

Fiscal policy and economic growth

António Afonso

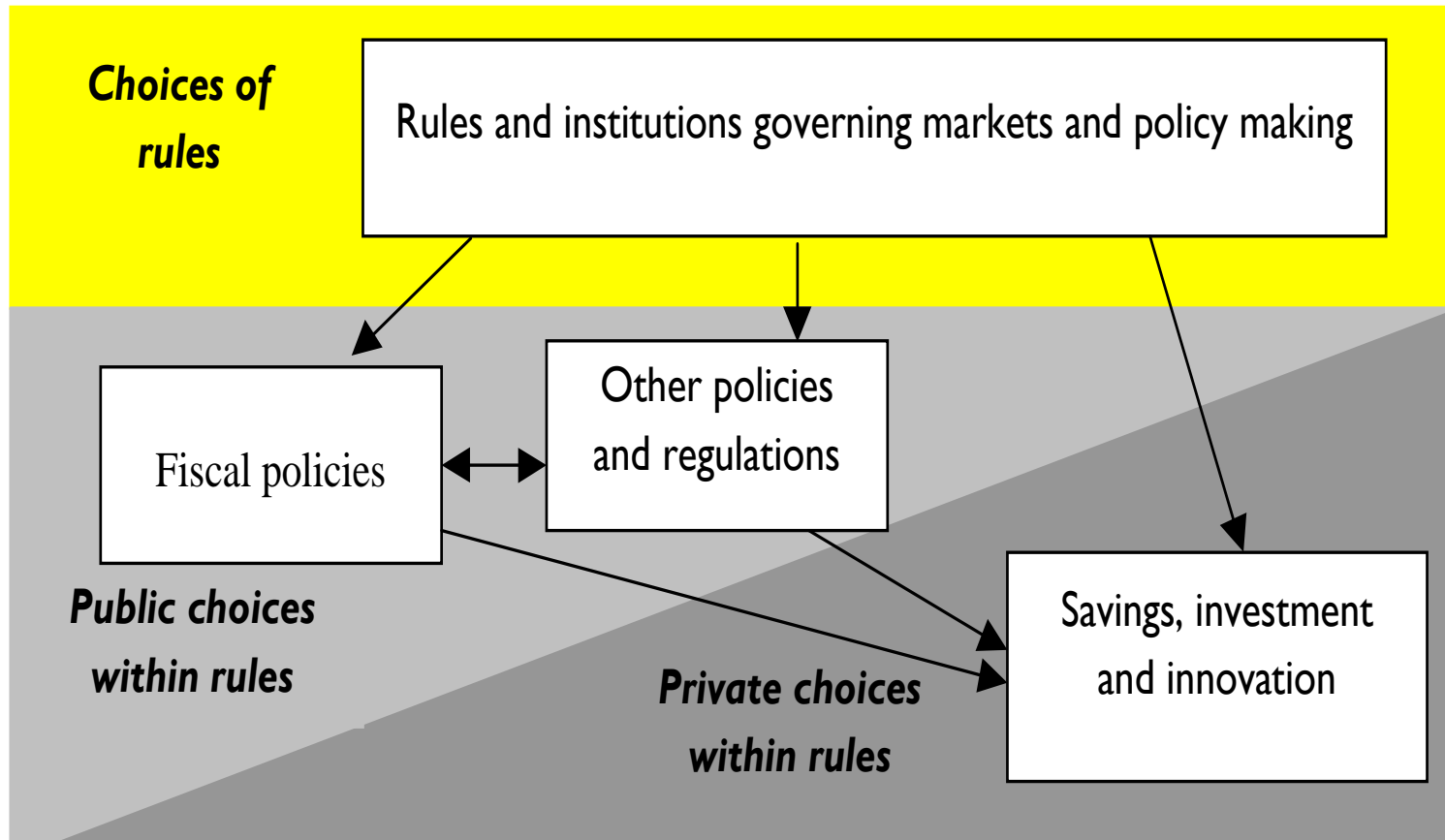
(ISEG/UL - University of Lisbon;
UECE-Research Unit on Complexity and Economics)

2014/2015

1. Conceptual issues
2. Literature
3. Some linkages
4. Stylised data on growth and fiscal
5. Empirical analysis

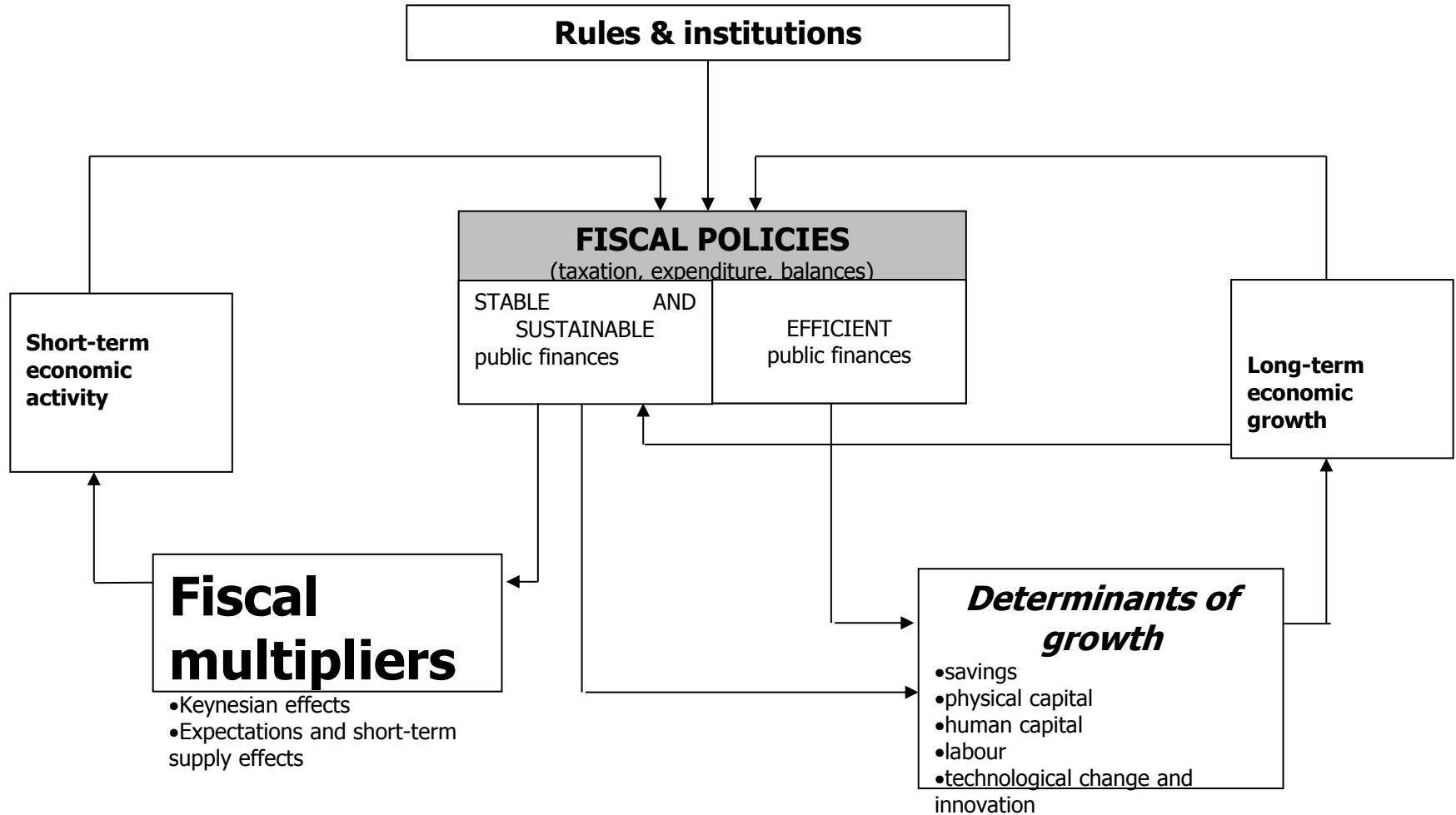
- Fiscal policies and growth
 - Short-term demand/activity (that affects inflation) affected by fiscal policies,
 - Long-term growth (that determines inflation expectations via sustainability) is affected by fiscal policies.

The links between growth and rules

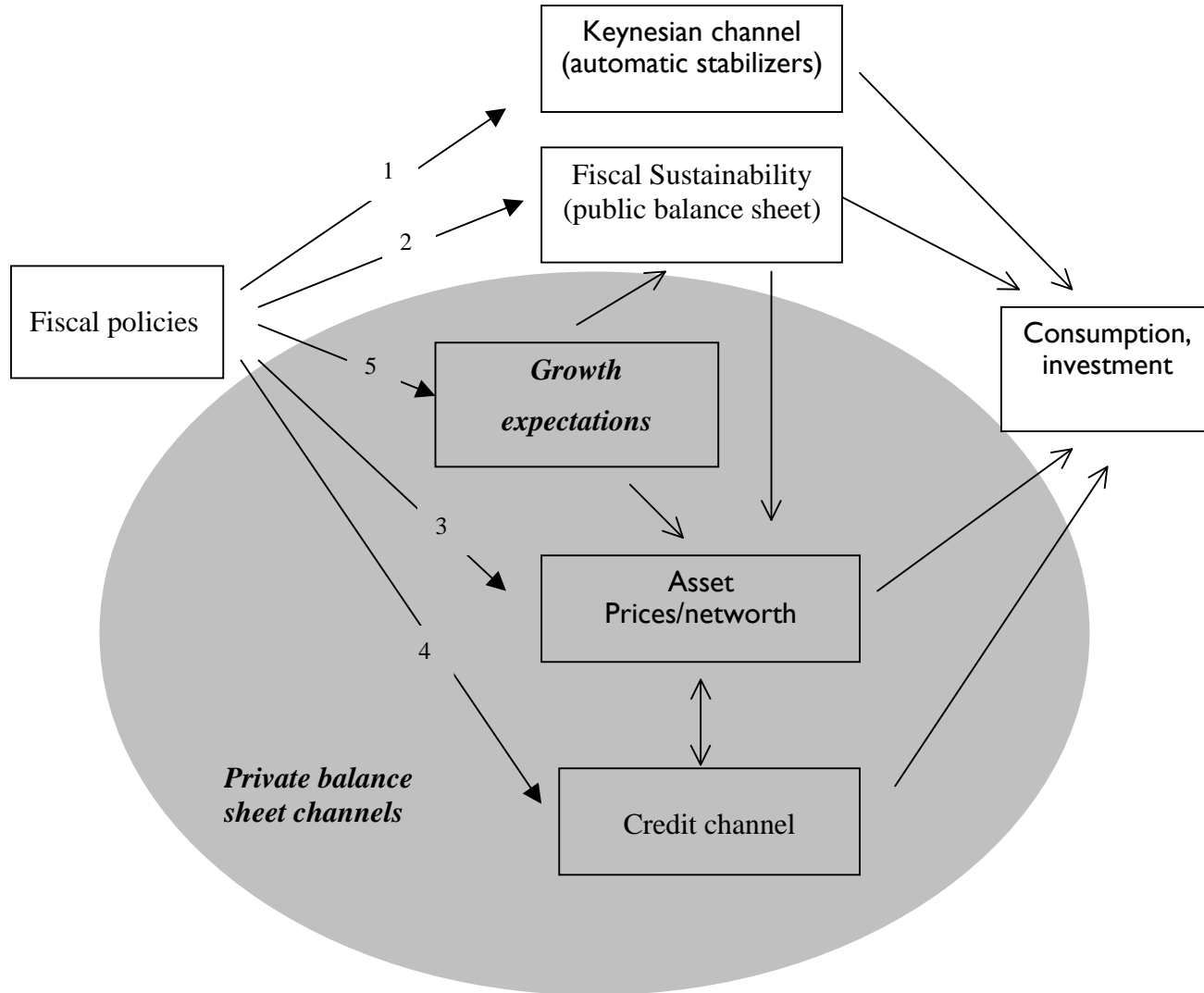


Fiscal policies and economic growth and activity

Conceptual issues (3/7)



The Transmission of Fiscal Policies to demand and activity



Short-term growth

- Channels affecting demand/activity
 - Keynesian
 - non-Keynesian public finances
 - supply-side/growth expectations
 - balance sheet effects

Long-term growth

- Long-term growth models
 - Exogenous models of growth:

$$y = AK^\alpha L^{1-\alpha}$$

- Factors resulting in endogenous growth
 - constant/increasing returns to scale
 - human capital
 - externalities, learning by doing effects

- The traditional neoclassical growth model did not allow for fiscal policies to affect the long-term growth rate of the economy.
- Extensions of neoclassical growth theory have considered public expenditure and taxation as playing a crucial role in long-term economic growth. (Aschauer 1989; Barro and Sala-i-Martin 1997; Mendoza et al. 1997)
- Under the denomination of endogenous growth models a large strand of the literature includes a variety of possibilities to model economic growth. (Acemoglu (2006) includes a detailed explanation of the evolution of endogenous growth models)

See Afonso, González Alegre (2011) for the references.

Surveys

- Amsten (1989) and Epstein and Gintis (1995) suggest that the state can actually, through appropriate policies, nurture productive activities.
- Zagler and Durnecker (2003) present a unifying framework for the analysis of long run growth implications of government expenditures and revenues.
- Gemmel (2004) has summarised many existing empirical work according to the econometric methods used and different effects of revenue and expenditure categories.

Theoretical Contributions

- Modigliani (1961), Diamond (1965) and Saint-Paul (1992): take a neoclassical growth model; an increase in public debt will always decrease output growth.
- Carlstrom and Gokhale (1991): use simulations; claim that when government expenditures increase permanently they cause a long-run decline in output.
- Cashin (1994) developed an endogenous growth model of the influence of public investment, transfers and taxation on the rate of economic growth.
- Slemrod, Gale and Easterly (1995) found positive, negative and no correlations between taxes and the level of per capita income depending on model parameters.

On taxation and growth...

- Koester and Kormendi (1989), Easterly and Rebelo (1993), Nelson and Singh (1994), Romero-Avila and Strauch (2008): effects of taxation are difficult to isolate empirically.
- Plosser (1992): negative correlation between the level of taxes on income and profits and output growth.

On functional expenditure and growth...

- Landau (1986), Nikos (2009): government expenditures on human capital and social protection do not have a significant effect.
- Folster and Henrekson (2001), Afonso and Furceri's (2010): social contributions have a negative effect on growth.
- Lin (1993), Afonso and Alegre (2010) find a significant dependence of productivity on public expenditure on education. Ahmed (1999) improved health conditions contribute positively to economic growth.

On government size and productivity...

- Dar and Amirkhalkhali (2002): TFP growth and productivity of capital are weaker in countries with larger government.
- De la Fuente (1997): negative externality effect of government on the level of productivity.

On debt maturity and growth...

- Cottarelli et al. (2010): longer maturity for advanced countries.

For the references see Afonso and Jalles (2013, 2014).

- **Deficits and debt**

- crowding out and aggregate saving
- inflation/interest rate expectations and macroeconomic stability
 - default risk and collateral value
 - price signal value
- Empirics: inflation and deficits mostly negatively correlated with growth

- **Taxation**

- Taxes are non-neutral and cause distortions
 - labour-leisure decisions
 - savings-consumption decisions
 - alternative consumption or investment choices
- The higher taxes/marginal tax rates, the more distortions.

- **Taxation continued....**

- Savings down if after tax return down
- corporate income taxes affect firm investment
- tax incentives could raise investment but also low-return investment/rent seeking
- labour tax may reduce human capital investment and labour supply/demand

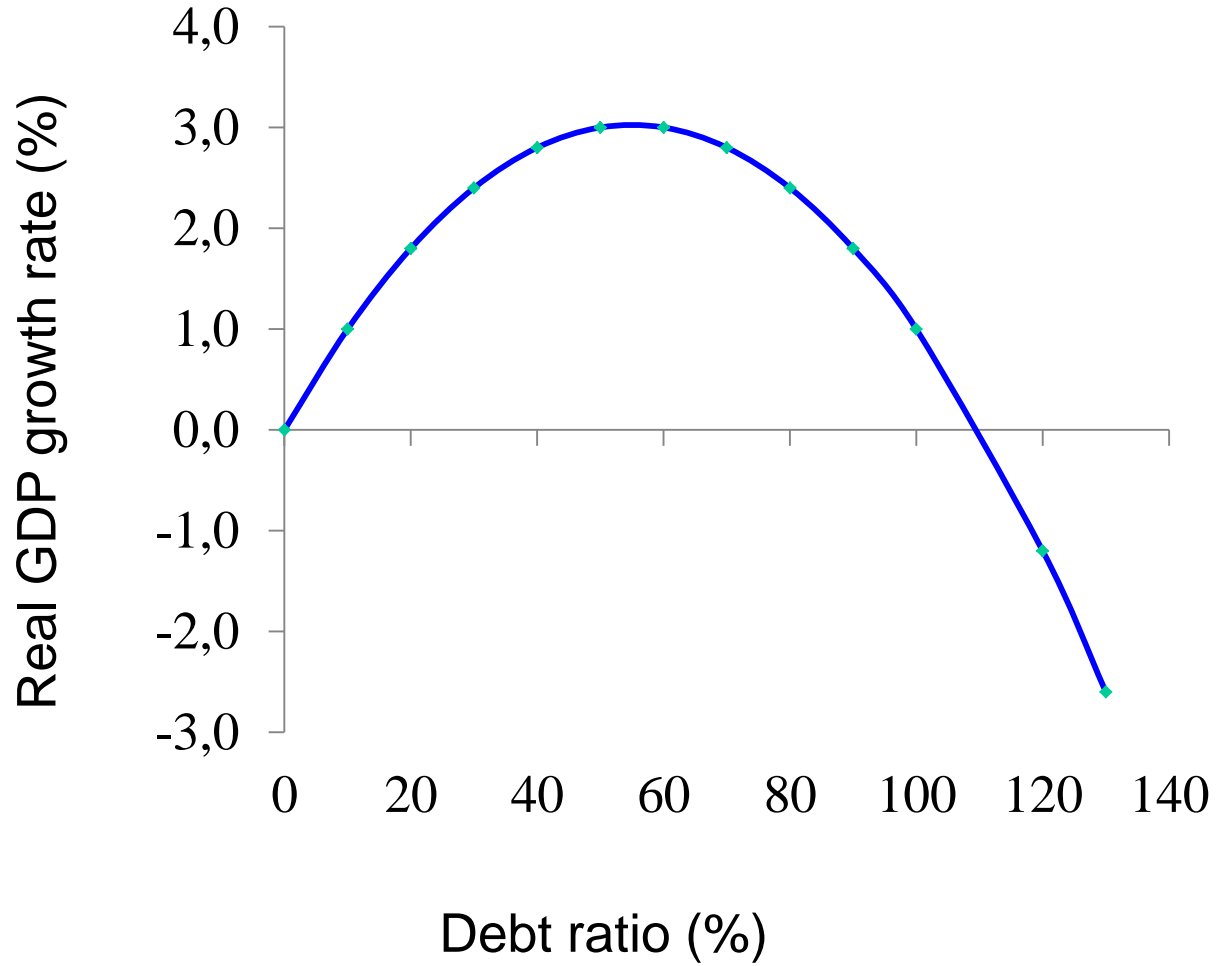
Empirics largely supportive

- Technological change can be promoted with tax incentives (but some problems as with incentives generally)
- Redistributive taxation can result in more or less growth depending on model
- Mixed evidence on last point

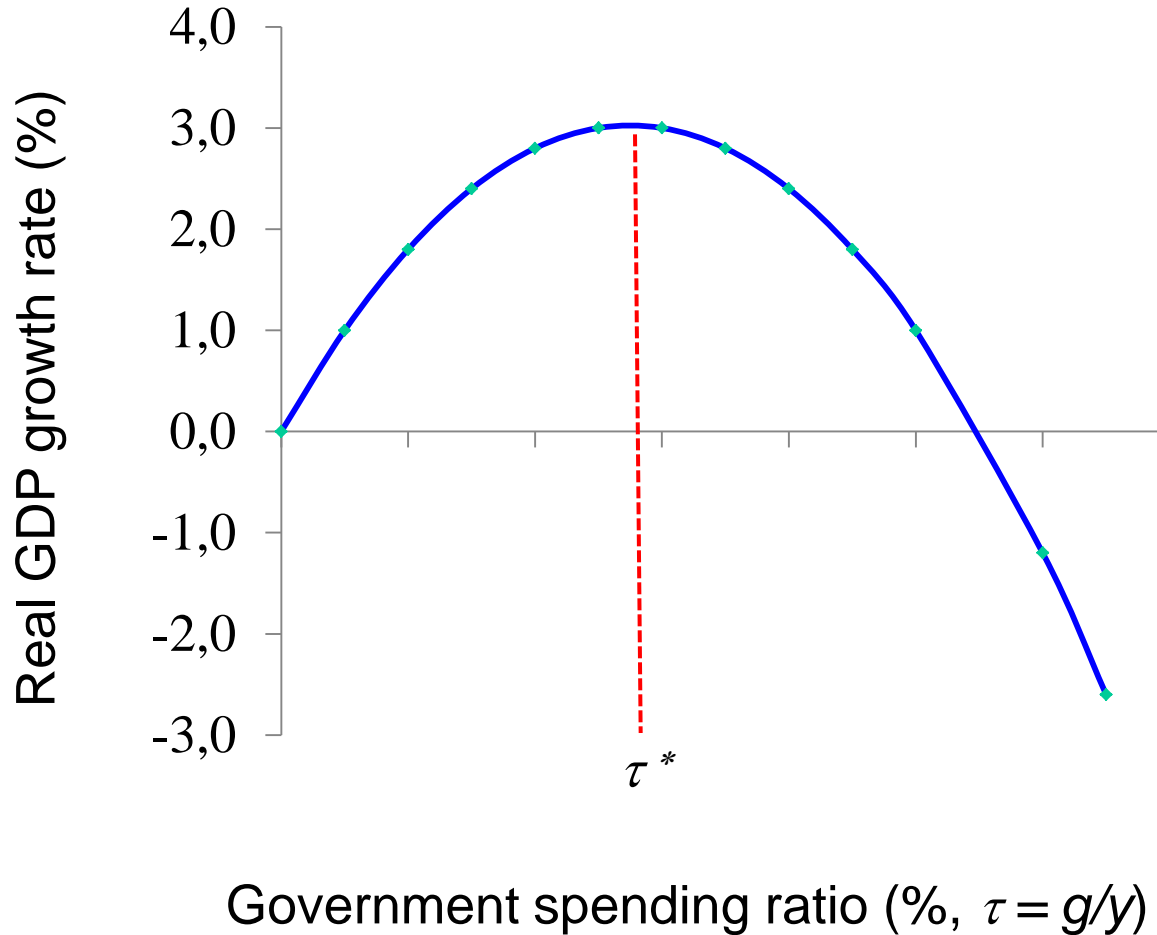
- **Public expenditure**

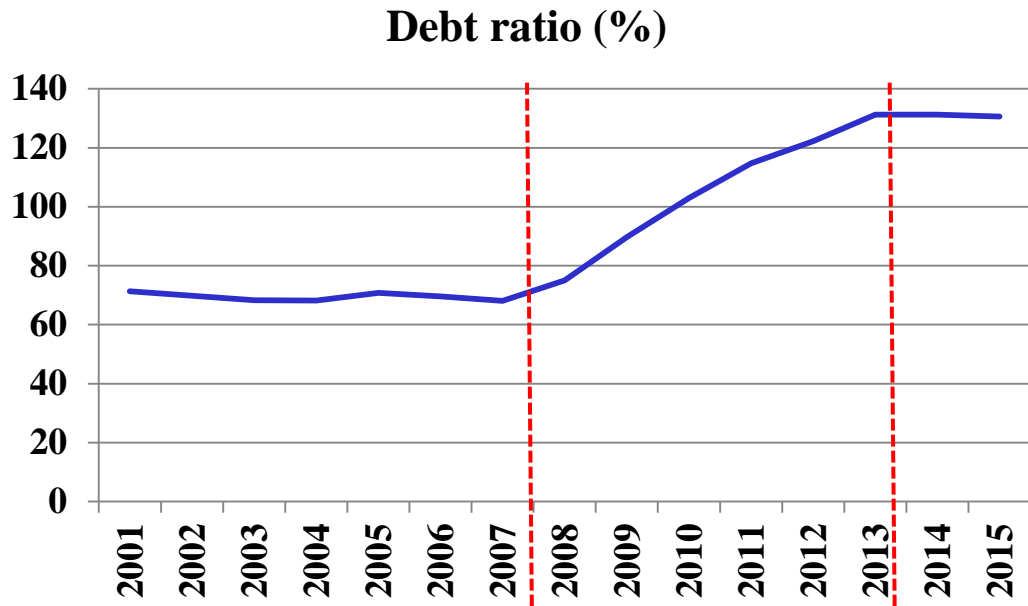
- Lower savings due to social insurance
- Input accumulation/investment via productive spending
 - education
 - public investment
 - (health)
- But cost in terms of taxation!
- Empirical evidence mixed
- Labour supply affected by benefit systems (unemployment, social assistance, early retirement)
- Wage floor from benefit systems reduces labour demand
- Active labour market policies could help training/employability or reduce labour supply/distort competition
- R & D support to boost technical change

Inverted U-shape relation between debt ratio and real growth?

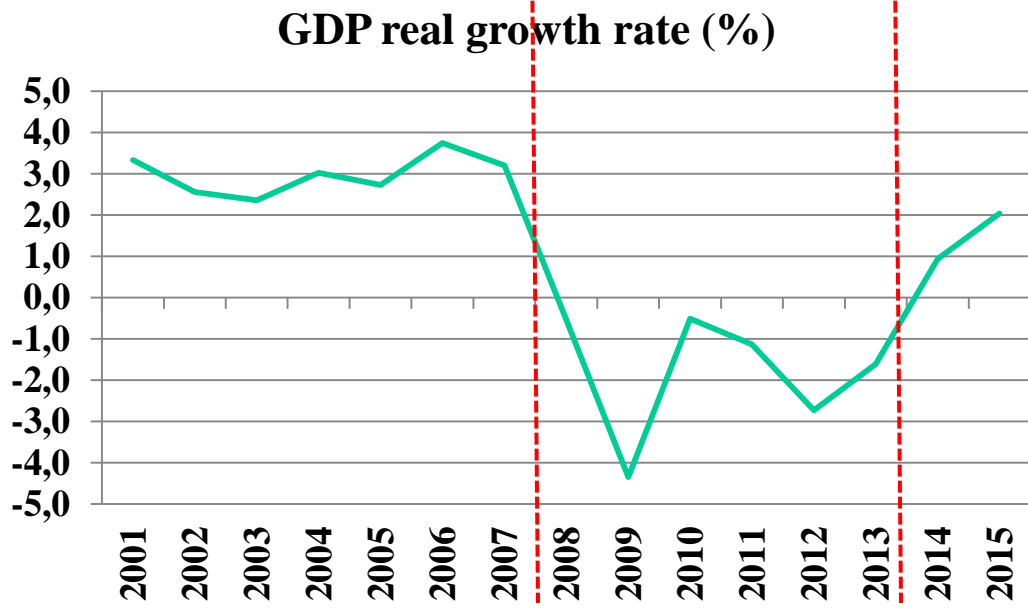


Inverted U-shape relation between government spending and real growth? (Barro, 1990)





Simple averages for Greece, Ireland, Italy, Portugal, Spain.



Source: European Commission spring 2014 economic forecast.

Real GDP growth rates across euro area countries



Stylised data on growth and fiscal (1/4)

(in annual percentage changes)

	1970-1979	1980-1989	1990-98		1999-2008												
			1990-94	1995-98		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		
Euro area	3.8	2.3	2.0	1.8	2.3	2.1	2.8	4.0	1.9	0.9	0.8	1.9	1.8	3.0	2.6	1.2	
Belgium	3.6	2.2	1.9	1.8	2.2	2.3	3.4	3.8	0.8	1.5	1.0	2.8	2.2	3.0	2.8	1.4	
Germany	3.3	2.0	2.3	2.8	1.7	1.6	1.9	3.5	1.4	0.0	-0.2	0.7	0.9	3.2	2.5	1.7	
Ireland	4.7	3.1	6.6	4.3	9.5	5.8	10.7	9.7	5.8	6.4	4.5	4.7	6.4	5.7	6.0	-1.6	
Spain	3.9	2.7	2.5	1.7	3.4	3.5	4.7	5.0	3.6	2.7	3.1	3.3	3.6	3.9	3.7	1.3	
Greece	5.5	0.8	1.7	0.8	2.9	4.1	3.4	4.5	4.5	3.9	5.0	4.6	3.8	4.2	4.0	3.1	
France	4.1	2.3	1.7	1.2	2.3	2.1	3.2	4.1	1.8	1.1	1.1	2.2	1.9	2.4	2.2	0.9	
Italy	4.0	2.6	1.4	1.1	1.8	1.3	1.4	3.9	1.7	0.5	0.1	1.4	0.8	2.1	1.5	0.0	
Cyprus	-	-	4.5	4.3	4.8	3.8	4.8	5.0	4.0	2.1	1.9	4.2	3.9	4.1	4.4	3.7	
Luxembourg	2.7	4.6	4.4	4.8	3.9	4.9	8.5	8.1	2.6	4.1	1.6	4.8	5.0	6.3	5.2	2.5	
Malta	-	-	4.8	5.0	4.6	2.4	4.1	6.4	-1.0	2.2	-0.2	0.5	3.1	3.2	3.7	2.4	
Netherlands	3.4	1.7	3.0	2.5	3.7	2.4	4.7	3.9	1.9	0.1	0.3	2.2	2.0	3.4	3.5	2.3	
Austria	4.1	2.0	2.4	2.5	2.1	2.4	3.7	3.3	0.9	1.4	0.8	2.5	3.3	3.3	3.1	1.9	
Portugal	5.1	3.4	2.8	1.7	4.2	1.6	3.8	3.9	2.0	0.8	-0.8	1.5	0.9	1.4	1.9	0.5	
Slovenia	-	-	1.7	-1.5	5.0	4.5	5.3	4.8	2.9	3.9	2.8	4.0	4.5	6.1	6.8	4.4	
Slovakia	-	-	6.1	-	5.9	5.2	0.0	1.4	3.4	4.8	4.7	5.2	6.5	8.5	10.4	7.0	
Finland	4.1	3.6	1.3	-1.4	4.6	3.3	4.0	5.1	2.5	1.5	2.0	3.7	3.0	4.9	4.5	2.4	
<i>Unweighted std. deviation ¹⁾</i>																	
EA 12	0.8	1.0	1.5	1.6	2.1	1.4	2.6	2.0	1.5	1.9	1.8	1.4	1.7	1.5	1.4	1.3	
EA 16	-	-	1.7	2.0	2.0	1.4	2.5	2.0	1.6	1.8	1.8	1.5	1.8	1.8	2.2	1.9	

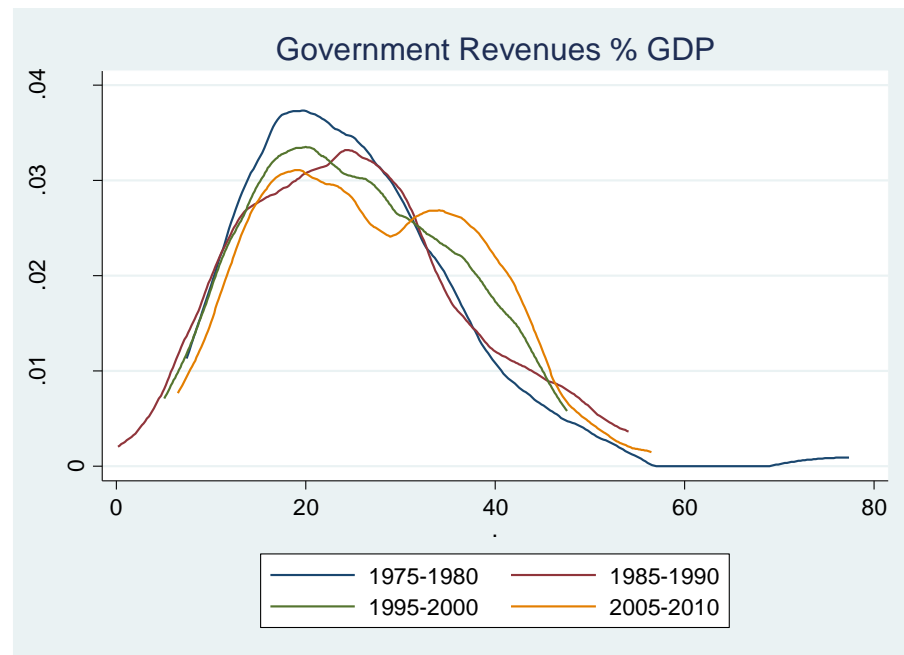
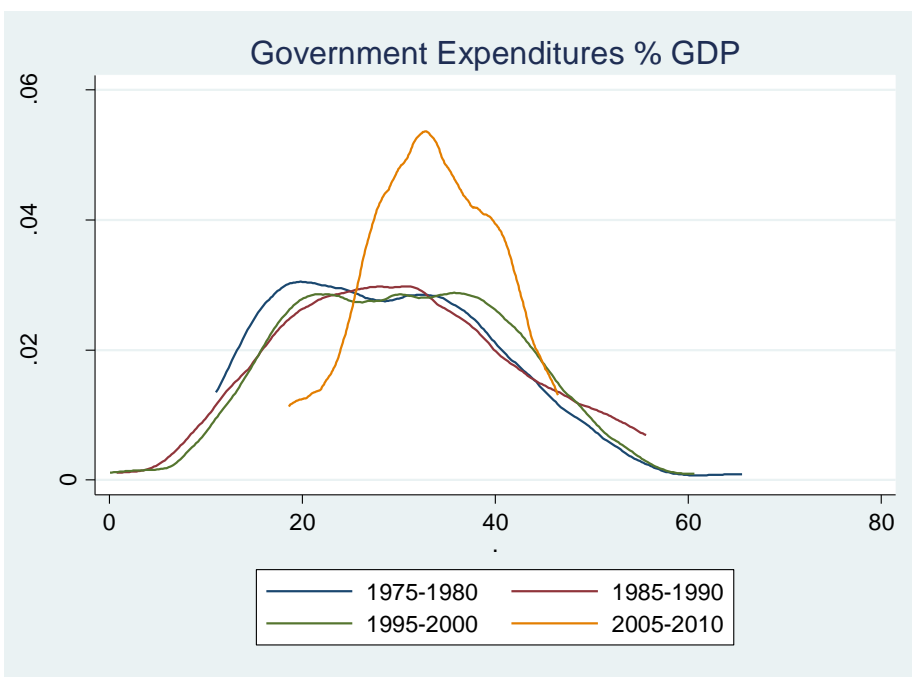
Source: Eurostat and European Commission (Ameco database).

Annual rates are based on quarterly SA or SA & WDA adjusted where available, otherwise annual data is used.

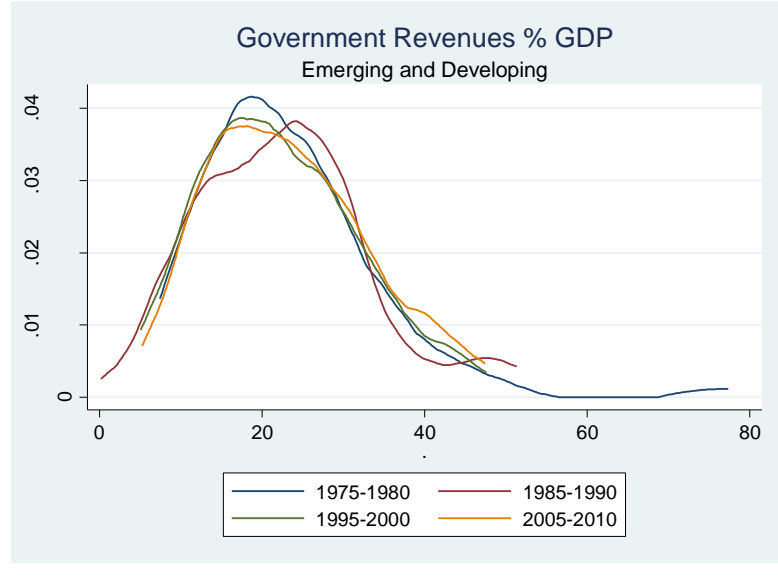
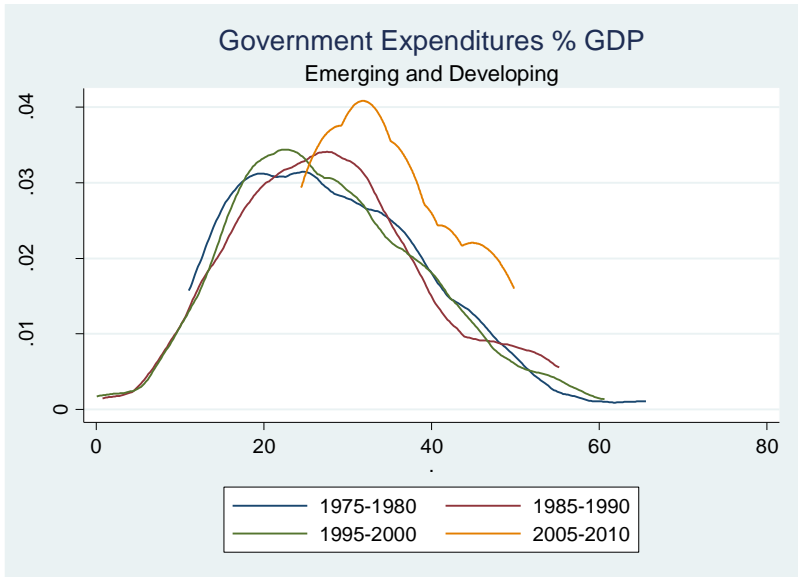
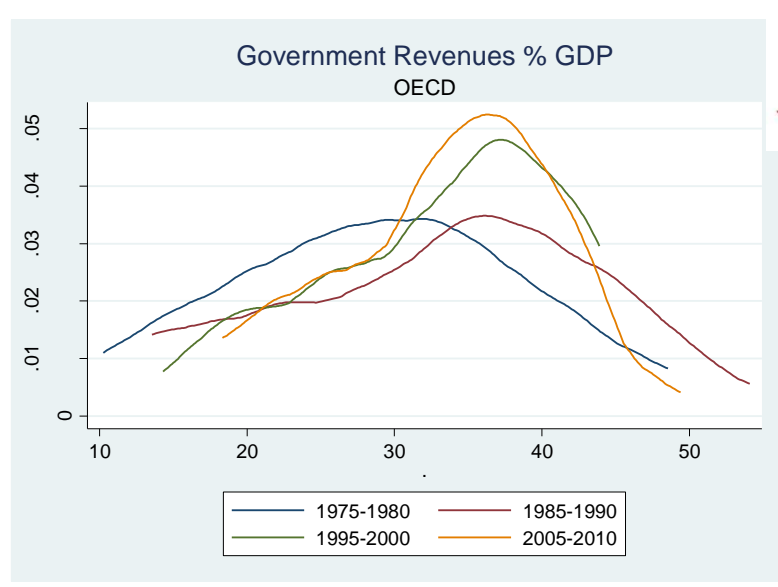
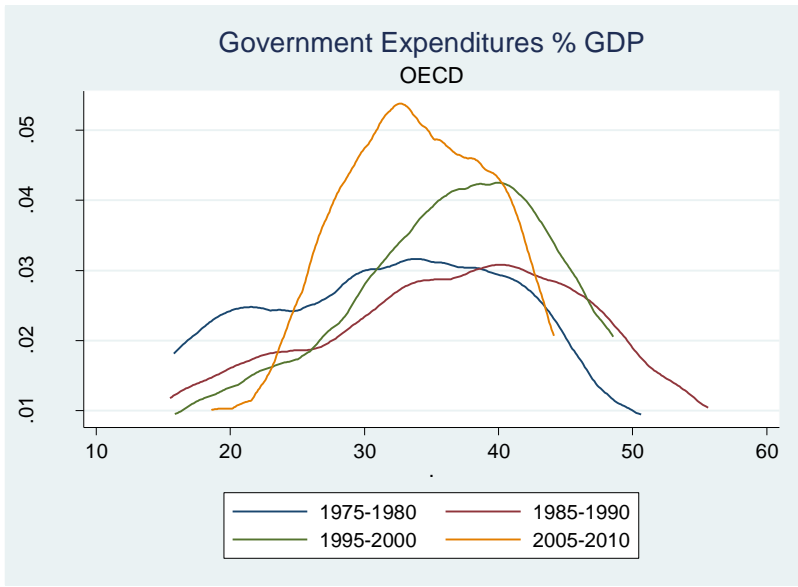
Data for Slovakia is available from 1993 onwards, for Malta from 1992 onwards, and for Cyprus and Slovenia from 1991 onwards. The euro area growth rates include Slovenia, Cyprus and Malta from 1992 onwards. Before, data refer to EA12.

EA12 includes the euro area composition as of December 2006; EA16 includes Slovenia, Cyprus, Malta and Slovakia.

- Government spending and revenue have increased throughout time, which implies an increase of the size of the government.
- The size of the government increases notably when trying to provide the additional services related to the welfare state.
- This result is particularly clear for the case of government spending, in all country sub-groups (countries in the dataset: 155). [see the Kernel density estimates]



Source: Afonso, Jalles (2013, WP).



Source: Afonso, Jalles (2013, WP).

Augmented Neoclassical Production Function

$$Y=F(L,K) \longrightarrow Y=F(L,K,D)$$

Baseline specification

$$y_{it} - y_{it-1} = \alpha_{it} + \beta_0 y_{i0} + \beta_1 x_{it}^j + \gamma D_{it} + \eta_t + v_i + \varepsilon_{it}$$

$y_{it} - y_{it-1}$ – growth rate of real GDP per capita;

y_{i0} – initial value of the real GDP per capita;

$x_{it}^j, j=1,2$, vector of control variables;

D_{it} – debt-related variable;

v_i, η_t – country-specific fixed effects and time-fixed effects;

ε_{it} – zero mean white noise-type column vector satisfying the standard assumptions;

$\alpha, \beta_0, \beta_1, \gamma$ – unknown parameters to be estimated.

Non-linear effects

$$y_{it} - y_{it-1} = \alpha_{it} + \beta_0 y_{i0} + \beta_1 x_{it} + \gamma G_{it} + \delta G_{it}^2 + \eta_t + v_i + \varepsilon_{it}$$

$$y_{it} - y_{it-1} = \alpha_{it} + \beta_0 y_{io} + \beta_1 x^j_{it} + \gamma D_{it} + \eta_t + \nu_i + \varepsilon_{it}$$

x^1_{it} : population growth, trade openness, gross fixed capital formation (% GDP), education proxy for human capital (Barro and Lee's, 2010, secondary school attainment), debt maturity.

x^2_{it} : initial values of the previous variables, initial values (at the beginning of each 5-year period) for inflation (CPI-based), initial government size, initial financial depth (or liquid liabilities over GDP), banking crisis dummy, and government balance ratio.

Debt-growth relationship (5-year averages)



Empirical analysis (3/6)

Real GDPpc growth	OLS			OLS-LAD	MM	LSDV-C
Sample	All	OECD	Emerg	All	All	All
	1	2	3	4	5	6
inigdppc	-0.55*** (0.125)	-0.60*** (0.227)	-0.97*** (0.258)	-0.52*** (0.118)	-0.82*** (0.095)	-5.05*** (0.510)
popgr	-0.36*** (0.111)	-0.02 (0.191)	-0.37** (0.165)	-0.41*** (0.111)	-0.68*** (0.217)	-0.37** (0.174)
openness	0.00 (0.002)	0.01*** (0.003)	0.01 (0.005)	0.00 (0.002)	0.00* (0.002)	0.04*** (0.008)
gfcf_gdp	0.16*** (0.021)	0.11*** (0.028)	0.22*** (0.040)	0.15*** (0.019)	0.14*** (0.022)	0.16*** (0.024)
education	0.02** (0.007)	0.01 (0.006)	0.01 (0.011)	0.02*** (0.006)	0.02*** (0.007)	0.05*** (0.010)
govdebt_gdp	-0.02*** (0.002)	-0.01** (0.004)	-0.02** (0.008)	-0.02*** (0.002)	-0.02*** (0.006)	-0.01*** (0.003)

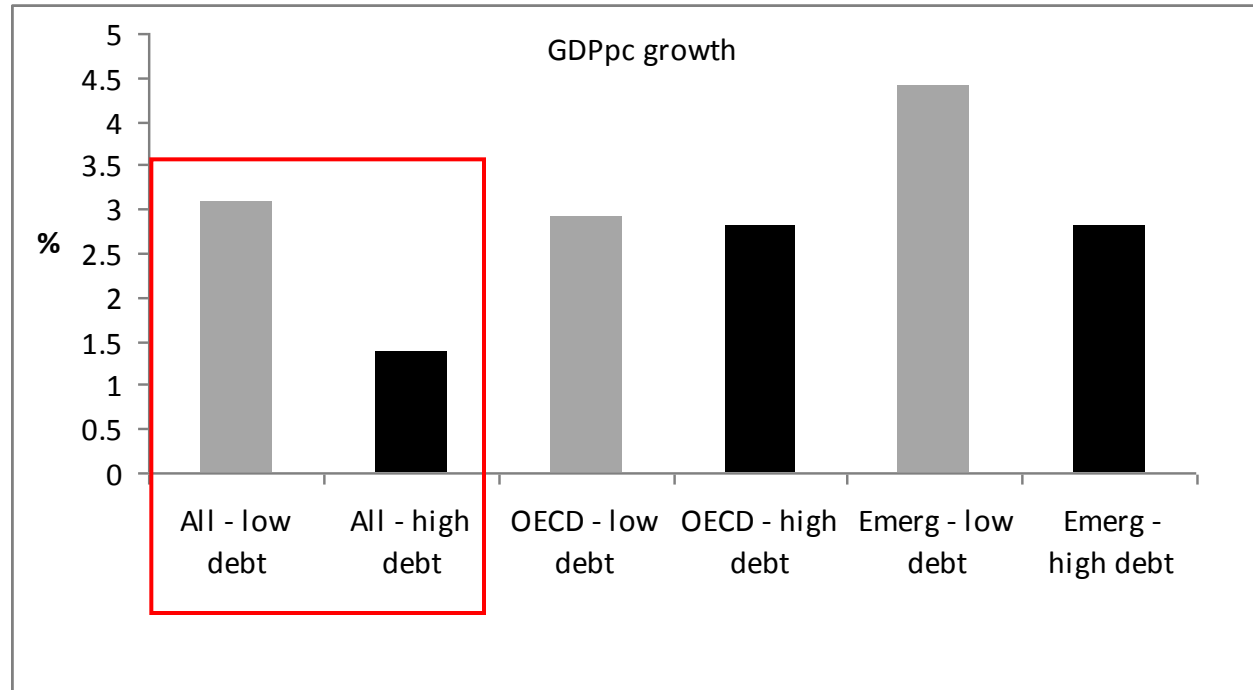
155 countries over the 1970-2008 period (annual data).

Real GDPpc growth	FE-within		IV-GLS		SYS-GMM	
Sample	All	OECD	All	OECD	All	OECD
	7	8	9	10	11	12
inigdppc	-5.22*** (0.619)	-2.90*** (0.467)	-4.17*** (0.541)	-2.66*** (0.422)	-0.30 (0.308)	-2.72 (2.927)
popgr	-0.37 (0.226)	-0.59 (0.390)	-0.37* (0.220)	-0.54* (0.308)	-0.31* (0.181)	1.03 (0.750)
openness	0.04*** (0.009)	0.05*** (0.015)	0.04*** (0.007)	0.04*** (0.010)	0.01 (0.010)	0.02 (0.024)
gfcf_gdp	0.18*** (0.042)	0.13** (0.049)	0.16*** (0.031)	0.13*** (0.039)	0.21*** (0.042)	-0.00 (0.230)
education	0.05*** (0.010)	0.01 (0.009)	0.04*** (0.009)	0.01 (0.009)	0.01 (0.020)	-0.00 (0.032)
govdebt_gdp	-0.02*** (0.003)	-0.00 (0.005)	-0.02*** (0.003)	-0.00 (0.005)	-0.01*** (0.004)	-0.01 (0.042)

Potential GDP growth as dependent variable yields similar results (HP, Baxter-King, Christiano-Fitzgerald filters).

Source: Afonso, Jalles (2013, 2014).

Debt-growth relationship (cross-sectional averages)



High debt: average debt ratio > 90%

Source: Afonso, Jalles (2013, 2014).

Low debt: average debt ratio < 30%

Countries with low debt ratios grow faster.

Debt-growth relationship: a simple exercise

	Initial debt ratios (% GDP)		
	<30	30-60	>90
Sample average of govdebt	14.644	46.542	116.565
Regression coefficient, average(1)	0.067	-0.017	-0.023
Growth impact of 10% increase in govdebt from sample average(2)	0.098	-0.079	-0.268

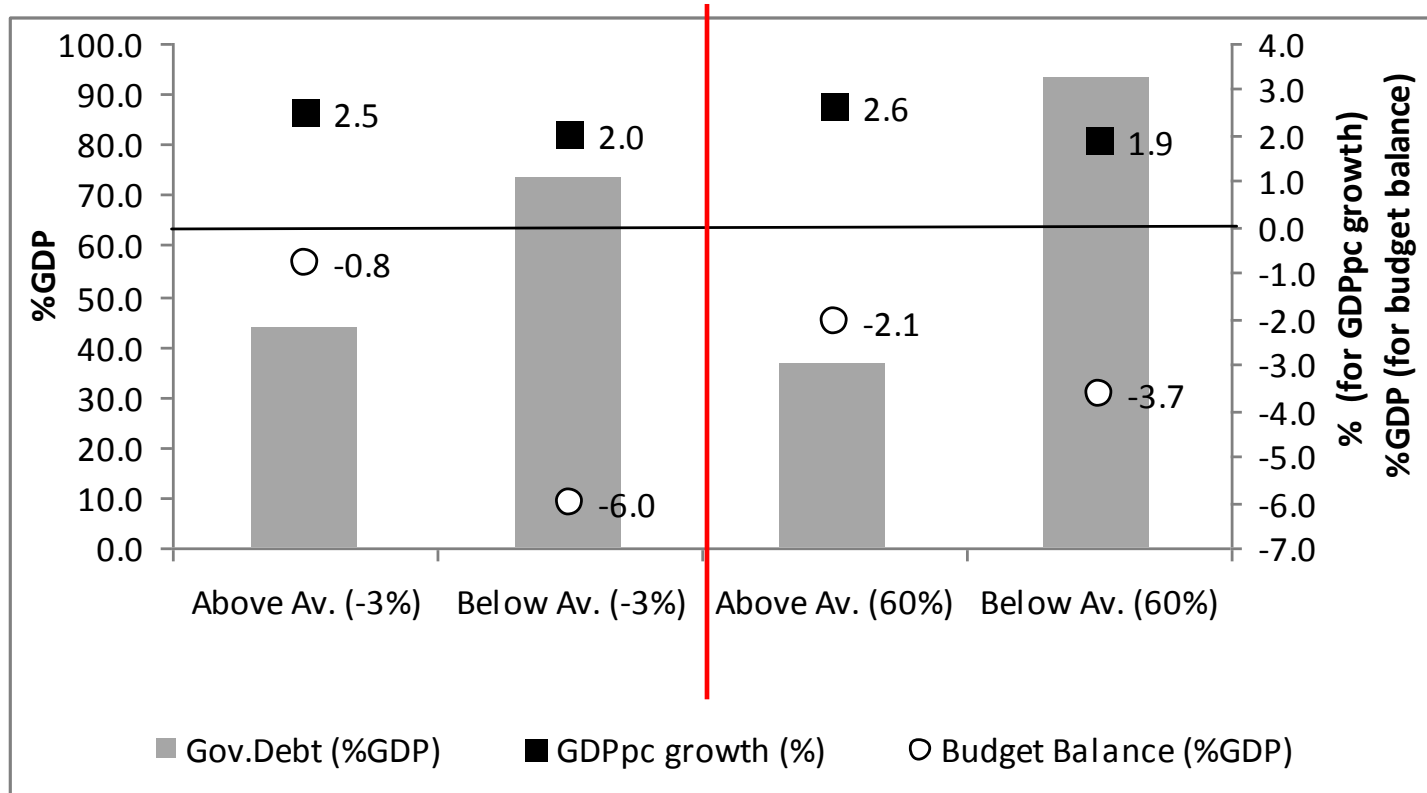
Notes:

- (1) average of the estimates (from OLS, FE, SYS-GMM) on the coefficients of interaction terms between initial debt-to-GDP and dummy variables for three groupings of debt ratios (below 30%, 30-60%, and above 90%) for the entire sample period.
- (2) this **estimate of growth impact of 10% increase in debt ratio** is obtained as the product of the regression coefficient (row 2) and 10% of the sample average debt ratios (row 1).

Source: Afonso, Jalles (2013).

Deficit/Debt thresholds

- with 60% debt or 3% budget deficit threshold, countries with higher debt ratios, and higher budget deficits, are associated with lower growth rates.



Source: Afonso, Jalles (2013, 2014).

- Afonso, A, González Alegre, J. (2011). “Economic growth and budgetary components: a panel assessment for the EU”, *Empirical Economics*, 41, 703-723.
- Afonso, A., Jalles. (2013). “Growth and Productivity: the role of Government Debt”. *International Review of Economics and Finance*, 25, 384-407.
- Afonso, A., Jalles, J. (2014). “Fiscal Composition and Long-term Growth”, *Applied Economics*. 46 (3), 349-358. ECB WP 1518, March 2013.
- Barro, R. (1990). “Government Spending in a Simple Model of Endogenous Growth.” *Journal of Political Economy*, 98(5), S103-S105.
- ECB (2001). “Fiscal policies and economic growth,” ECB Monthly Bulletin, August.
- IMF (2014). “Is it time for an infrastructure push: the macroeconomic effects of public investment”, IMF WEO, October.