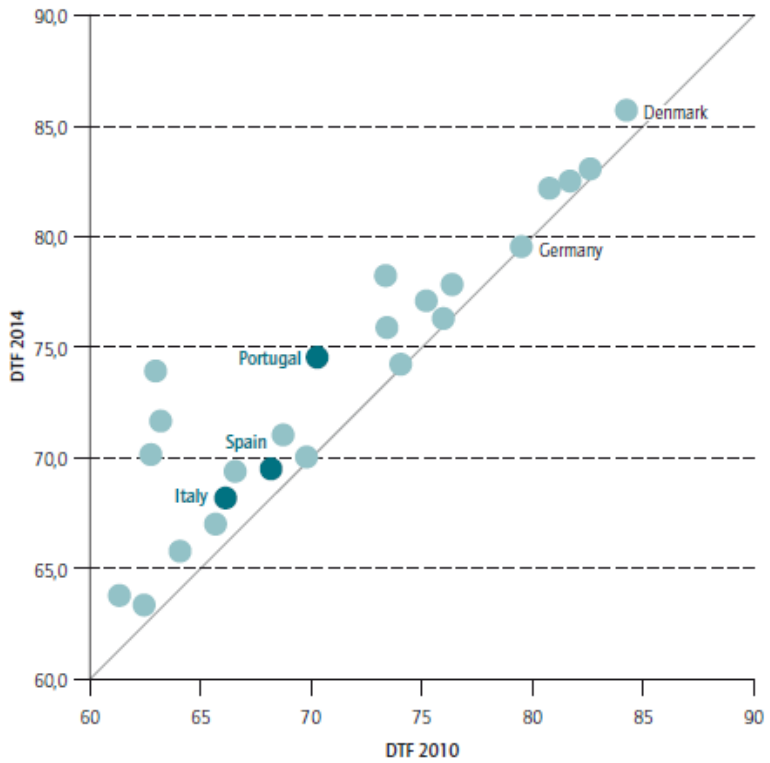
- Fiscal policy very effective in this environment
  - Strong, timely and temporary reaction most effective because…
    - …downward spiral of productivity avoided and
    - …negative wealth effect minimized

- Back of the envelope: 2011-13 austerity in Eurozone will reduce potential output by 0.6% in 2020.

Austerity and Structural Reforms

- Could the miserable side-effects have been forecast by advocates of austerity?
- Yes, but typically austerity goes hand-in hand with growth boosting „structural“ reforms

Distance to Frontier of Doing Business Indicator, selected EU-countries
2010 compared to 2014



- Indeed, considerable structural reforms were achieved!
- However, many reforms reduce growth in short-run!
- <u>Policy conclusion:</u> Complement structural reforms with expansionary rather than contractionary fiscal policy!

Conclusion

- Portugal, Spain and Italy had a double-dip recession
- Fiscal policy likely contributed to the second dip
- Environment of private deleveraging and high unemployment contributed to devastating effect
- We add to the debate on „state dependent“ fiscal multipliers
- „Reform package“ of austerity plus structural reforms failed

Thanks a lot for your your attention.

Links to the papers:

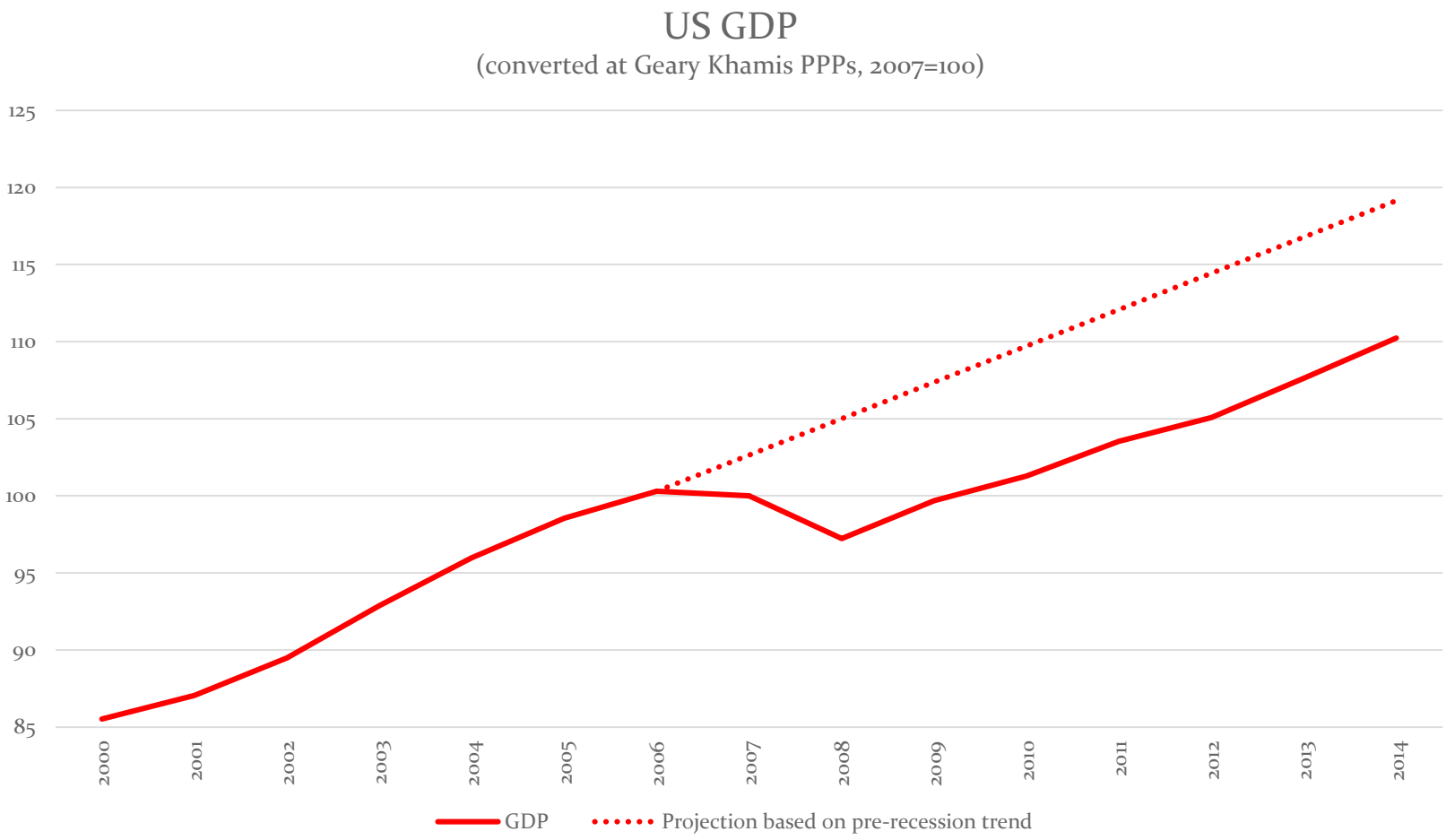
http://www.diw.de/documents/publikationen/73/diw_01.c.549430.de/dp1631.pdf

https://www.diw.de/sixcms/detail.php?id=diw_01.c.553149.de

https://www.diw.de/documents/publikationen/73/diw_01.c.545193.de/dp1611.pdf

Backup slides

Stylized fact: Recessions have permanent effect on output:



Standard New Keynesian DSGE model of two countries:

- Home and Foreign countries of equal size
- Representative household maximizing utility
- Continuum of firms acting under monopolistic competition, setting prices à la Calvo (1983); Flexible wages
- Central Banks follow Taylor rules
- Government spending financed by lump-sum taxes
- Non-state contingent bond traded across countries

The model

The domestic household maximizes

Time preference shock

$$U_t(z) = E_t \sum_{s=t}^{\infty} \beta^{s-t} \epsilon_s^{TP} \left[\log C_s - \frac{(\ell_s(z))^{1+\frac{1}{\varphi}}}{1+\frac{1}{\varphi}} + \nu \log G_s \right]$$

subject to

$$D_t = (1+i_t) D_{t-1} + w_t \ell_t - P_t C_t + \pi_t - P_t T_t.$$

with

$$C_t = \left[(\alpha n)^{\frac{1}{\rho}} (C_t^h)^{\frac{\rho-1}{\rho}} + (1-\alpha n)^{\frac{1}{\rho}} (C_t^f)^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}}$$

$$C_t^h = \left[n^{-\frac{1}{\theta}} \int_0^n (c_t^h(z))^{\frac{\theta-1}{\theta}} dz \right]^{\frac{\theta}{\theta-1}} \qquad C_t^f = \left[(1-n)^{-\frac{1}{\theta}} \int_n^1 (c_t^f(z))^{\frac{\theta-1}{\theta}} dz \right]^{\frac{\theta}{\theta-1}}$$

Our scenario: Time pref. shock of foreign household induces 1% drop in domestic output.

Firm z has profits

$$\pi_t(z) = p_t^h(z)\, y_t^d(z) - w_t \ell_t(z)$$

and produces with

$$y_t(z) = a_t(z)\ell_t(z)$$

$$\hat{a}_t(z) = \phi \hat{a}_{t-1}(z) + \mu \hat{\ell}_{t-1}(z)$$

$$\hat{a}_t = da_t / a_0.$$

Maximizes profits s.t. demand function and Calvo constraint.

Optimal price:

$$\hat{p}_t^h(z) = \beta\gamma E_t \hat{p}_{t+1}^h(z) + (1 - \beta\gamma)(\hat{w}_t - \hat{a}_t(z)).$$

Fiscal policy:

Gov't pays for consumption with lump-sum revenues:

$$T_t = G_t.$$

$$\hat{G}_t = \rho^G \hat{G}_{t-1} + \varepsilon_t^G$$

Spending „shock" used to implement reaction to recession.

Monetary Policy:

$$\hat{\imath}_t = (1 - \mu_1)\mu_2 \Delta \hat{P}_t + \mu_1 \hat{\imath}_{t-1}$$

Welfare measure λ:

Fraction of consumption in scenario WFE that household is willing to pay to be as well off under scenario with fiscal expansion (FE)

- Welfare „w/o fiscal expansion“ (WFE):

$$U_t^{WFE}(z) = E_t \sum_{s=t}^{\infty} \beta^{s-t} \left[\log C_s^{WFE} - \frac{\left(\ell_s^{WFE}(z)\right)^{1+\frac{1}{\varphi}}}{1+\frac{1}{\varphi}} + \nu \log G_s^{WFE} \right]$$

- Reduce welfare WFE such that…

$$U_t^{FE} = E_t \sum_{s=t}^{\infty} \beta^{s-t} \left[\log((1+\lambda_t) C_s^{WFE}) - \frac{\left(\ell_s^{WFE}(z)\right)^{1+\frac{1}{\varphi}}}{1+\frac{1}{\varphi}} + \nu \log G_s^{WFE} \right]$$

The Simulation : Calibration

Parameter	Description	Value	Reference
β	Discount factor	0.99	
n	Relative size of Home	0.5	
α	Home bias parameter	1.5	World Bank (2016)
α^*	Home bias parameter	0.5	World Bank (2016)
φ	Frisch elasticity	0.5	Chetty et al. (2013)
ν	Weight of public consumption	0.4	Song et al. (2012)
θ	Within-country substitutability	9	Gali (2015)
σ	Cross-country substitutability	1.5	Dong et al. (2012)
ψ	Risk premium parameter	0.004	Bergin (2006)
γ	Price rigidity	0.75	Rabanal/Tuesta (2010)
μ_1	Interest rate smoothing	0.79	Clarida et al. (2000)
μ_2	Inflation coefficient	1.5	Taylor (1993)
ρ^{TP}	Persistency of preference shock	0.75	Bodenstein et al. (2009)
$\hat{\varepsilon}^{*TP}$	Foreign time preference shock	-5	
ρ^G	Persistency of fiscal shock	0.75	Iwata (2013)
ϕ	Persistency of productivity	0.99	
μ	Elasticity of productivity	0.11	Chang et al. (2002)

The Simulation: Robustness

Row	Parameter	Cumul. multipl.	Net pr. v. multipl.	Welfare Multiplier ($\nu = 0$)	($\nu = 0.4$)
1	Baseline	*0.9*	*2.9*	*1.1*	*1.5*
2	$\mu = 0.06$ (0.11)	0.7	1.9	0.2	0.6
3	$\mu = 0.15$ (0.11)	1.1	3.8	1.8	2.2
4	$\phi = 0.9$ (0.99)	0.7	0.9	-0.6	-0.2
5	$\phi = 0.8$ (0.99)	0.6	0.7	-0.9	-0.4
6	$\varphi = 1.0$ (0.5)	1.2	3.8	1.7	2
7	$\gamma = 0.5$ (0.75)	0.7	2.4	0.8	1.1
8	$\sigma = 3.0$ (1.5)	0.9	3.2	1.4	1.8
9	$\rho^G = 0.6$ (0.75)	1.1	3.2	1.3	1.6

Less persistent gov‘t spending increase raises multiplier, (=> less crowding out!)