

# **A Surplus of Ambitions: Can Europe Rely on Large Primary Surpluses to Solve its Debt Problem?**

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# Outline

- Background
- Definition of episodes
- Descriptions and correlates
- Regressions
- Case studies

# Background

**Table 1: Primary balances necessary to achieve debt targets by 2030 and underlying assumptions**

Country	IMF Forecasts <sup>a</sup>			Debt Target in 2030 <sup>b</sup>	Required cyclically adjusted primary balance (2020-30) <sup>b</sup>
	Real GDP Growth (2019)	Inflation (2019)	Interest rate-growth differential (2013-19 average)		
Belgium	1.6%	1.2%	1.0%	60%	3.8%
France	1.9%	1.8%	-0.1%	60%	2.9%
Greece	3.3%	1.3%	1.0%	60%	7.2%
Ireland	2.7%	1.8%	0.4%	60%	5.6%
Italy	1.2%	1.5%	2.4%	60%	6.6%
Japan <sup>c</sup>	1.1%	2.0%	-2.0%	200%	7.3%
Portugal	1.8%	1.5%	1.2%	60%	5.9%
Spain	1.6%	1.5%	2.2%	60%	4.0%
United Kingdom	2.5%	2.0%	-0.3%	60%	4.2%
United States	2.9%	2.1%	-1.8%	60%	4.1%
Av. for AEs.					3.6%
Av. for G20 AEs					3.8%
Av. for EMs					0.5%

Sources: <sup>a</sup>IMF (2013) Table 12a and WEO database (April 2013) 13b; <sup>b</sup> IMF (2013) Tables 13a and 13b. <sup>c</sup> The gross debt target for Japan corresponds to a net debt of 80% of GDP.

# Background

- IMF *Fiscal Monitor* (2013/14) sketches a scenario in which the debts of European sovereigns fall to the 60 percent level targeted by the EU's Fiscal Compact by 2030.
- The required average primary surplus in the decade 2020-2030 are:
  - Greece: 7.2% of GDP
  - Ireland: 5.6% of GDP
  - Italy: 6.6% of GDP
  - Portugal 5.9% of GDP
  - Spain: 4% of GDP

# Background

- We ask whether these primary surpluses can be achieved
- This is important because the notion of debt sustainability is not well defined
  - =>Multiple Equilibria
- “Whatever it takes” was able to coordinate expectations towards the good equilibrium
- Debt sustainability is a long-term concept, but the near term evolution of debt may become disproportionately important if political support for “whatever it takes” is stronger when a government’s fiscal numbers are good.
- Since good fiscal numbers increase the likelihood of support in a crisis, they reduce the likelihood that the crisis will happen.

# Large and persistent primary surplus episodes

- Data: unbalanced panel of 54 emerging and advanced economies in the 1974-2013 period
  - 29 AEs and 27 EMs
- Three definitions of large and three definitions of persistent.
  - Large: the average value of the primary surplus during the episode is greater than 3, 4, or 5 percent of GDP.
  - Persistent: the episode lasts at least 5, 8, or 10 years.

# Large and persistent primary surplus episodes

- A series of overlapping periods may satisfy one or more of our definitions
  - Example: Belgium had an average primary surplus greater than 3 percent of GDP for each five-year period from 1989-93 to 2004-08 and for each ten-year period from 1987-96 to 2000-09
  - These overlapping episodes would be problematic for our statistical analysis
- We select the episode with the largest average primary surplus in any given 5, 8, and 10 year window

# Large and persistent primary surplus episodes

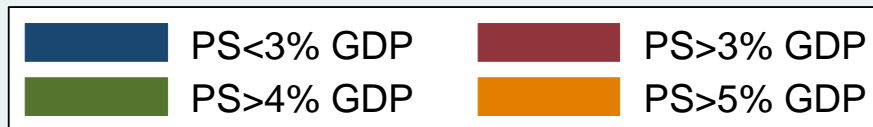
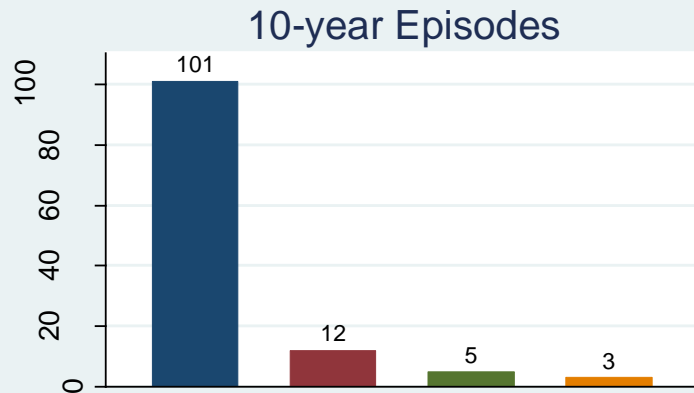
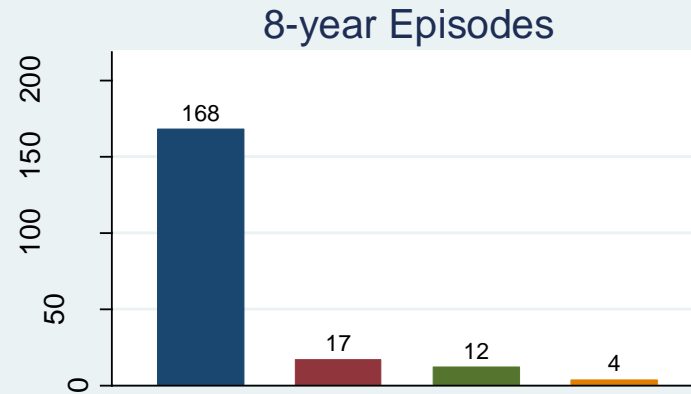
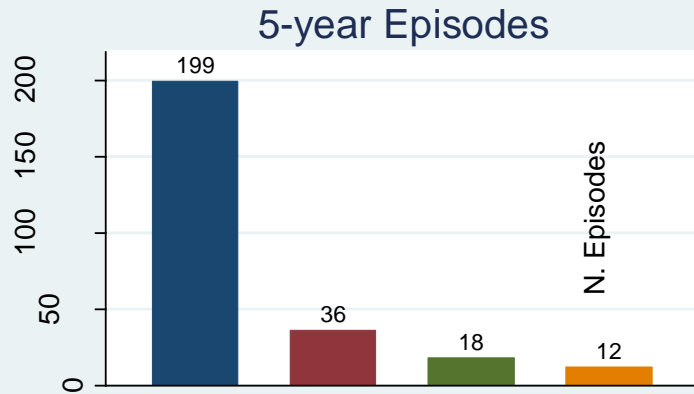
- Comparison groups.
  - For the five-year episodes, the comparison group consists of all nonoverlapping five-year periods between 1974 and 2013 (1974-78; 1979-83; 1984-88; 1989-93-1994-98; 1999-03; 2004-08-2009-13) which:
    - Do not do not overlap with a window starting two year before and ending two year after the episodes
    - Do not overlap with the non-selected episodes
  - We do the same for 8 and 10-year episodes



# How many episodes?

- Large and persistent primary surpluses are unusual.
  - Out of **235** nonoverlapping **five-year** periods in our data, there are:
    - **36** 3% episodes (15% of the sample)
    - **18** 4% episodes (8 % of the sample)
    - **12** 5% episodes (5 % of the sample)
  - Out of **185** nonoverlapping **eight-year** periods, there are:
    - **17** 3% episodes (9% of the sample)
    - **12** 4% episodes (6 % of the sample)
    - **4** 5% episodes (2 % of the sample)
  - Out of **113** nonoverlapping **ten-year** periods, there are:
    - **12** 3% episodes (11% of the sample)
    - **5** 4% episodes (5 % of the sample)
    - **3** 5% episodes (2.5 % of the sample)

# How many episodes?



# Correlates of episodes

	Five-year episodes			Eight-year episodes			Ten-year episodes		
	3%	4%	5%	3%	4%	5%	3%	4%	5%
	<b>GDP Growth (%)</b>								
Control	2.74	2.99	2.98	3.04	3.11	3.05	2.90	2.92	2.95
Episode	4.78	4.33	4.64	3.99	3.75	4.20	3.60	4.42	3.79
Diff.	-2.03	-1.34	-1.66	-0.95	-0.64	-1.15	-0.70	-1.51	-0.83
p-value	<b>0.00</b>	<b>0.02</b>	<b>0.01</b>	<b>0.05</b>	0.27	0.29	0.19	<b>0.07</b>	0.43
	<b>GDP per capita (USD)</b>								
Control	23'239	22'701	23'015	22'653	21'957	22'936	23'265	24'054	24'222
Episode	24'645	28'774	29'442	26'926	32'534	39'328	30'765	34'077	38'959
Diff.	-1'405	-6'073	-6'427	-4'273	-10'577	-16'392	-7'500	-10'023	-14'737
p-value	0.60	<b>0.10</b>	0.15	0.28	<b>0.02</b>	<b>0.05</b>	0.11	0.15	<b>0.09</b>
	<b>World GDP Growth (%)</b>								
Control	2.74	2.75	2.76	2.79	2.79	2.79	2.79	2.80	2.81
Episode	3.05	3.13	3.12	3.04	3.07	2.85	2.97	2.89	2.92
Diff.	-0.31	-0.39	-0.36	-0.26	-0.28	-0.06	-0.18	-0.09	-0.11
p-value	<b>0.01</b>	<b>0.02</b>	<b>0.06</b>	<b>0.00</b>	<b>0.00</b>	0.70	<b>0.00</b>	0.27	0.29
	<b>Current account balance (% of GDP)</b>								
Control	-1.40	-1.19	-1.13	-1.44	-1.44	-1.30	-0.98	-0.80	-0.87
Episode	1.34	2.82	3.97	1.83	3.17	10.46	3.10	5.94	10.70
Diff.	-2.74	-4.01	-5.10	-3.27	-4.61	-11.75	-4.09	-6.74	-11.57
p-value	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>



# Correlates of episodes

	Five-year episodes			Eight-year episodes			Ten-year episodes		
	3%	4%	5%	3%	4%	5%	3%	4%	5%
	Electoral System (Parliamentary=1; Presidential=0)								
Control	0.81	0.77	0.78	0.81	0.78	0.80	0.77	0.79	0.80
Episode	0.71	0.89	0.83	0.81	1.00	1.00	0.92	1.00	1.00
Diff.	0.10	-0.12	-0.05	-0.01	-0.22	-0.20	-0.14	-0.21	-0.20
p-value	0.19	0.22	0.65	0.95	<b>0.07</b>	0.39	0.25	0.24	0.38
	Economic Ideology of the Government (Right=1; Left=3; Center=2)								
Control	1.87	1.91	1.93	1.91	1.94	1.93	1.90	1.91	1.91
Episode	2.13	2.00	1.82	2.08	1.76	1.38	1.84	1.53	1.30
Diff.	-0.26	-0.09	0.11	-0.17	0.17	0.55	0.06	0.39	0.61
p-value	<b>0.09</b>	0.67	0.68	0.40	0.47	0.28	0.77	0.26	0.20
	Does party of executive control all relevant houses? (1=yes)								
Control	0.22	0.22	0.22	0.20	0.23	0.23	0.21	0.22	0.22
Episode	0.27	0.36	0.38	0.38	0.35	0.33	0.33	0.26	0.33
Diff.	-0.05	-0.14	-0.17	-0.19	-0.13	-0.10	-0.12	-0.04	-0.11
p-value	0.53	0.15	0.16	<b>0.07</b>	0.30	0.66	0.30	0.84	0.62
	Plurality (1= first past the post rule)								
Control	0.54	0.54	0.52	0.54	0.56	0.55	0.59	0.56	0.55
Episode	0.49	0.44	0.50	0.50	0.36	0.33	0.41	0.40	0.33
Diff.	0.05	0.09	0.02	0.04	0.20	0.21	0.18	0.16	0.22
p-value	0.56	0.44	0.87	0.77	0.20	0.47	0.23	0.48	0.45
	Proportional representation (1=yes)								
Control	0.80	0.82	0.83	0.81	0.81	0.81	0.79	0.80	0.80
Episode	0.83	0.78	0.67	0.75	0.82	0.67	0.83	0.80	0.67
Diff.	-0.03	0.04	0.17	0.06	0.00	0.15	-0.05	0.00	0.13
p-value	0.71	0.64	0.14	0.55	0.97	0.53	0.72	0.98	0.57

# Correlates of episodes

	Five-year episodes			Eight-year episodes			Ten-year episodes		
	3%	4%	5%	3%	4%	5%	3%	4%	5%
Control	38.94	35.42	33.98	43.37	39.14	35.39	34.81	31.49	30.34
Episode	12.14	8.73	7.99	8.17	8.99	8.34	8.96	10.87	8.49
Diff.	26.80	26.69	25.98	35.20	30.15	27.05	25.86	20.62	21.85
p-value	0.26	0.38	0.47	0.34	0.47	0.72	0.49	0.70	0.75
	Vote share of Government Parties								
Control	42.60	42.57	42.89	44.08	43.90	44.11	43.05	43.26	43.52
Episode	44.34	45.91	45.28	45.48	46.95	52.58	46.42	49.46	51.42
Diff.	-1.74	-3.34	-2.39	-1.40	-3.05	-8.46	-3.38	-6.20	-7.91
p-value	0.59	0.44	0.64	0.73	0.50	0.31	0.47	0.37	0.36
	Herfindahl Index Government								
Control	0.71	0.70	0.69	0.70	0.71	0.71	0.71	0.71	0.71
Episode	0.69	0.75	0.75	0.69	0.66	0.57	0.66	0.63	0.57
Diff.	0.02	-0.05	-0.05	0.01	0.05	0.14	0.05	0.08	0.14
p-value	0.65	0.40	0.50	0.93	0.55	0.36	0.55	0.50	0.35
	Government Fractionalization								
Control	0.30	0.31	0.31	0.30	0.30	0.29	0.30	0.30	0.29
Episode	0.32	0.25	0.26	0.31	0.35	0.43	0.34	0.37	0.43
Diff.	-0.02	0.05	0.05	-0.01	-0.05	-0.14	-0.05	-0.08	-0.14
p-value	0.65	0.40	0.50	0.93	0.55	0.35	0.55	0.50	0.35
	Polarization between the executive party and the four principal parties of the legislature								
Control	1.02	1.02	1.05	1.04	1.03	1.05	0.98	1.01	1.04
Episode	1.07	1.16	1.05	1.17	1.26	1.33	1.27	1.42	1.33
Diff.	-0.05	-0.14	0.00	-0.13	-0.23	-0.29	-0.29	-0.41	-0.29
p-value	0.73	0.50	0.99	0.54	0.36	0.54	0.22	0.25	0.52
	Democracy Index								
Control	9.26	9.18	9.20	9.23	9.19	9.27	9.20	9.23	9.27
Episode	8.84	9.06	8.84	9.14	9.11	7.91	9.06	8.72	7.89
Diff.	0.42	0.12	0.36	0.10	0.08	1.37	0.14	0.51	1.38
p-value	0.17	0.77	0.44	0.82	0.87	0.13	0.77	0.48	0.12

# In terms of economic characteristics

- It shows that persistent surplus episodes are significantly more more likely when:
  - Growth is strong
  - The country has high per capita income (strong institutions?)
  - Global growth is strong
  - Current account is in surplus (high savings, in other words)
  - Debt-to-GDP ratio is high (need is pressing)
  - Exchange rate is at competitive levels (consistent with current account surplus finding)

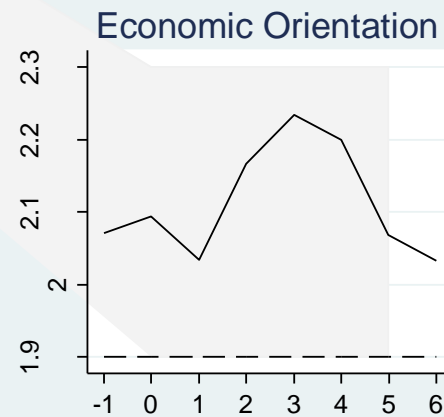
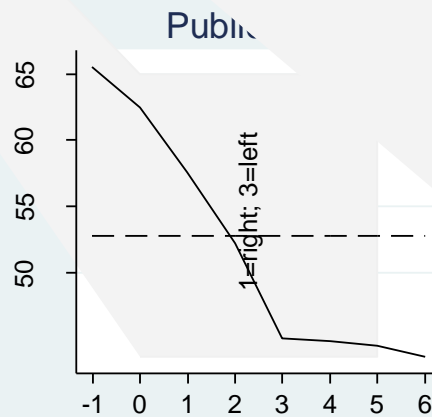
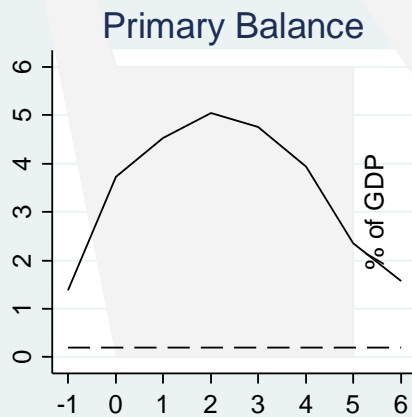
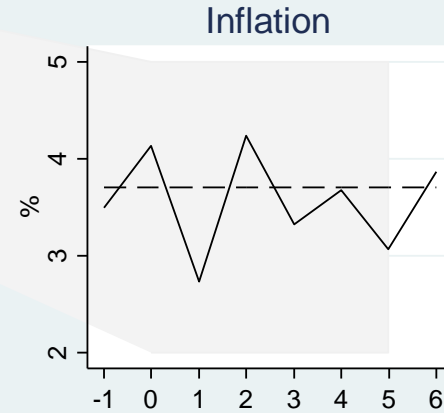
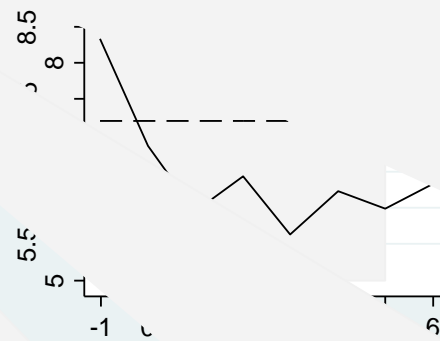
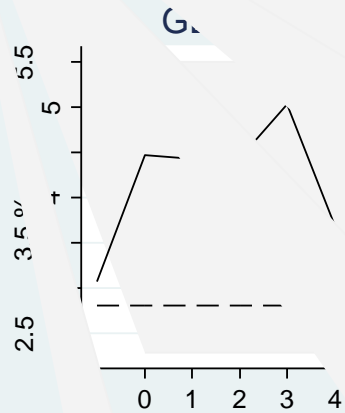
# In terms of political characteristics

- Surpluses are significantly more likely in countries with:
  - Left of center governments (right wing governments want to commit their successors to low deficits? Right wing governments find it harder to build consensus around consolidation?)
  - Governing party or parties control all houses of congress or parliament
  - (Results here for PR vs. MR electoral systems are inconclusive)



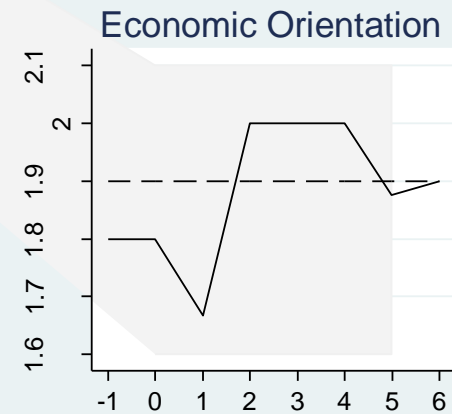
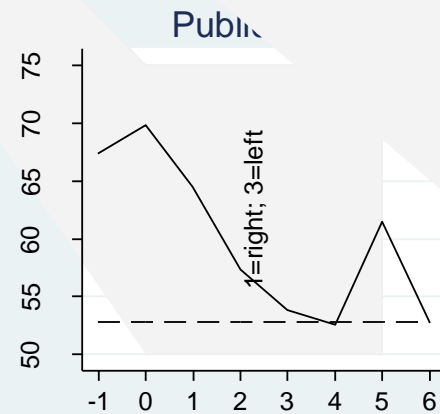
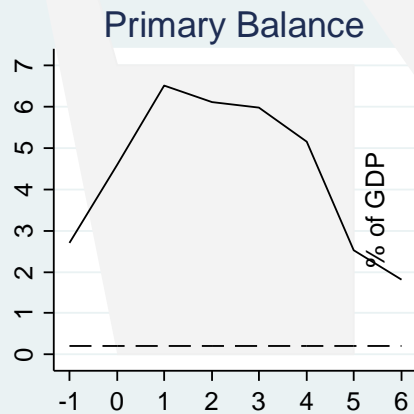
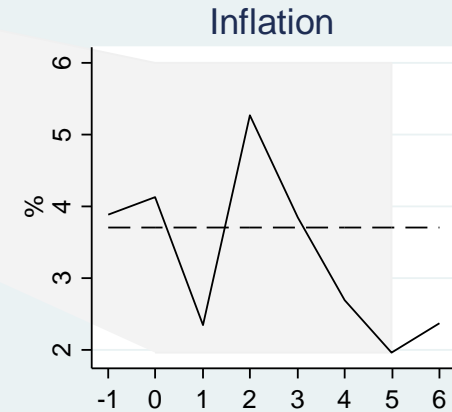
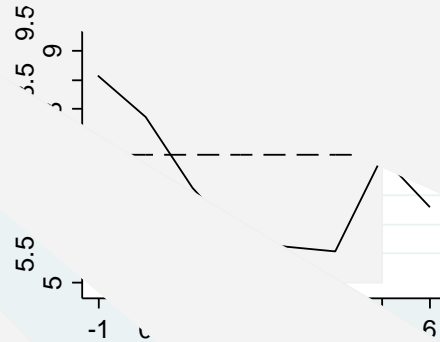
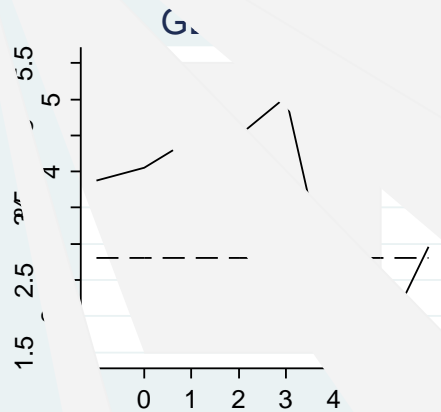
# What happens during episodes

Main Economic and Political Variables  
(medians for 5-year, 3% episodes)



# What happens during episodes

Main Economic and Political Variables  
(medians for 5-year, 5% episodes)



# High and Growing Debt

- Are historical data informative about the likely behavior of the current set of highly indebted countries?
  - In our sample, the average public-debt-to-GDP ratio is on the order of 50 and 60 per cent
  - In today's Eurozone, it averages 90 per cent
    - And in Europe's heavily indebted countries the debt ratio is even higher

# High and Growing Debt

- We have considerable variation in debt-to-GDP ratios in our sample and can divide our large and persistent primary surplus episodes into those that occur in periods when debt is high or growing fast, and those that do not occur in such periods.
- We define as high or rapidly growing public debt a situation that meets at least one of the following conditions:
  - Public debt is above 70 per cent of GDP for advanced economies and above 50 per cent of GDP for emerging markets;
  - The debt-to-GDP ratio has grown by more than 20 percentage points over the ten years that preceded the first year of the episode and debt is greater than 40 per cent of GDP;
  - The debt-to-GDP ratio has grown by more than 15 percentage points during the 5 years that preceded the first year of the episode and debt is greater than 40 per cent of GDP.

# High and Growing Debt

<b>3 % of GDP</b>			<b>4% of GDP</b>			<b>5% of GDP</b>		
<b>5-yr</b>	<b>8-yr</b>	<b>10-yr</b>	<b>5-yr</b>	<b>8-yr</b>	<b>10-yr</b>	<b>5-yr</b>	<b>8-yr</b>	<b>10-yr</b>
<b>A. Number of episodes</b>								
36	17	12	18	12	5	12	4	3
<b>B. Total number of periods in the sample</b>								
235	185	113	235	185	113	235	185	113
<b>C. Total number of periods of high or rapidly growing debt</b>								
77	26	26	77	26	26	77	26	26
<b>D. Number of episodes that overlap with periods of high or rapidly growing debt</b>								
18	10	6	11	8	3	7	2	2
<b>E. Share of episodes that overlap with periods of high or rapidly growing debt (D/A)</b>								
0.5	0.59	.05	0.61	0.67	0.60	0.58	0.50	0.67
<b>F. Share of periods of high or rapidly growing debt that overlap with episodes (D/C)</b>								
0.23	0.39	0.23	0.14	0.31	0.12	0.09	0.08	0.08

# High and Growing Debt

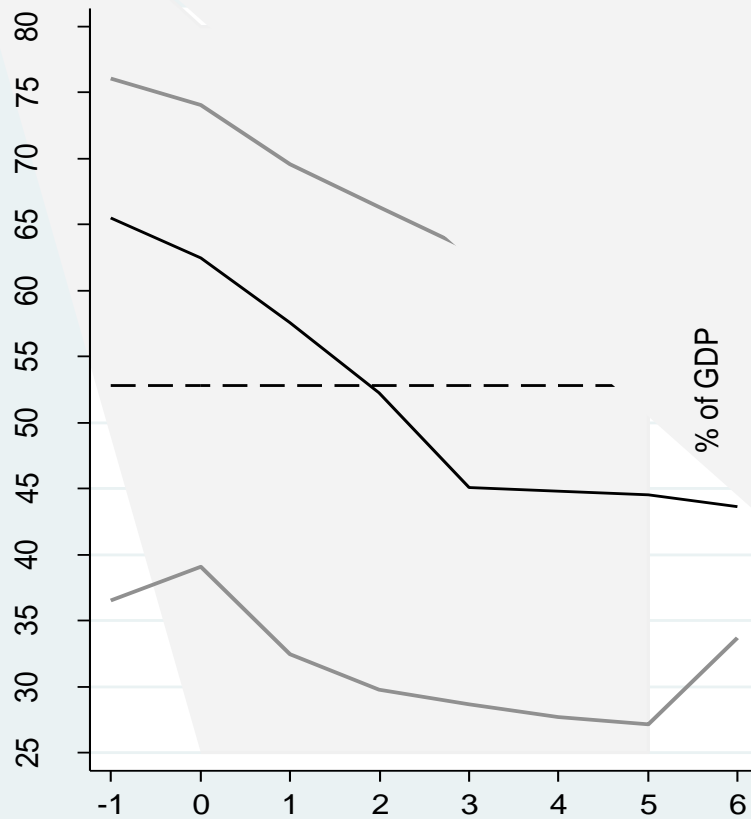
**Table 3: Probability of observing an episode and a period of high or growing public debt**

Episode group	Probability of observing an Episode		Probability of observing a period of high or growing public debt	
	Unconditional	Conditional on periods of high or growing public debt	Unconditional	Conditional on episodes
5 years 3%	15.3%	23.4% **	32.8%	50.0% ***
5 years 4%	7.7%	14.3% ***	32.8%	61.1% ***
5 years 5%	5.1%	9.1% **	32.8%	58.3% ***
8 years 3%	9.2%	38.5% ***	14.1%	58.8% ***
8 years 4%	6.5%	30.8% ***	14.1%	66.7% ***
8 years 5%	2.2%	7.7%	14.1%	50.0%
10 years 3%	10.6%	23.1% **	23.0%	50.0% ***
10 years 4%	4.4%	11.5%	23.0%	60.0% *
10 years 5%	2.7%	7.7%	23.0%	66.7%

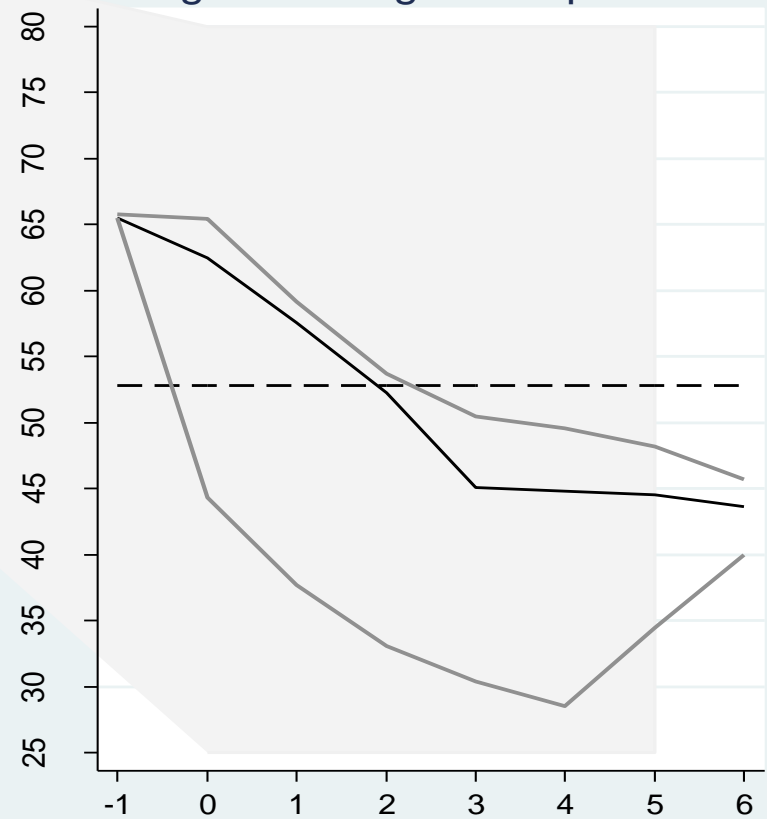
The asterisks indicate whether the differences between the conditional and unconditional probabilities are statistically significant (significance levels are obtained by running probit regressions) \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Evolution of public debt

Public Debt  
(medians for 5-year, 3% episodes)



High vs. low growth episodes



# Regressions Analysis (ec. vars.)

**Table 6: Primary surpluses and Economic Variables**

	(1)	(2)	(3)	(4)
Pop growth	0.0451 (0.0523)	0.0126 (0.0369)	0.0882* (0.0476)	0.0431 (0.0325)
GDP Growth	0.0752*** (0.0222)	0.0670*** (0.0164)	0.0678*** (0.0218)	0.0590*** (0.0155)
Ln(GDP)	-0.0148 (0.0231)	-0.0266 (0.0187)	-0.0104 (0.0237)	-0.0224 (0.0191)
Log(infl)	0.0610 (0.0406)	0.0351 (0.0285)	0.0462 (0.0356)	0.0201 (0.0249)
Debt-to-GDP	0.00246** (0.00114)	0.00229** (0.000890)		
Credit to priv. sect.	-0.000463 (0.000922)	-0.000422 (0.000754)	-0.000702 (0.000941)	-0.000697 (0.000776)
Current acc. bal.	0.0178** (0.00765)	0.0143** (0.00577)	0.0183** (0.00767)	0.0141** (0.00573)
Log(GDP PC)	0.106** (0.0419)	0.0690** (0.0317)	0.119*** (0.0437)	0.0751** (0.0324)
Unemployment	-0.00263 (0.00802)	-0.00229 (0.00649)	0.00271 (0.00819)	0.00200 (0.00653)
World GDP growth	3.813 (4.667)	1.429 (3.560)	6.241 (4.631)	3.462 (3.571)
RER	0.0121 (0.0131)		0.0101 (0.0134)	
OPENNES	0.00156** (0.000719)	0.000240 (0.000522)	0.00179** (0.000762)	0.000237 (0.000544)
Observations	173	203	173	203
Sample	AE&EM	AE&EM	AE&EM	AE&EM

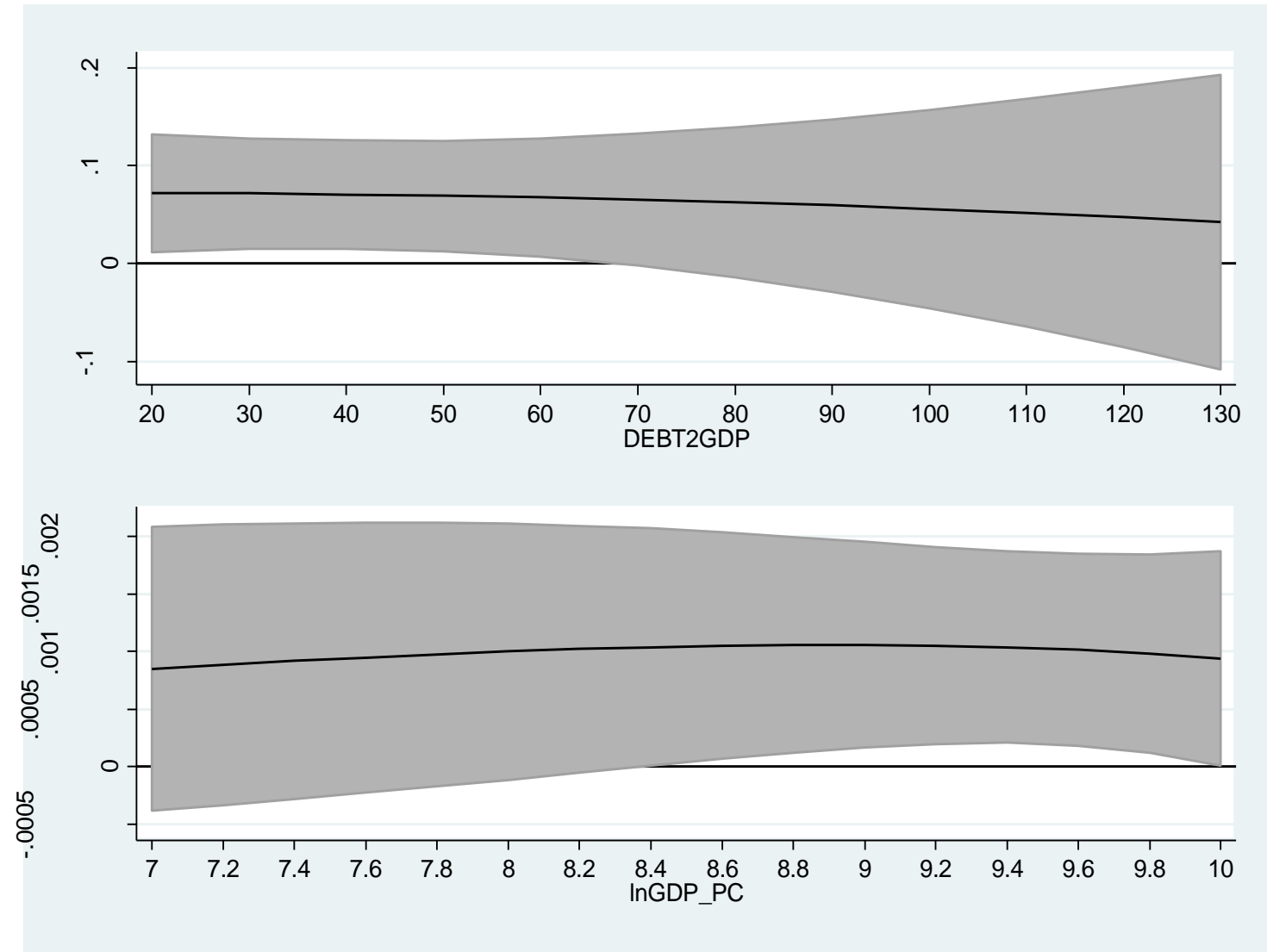
Probit Regressions, the dependent variable takes value one for five year episodes with a primary surplus of at least 3% of GDP. The table reports the marginal effects estimated at the mean of the dependent variable. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Debt and the probability of a fiscal adjustment

- A 10 percentage point increase in the debt-to-GDP ratio is associated with a 2.4 percentage point increase in the likelihood of a primary surplus episode
- Raising the debt-to-GDP ratio from 50 to 90 per cent (from the average in our sample to the average in Europe today) increases the likelihood of a surplus episode by 11.5 percentage points.

**Figure 2: Marginal effect of GDP per capita at different level of public debt and marginal effect of debt at different levels of GDP per capita.**



# Regressions Analysis (pol. vars.)

**Table 7: Primary Surpluses and Political Variables**

	(1)	(2)	(3)	(4)
Pol. Syst.	-0.0773 (0.0568)	-0.0833 (0.0606)	-0.0407 (0.0930)	-0.0407 (0.0997)
Ec. Orient	0.0767*** (0.0297)	0.0721** (0.0305)	0.0617* (0.0337)	0.0664** (0.0336)
Allhouse	0.161* (0.0832)	0.139* (0.0815)	0.226** (0.0939)	0.217** (0.0894)
Plurality	0.00528 (0.0575)	0.00925 (0.0606)	-0.0564 (0.0681)	-0.0638 (0.0678)
Proportional	0.109** (0.0511)	0.0743 (0.0618)	0.142*** (0.0428)	0.144*** (0.0427)
Numvote	-0.000156 (0.00157)	-0.00137 (0.00162)	0.000215 (0.00220)	-4.65e-05 (0.00183)
Fract.	0.189 (0.116)	0.299** (0.127)	0.0807 (0.155)	0.119 (0.149)
Polariz.	0.0646* (0.0350)	0.0231 (0.0375)	0.0691* (0.0407)	0.0491 (0.0411)
Democracy	-0.0214 (0.0230)		-0.00497 (0.0292)	
Log(ADM)	-0.0186 (0.0157)		-0.00266 (0.0145)	
Observations	192	204	149	160
Sample	AE&EM	AE&EM	Adv. Ec.	Adv. Ec.

Probit Regressions, the dependent variable takes value one for five year episodes with a primary surplus of at least 3% of GDP. The table reports the marginal effects estimated at the mean of the dependent variable. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Regressions Analysis (Synth.)

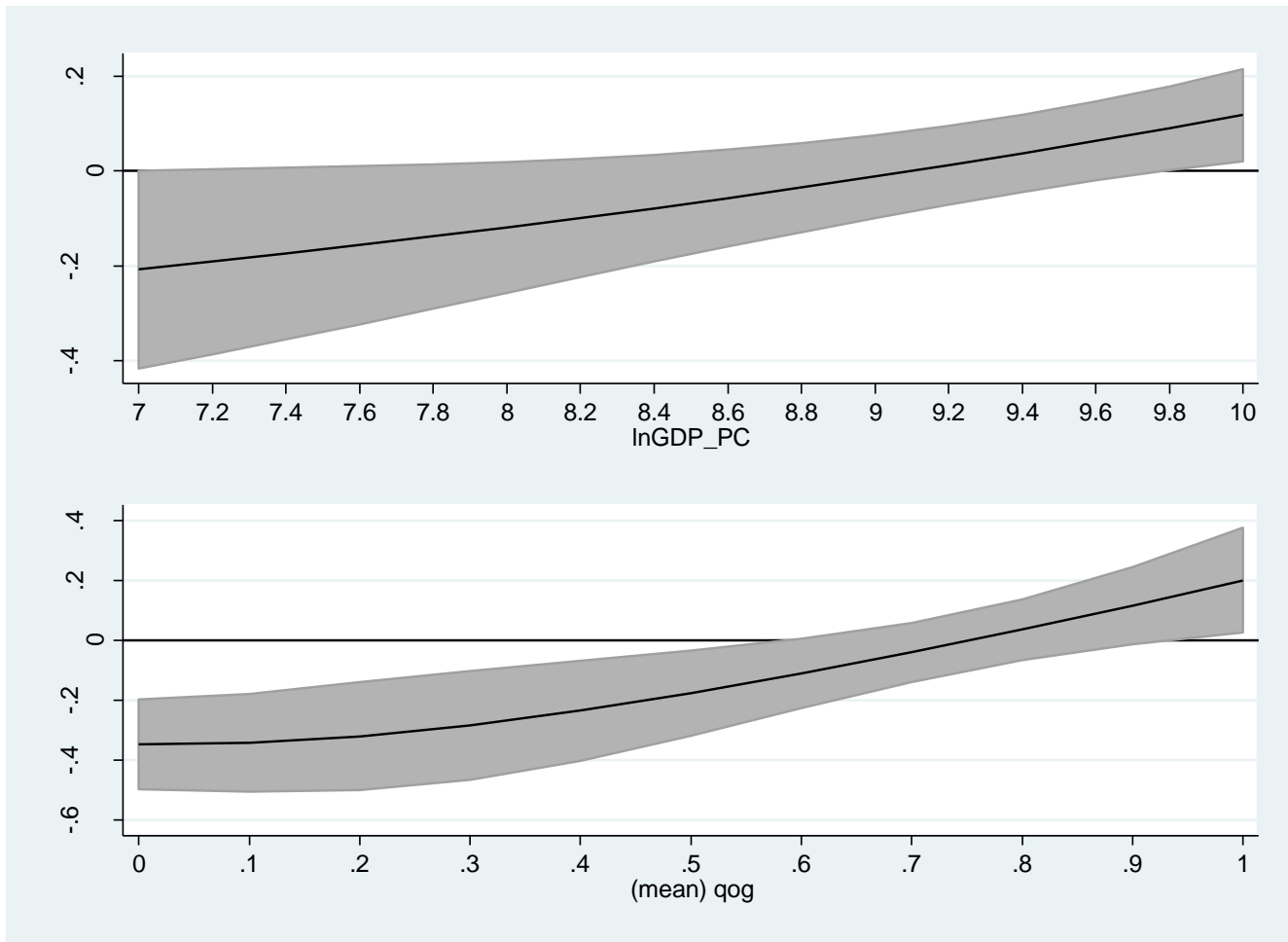
**Table 8: Primary Surpluses, Economic and Political Variables**

	(1)	(2)	(3)	(4)	(5)
GDP Growth	0.0695*** (0.0151)	0.0588*** (0.0146)	0.0757*** (0.0142)	0.0681*** (0.0141)	0.0741*** (0.0138)
Debt-to-GDP	0.00169*** (0.000637)	0.00211*** (0.000655)	0.00136** (0.000546)		
Log(GDP PC)	0.0405 (0.0287)	0.0476 (0.0296)	0.0427 (0.0264)	0.0424 (0.0305)	0.0439 (0.0270)
Log(GDP)	-0.0529*** (0.0172)	-0.0642*** (0.0185)	-0.0435*** (0.0159)	-0.0437*** (0.0167)	-0.0371** (0.0157)
OPENNES	-0.000756 (0.000543)	-0.000801 (0.000537)	-0.000616 (0.000483)	-0.000831 (0.000603)	-0.000607 (0.000495)
Current acc. bal.	0.0202*** (0.00608)	0.0173*** (0.00585)	0.0187*** (0.00519)	0.0220*** (0.00635)	0.0192*** (0.00519)
Ec. Orient	0.0732*** (0.0271)	0.0721** (0.0289)		0.0641** (0.0268)	
Allhouse	0.132* (0.0715)	0.0899 (0.0672)	0.117* (0.0683)	0.159** (0.0754)	0.130* (0.0710)
Fract.	0.0860 (0.0995)	0.107 (0.103)	-0.0270 (0.0916)	0.101 (0.110)	-0.0310 (0.0951)
Proportional	0.0247 (0.0545)		0.0476 (0.0440)	0.0530 (0.0491)	0.0574 (0.0443)
Observations	183	186	207	183	207
Sample	AE&EM	AE&EM	AE&EM	AE&EM	AE&EM

Probit Regressions, the dependent variable takes value one for five year episodes with a primary surplus of at least 3% of GDP. The table reports the marginal effects estimated at the mean of the dependent variable. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Fiscal adjustment and proportional representation

**Figure 3: Marginal effect of proportional representation at different levels of GDP per capita and quality of government**



# Regressions Analysis (HD vs LD)

**Table 9: Primary surpluses during tranquil periods and periods of high and growing debt.**

	(a) High and Growing debt=1	(b) High and Growing debt=0	(c) (b)-(a)
GDP Growth	0.054*** (0.021)	0.0588*** (0.019)	0.0049 (0.029)
Ln(GDP)	-0.053** (0.023)	-0.0599*** (0.023)	-0.007 (0.029)
Debt-to-GDP	0.002* (0.001)	0.000585 (0.0016)	-0.0014 (0.002)
Current account balance	0.023* (0.013)	0.0146** (0.0062)	-0.0088 (0.015)
Log(GDP PC)	0.041 (0.038)	0.0690* (0.041)	0.0279 (0.055)
OPENNES	0.0015 (0.0009)	-0.0027** (0.001)	-0.001** (0.001)
Economic Orientation	0.138*** (0.054)	0.036 (0.039)	-0.103 (0.064)
Allhouse	0.145 (0.125)	0.0587 (0.086)	-0.086 (0.146)
Fractionalization	0.158 (0.166)	0.0246 (0.119)	-0.134 (0.199)
High and Growing debt		-0.221 (0.537)	
Observations		186	
Sample		AE&EM	

# Alternative definition of HD

- We have considerable variation in debt-to-GDP ratios in our sample and can divide our large and persistent primary surplus episodes into those that occur in periods when debt is high or growing fast, and those that do not occur in such periods.
- We define as high or rapidly growing public debt a situation that meets at least one of the following conditions:
  - Public debt is above **100** per cent of GDP (it was 70%) for advanced economies and above **70** per cent of GDP for emerging markets (it was 50%);
  - The debt-to-GDP ratio has grown by more than 20 percentage points over the ten years that preceded the first year of the episode and debt is greater than **70** per cent of GDP (it was 40%);
  - The debt-to-GDP ratio has grown by more than 15 percentage points during the 5 years that preceded the first year of the episode and debt is greater than **70** per cent of GDP (it was 40%);

# Alternative definition of HD

- 37 periods of HD, 10 of them overlap with the 36 5-year 3% episodes, 27 overlap with tranquil periods
- Unconditional probability of observing an episode 15.3%
- Probability of observing an episode conditional on being on a HD period 27%
  - Probability of observing an episode conditional on not being on a HD period (p-value 0.16)



# Alternative definition of HD

	High and Growing Debt=1	X*(1-HGD)
GDP Growth	0.256 (0.226)	0.0878 (0.247)
Debt-to-GDP	0.0243** (0.0112)	-0.0179 (0.0135)
Ln(GDP PC)	-0.348 (0.499)	0.673 (0.543)
Ln(GDP)	-1.214* (0.620)	0.866 (0.628)
OPENNESS	-0.00592 (0.0127)	-0.00120 (0.0131)
Current Account Balance	0.546** (0.244)	-0.445* (0.246)
Ec. Orientation	2.130*** (0.689)	-1.817** (0.713)
High and Growing Debt		7.319 (6.889)
Constant		-3.935 (2.411)
Observations		186
Sample		AER&EM

# Identification through heteroskedasticity

- We are particularly worried about the endogeneity of the current account balance and GDP growth
- We don't have good instruments
- We use identification through heteroskedasticity (Rigobon, 2003, Lewbel, 2012)

# Identification through heteroskedasticity

- Assume that you want to estimate:

$$y_1 = a + bX + cy_2 + u_1$$

- But:

$$y_2 = \alpha + \beta X + \gamma y_1 + u_2$$

- If to the standard assumption that  $E(Xu_1) = E(Xu_2) = cov(X, u_1u_2) = 0$ , we add a heteroskedasticity assumption ( $cov(X, u_2^2) \neq 0$ ), then  $Xu_2$  as a valid instrument for  $y_2$

# Regressions Analysis (IH)

**Table 10: Instrumental variable regressions**

	(1) OLS	(2) Linear IH
Log(GDP PC)	0.0366 (0.0311)	0.0514 (0.0482)
Debt-to-GDP	0.00189** (0.000751)	0.00220*** (0.000749)
Log(GDP)	-0.0569*** (0.0180)	-0.0687*** (0.0261)
OPENNNNESS	-0.000374 (0.000488)	-0.000933 (0.000704)
Proportional	0.0569 (0.0621)	0.0629 (0.0659)
Allhouse	0.139* (0.0705)	0.149** (0.0717)
Fract.	-0.0834 (0.114)	-0.107 (0.113)
Current acc. bal.	0.0231*** (0.00580)	0.0318*** (0.0120)
GDP Growth	0.0789*** (0.0112)	0.103*** (0.0247)
Constant	-0.209 (0.343)	-0.322 (0.646)
Observations	183	183
R-squared	0.281	0.258

# Regressions Analysis (IH)

## First-stage diagnostics

---

Rk, LM statistics	10.27
P-value	0.016
Rk Wald F-statistics	8.74
Stock-Yogo 5% critical value	11.04
Stock-Yogo 10% critical value	7.56
Sargan test	0.451
P-value	0.79

---

# Debt Reductions

At least 15% in 5 years						
Country	Begin	End	debt t0	debt t5	change	Episodes
BEL	1995	2000	130.2	107.8	-22.4	1998
CAN	1995	2000	101.6	82.1	-19.5	1997
CHE	2005	2010	70.1	48.5	-21.6	NO
CYP	2003	2008	69.6	48.9	-20.7	NO
DNK	1995	2000	72.6	52.4	-20.2	1997
DNK	2002	2007	49.5	27.1	-22.3	2004
ESP	1998	2003	64.2	48.8	-15.4	NO
GBR	1986	1991	46.1	31.0	-15.1	NO
IRL	1995	2000	80.1	37.0	-43.1	1996
ISL	1995	2000	58.9	41.0	-17.9	2003
NLD	1996	2001	74.1	50.7	-23.4	1996
NOR	1993	1998	53.7	23.5	-30.3	NO
NOR	2006	2011	53.7	29.0	-24.8	2004
NZL	1992	1997	61.5	36.3	-25.2	1993
SWE	1985	1990	61.2	40.3	-21.0	1986
USA	1996	2001	69.9	53.0	-16.9	NO
<b>Average</b>			<b>69.8</b>	<b>47.3</b>	<b>-22.5</b>	
Missing 3% 5-year (advanced economies only)						
DNK85	FIN76	FIN86	GRC96	IRL1988	ITA96	LUX97
NOR81	NZL92	SWE97				

# Debt Reductions

At least 20% in 8 years						
Country	Begin	End	debt t0	debt t8	change	Episodes
BEL	1996	2004	127.2	94.0	-33.1	1997
CAN	1996	2004	101.7	72.6	-29.1	1997
DNK	1993	2001	80.1	49.6	-30.5	2000
ESP	1999	2007	62.4	36.3	-26.1	NO
IRL	1993	2001	95.2	34.5	-60.7	1993
ISL	1997	2005	53.1	25.4	-27.7	NO
NLD	1993	2001	78.5	50.7	-27.8	NO
NOR	1993	2001	53.7	27.5	-26.2	2001
NZL	1992	2000	61.5	31.6	-30.0	1993
SWE	1998	2006	69.9	45.3	-24.6	NO
<b>Average</b>			<b>78.3</b>	<b>46.7</b>	<b>-31.6</b>	
Missing 3% 8-year (advanced economies only)						
DNK84	FIN200	GRC94	ITA95	NOR81	SWE84	

# Debt Reductions

At least 25% in 10 years						
Country	Begin	End	debt t0	debt t10	change	Episodes
BEL	1994	2004	135.9	94.0	-41.9	1995
CAN	1996	2006	101.7	70.3	-31.5	1996
DNK	1997	2007	65.4	27.1	-38.3	1999
ESP	1997	2007	66.2	36.3	-29.9	NO
IRL	1993	2003	95.2	31.0	-64.3	1991
ISL	1995	2005	58.9	25.4	-33.5	NO
NLD	1992	2002	77.3	50.5	-26.8	NO
NZL	1992	2002	61.5	27.7	-33.9	1994
SWE	1997	2007	72.1	40.2	-31.9	NO
<b>Average</b>			<b>61.5</b>	<b>44.7</b>	<b>-36.9</b>	
Missing 3% 8-year (advanced economies only)						
DNK84	FIN99	ITA93	NOR99			



# Further checks

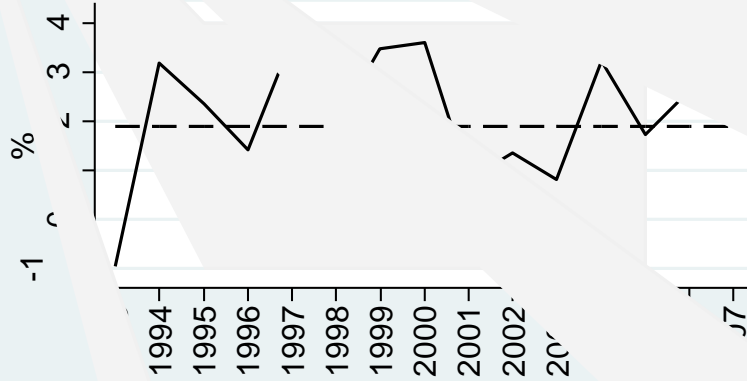
- All countries with income per capita of at least \$2000
- Only advanced economies
  - (main difference, proportional representation)
- Higher thresholds for primary surplus and length of episode
  - 4% 5yrs: GDP growth, GDP PC, proportional rep
  - 5% 5yrs: GDP growth, GDP PC
  - 3% & 4% 8yrs: GDP growth, GDP PC, allhouse
  - 3% 10yrs: GDP growth, GDP PC, allhouse
  - 4% 10 yrs: nothing significant
  - 5% 8yrs & 10yers: cannot estimate the model

# But what about the exceptions?

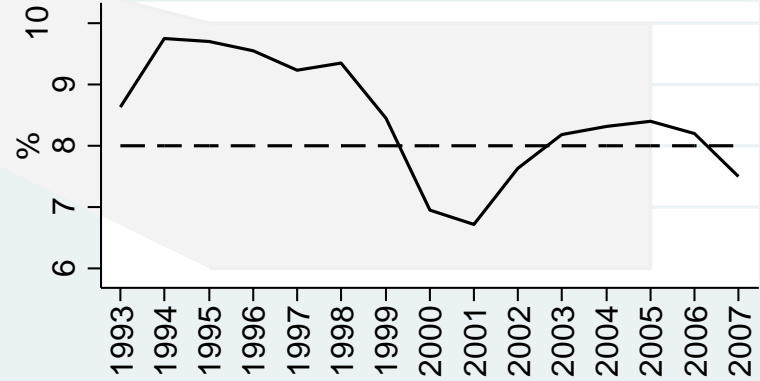
- The three ten-year episodes of 5+ percent primary surpluses in our sample are Belgium starting in 1995, Norway starting in 1999, and Singapore starting in 1990.
- We also have two additional cases of countries that have run surpluses of at least 4 per cent of GDP for as long as ten years: Ireland starting in 1991 and New Zealand starting in 1994.
  - It's always useful to analyze outliers.
  - These outliers suggest that, in general, running large surpluses for extended periods requires a *combination* of strong domestic institutions and external pressures.

# Belgium (1995-2005)

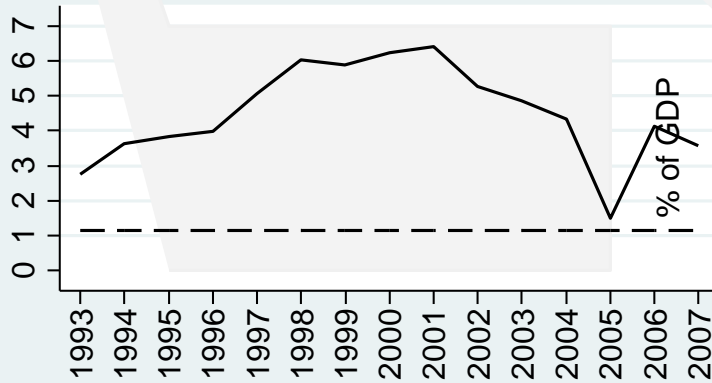
## GDP



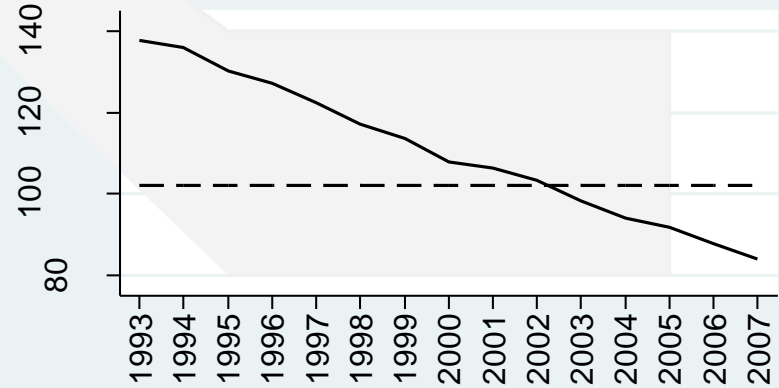
## Unemployment



## Primary Balance



## Public Debt



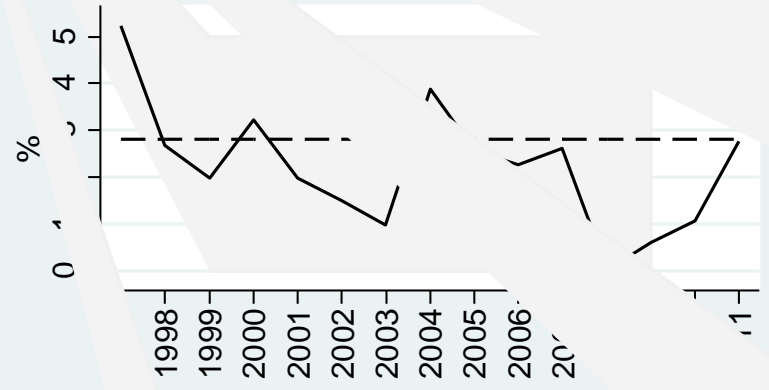
# Belgium from 1995

- Need to meet Maastricht criteria.
- But other countries (like Italy) had similar problems. Why was Belgium different?
- Answer: institutional reforms:
  - Belgium reformed its tax code in the mid-1980s (enlarging the tax base and lowering top marginal income tax rates) and rationalized its system of fiscal federalism at the end of the decade (constraining spending by regional governments).
  - It empowered the Federal Planning bureau to issue nonpartisan, independent forecasts of the budget in the mid-1990s.
  - It restructured the High Finance Council to give it a clear mandate to monitor and coordinate fiscal policies between the federal and regional levels.
- Or, maybe, Kotlikoff is right

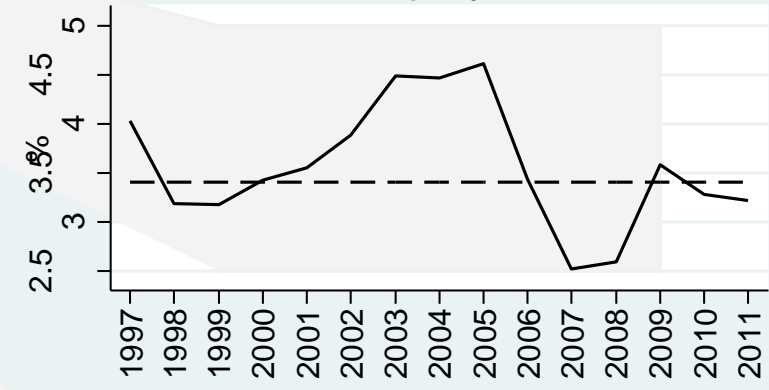
# Norway

## (1999-2009)

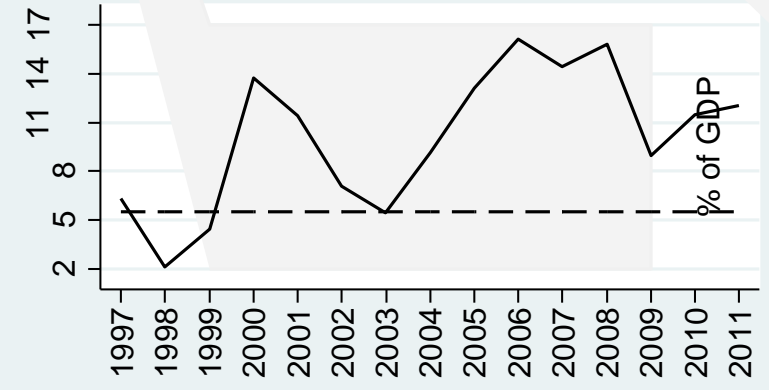
### GDP



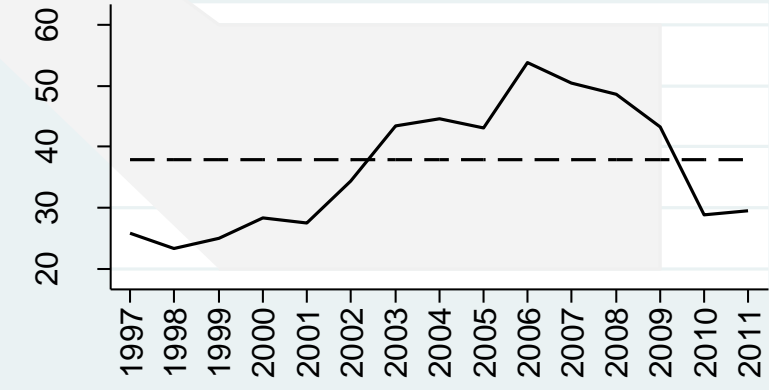
### Unemployment



### Primary Balance



### Public Debt

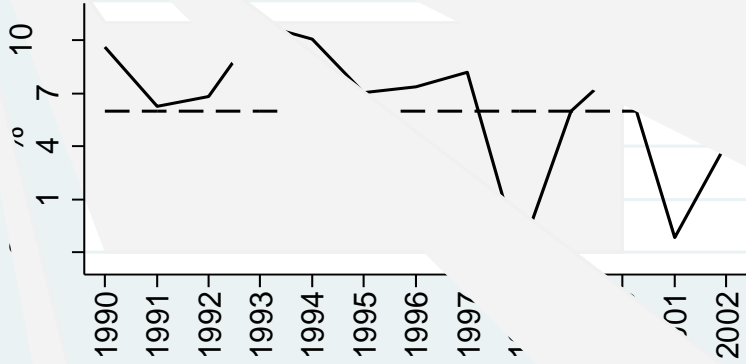


# Norway from 1999

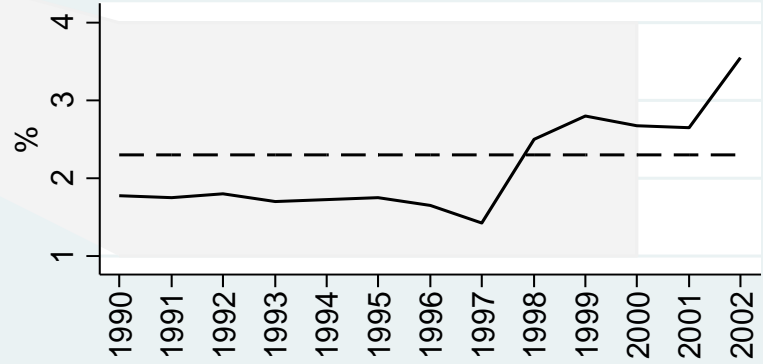
- Production in the Norwegian sector of the North Sea nearly doubled in the 1980s and remained elevated in the 1990s.
- The Government Petroleum Fund was created to husband these revenues from peak oil for future generations. Budget surpluses associated with oil revenues were paid into the fund starting in the 1990s.
- Again, the practice was encouraged by the development of strong budgeting institutions.
  - Budget documents refer to the non-oil deficit, making transparent the dependence of revenues on natural resources and encouraging a long-term approach to budgeting.
  - The government adopted a guideline for fiscal policy stating that the structural non-oil deficit could not exceed 4 per cent of total financial assets in the Government Pension Fund, reflecting the assumption that the long run return on the assets of the pension fund is 4 per cent.

# Singapore (1990-2000)

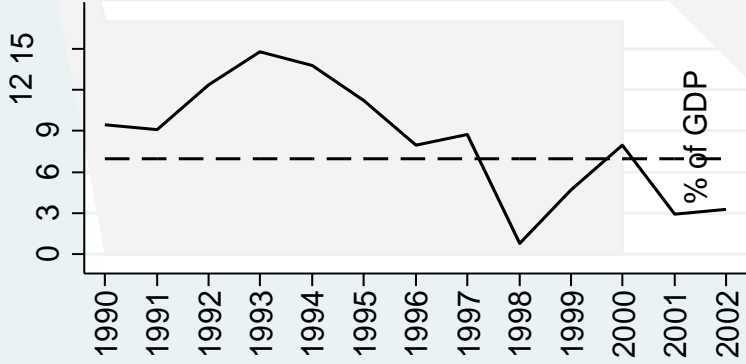
## GDP



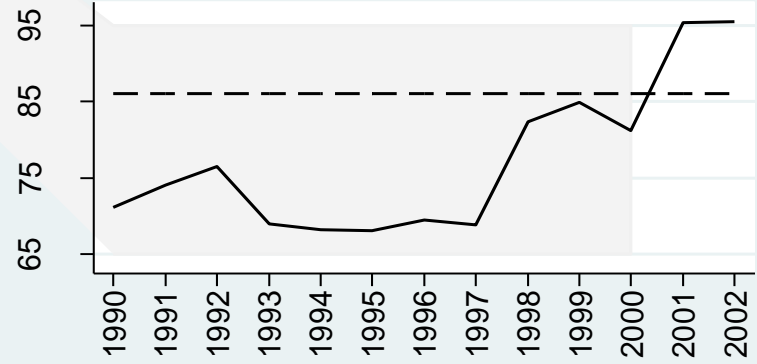
## Unemployment



## Primary Balance



## Public Debt

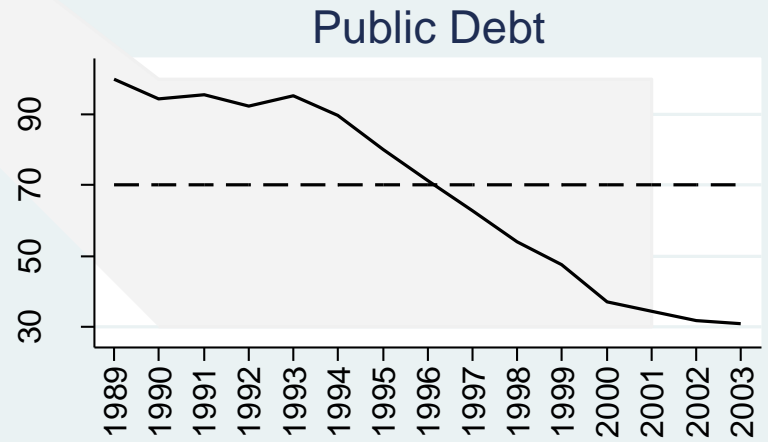
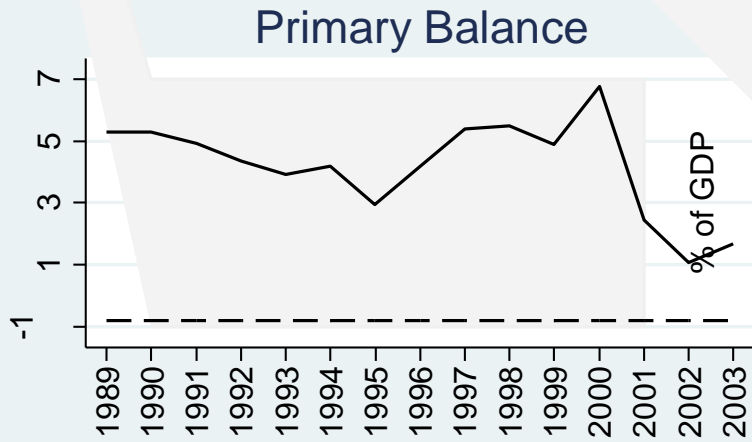
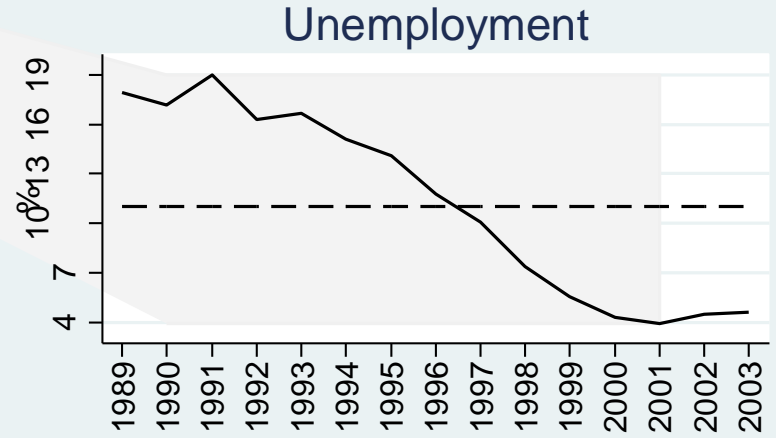
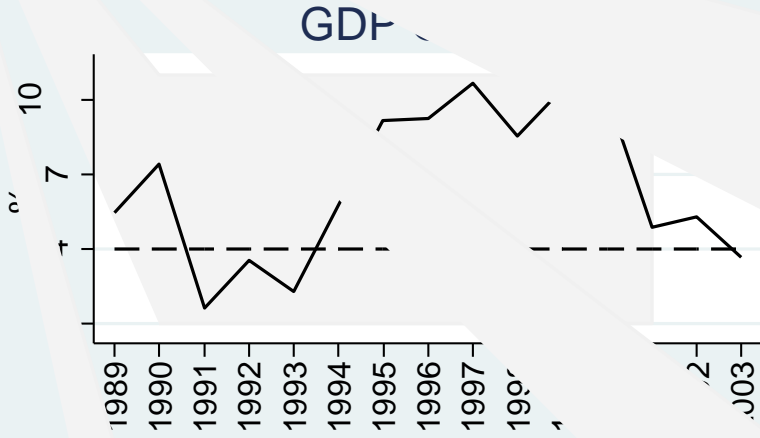


# Singapore from 1990

- Singapore has run budget surpluses as a way of building up a reserve to insure against volatility. The economy is small and lacking in natural resources. Its status as an entrepot center has come under challenge, and the financial and pharmaceutical sectors are volatile. It is exposed geopolitically, and its relations with Malaysia have not always been the best.
- All this has caused the government to prioritize accumulating surpluses in its sovereign wealth funds.
- The structure of governance in Singapore, with its strong executive, strong bureaucracy, and strong fiscal rules, enables the government to commit to persistent surpluses.
  - The government has consistently issued conservative growth forecasts that understate revenues, while coming under relatively little pressure to correct those forecasts and increase spending accordingly.



# Ireland (1991-2001)

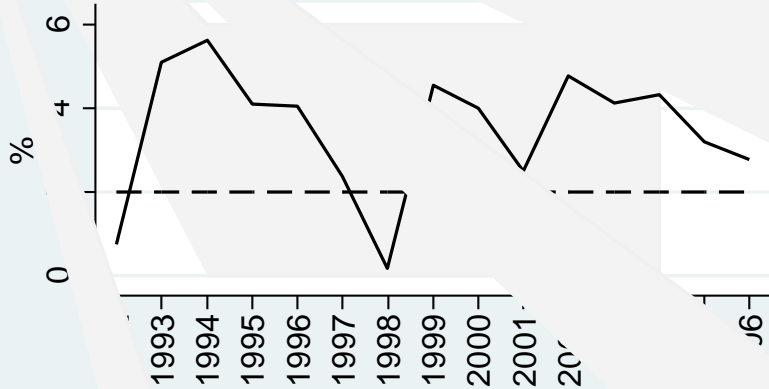


# Ireland from 1991

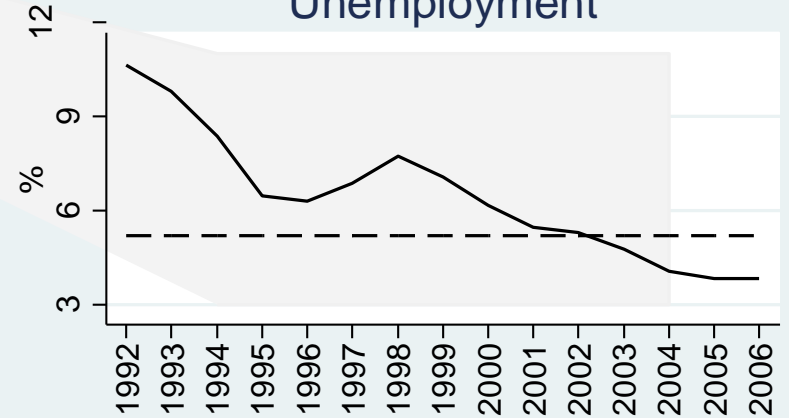
- Ireland's move to large primary surpluses was taken in response to an incipient debt crisis: after a period of deficits as high as 8 per cent of GDP, general government debt as a share of GDP reached 110 per cent in 1987.
- A new government then slashed public spending by 7 per cent of GDP, abolishing some long-standing government agencies, and offered a one-time tax amnesty to delinquents. The result was faster economic growth that then led to self-reinforcing favorable debt dynamics).
- But there were special circumstances.
  - Currency could be devalued.
  - A small country could negotiate a national pact (the Program for National Recovery).
    - Indeed, it is striking that every exception considered in this section is a small open economy.
  - Global growth was strong in the decade of the 1990s.
  - Ireland, like Belgium, faced the Maastricht criteria.
  - The multinational-friendly tax regime undoubtedly helped.

# New Zealand (1994-2004)

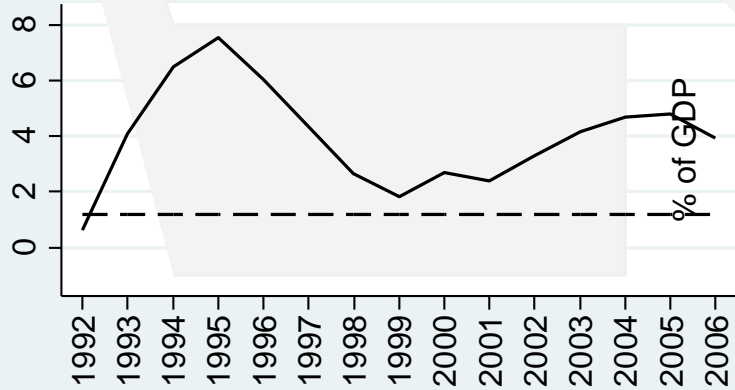
## GDP



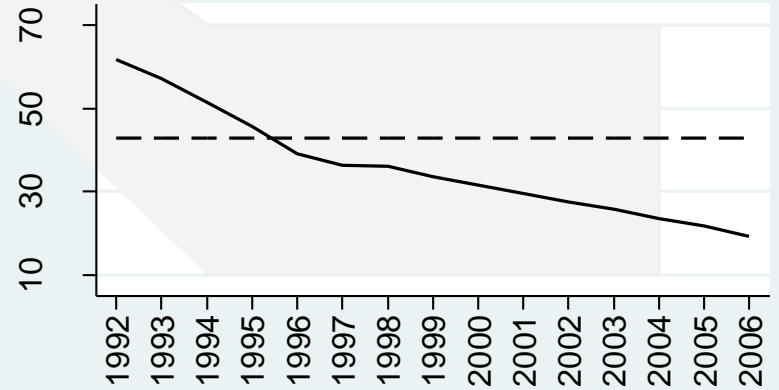
## Unemployment



## Primary Balance



## Public Debt



# New Zealand from 1994

- New Zealand experienced chronic instability in the first half of the 1980s; the budget deficit was 9 per cent of GDP in 1984, the debt ratio high and rising.
- Like Singapore, small size and openness heightened the perceived sense of urgency.
- New Zealand therefore adopted far-reaching and, in some sense, unprecedented institutional reforms.
  - The Fiscal Responsibility Act of 1994 limited the scope for off-budget spending and creative accounting.
  - It required the government to provide Parliament with a statement of its long-term fiscal objectives, a forecast of budget outcomes, and a statement of fiscal intentions explaining whether its budget forecasts were consistent with its budget objectives.
  - It required prompt release of aggregate financial statements and regular auditing, using internationally accepted accounting practices.
  - Further reforms at the level of individual departments.

# Conclusion

- For the debts of Europe's problem countries to be sustainable, absent restructuring or an unanticipated burst of inflation, governments will have to run primary as large as 5% for 10 years.
- While such behavior is not unknown, it is exceptional.
- Countries that have run such large surpluses for such extended periods have faced exceptional circumstances.
- Sustained surplus episodes are more likely when growth is strong, the current account of the balance of payments is in surplus, the debt-to-GDP ratio is high (heightening the urgency of fiscal adjustment), and the governing party controls all houses of parliament or congress.
- More generally, a *combination* of strong institutions and external pressure is required.
- This does not leave one optimistic that Europe's crisis countries will be able to run primary budget surpluses as large and persistent as projected.

# **A Surplus of Ambitions: Can Europe Rely on Large Primary Surpluses to Solve its Debt Problem?**

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UC, Berkeley

Ugo Panizza  
The Graduate Institute, Geneva