

Growth Forecast Errors: Fiscal Multipliers or Sudden Stops?

Bas B. Bakker

Forecasting blues

- Before the GFC, forecasting was easy
- World had entered Great Moderation
 - Little variance in growth
 - Little variance in inflation
- After GFC, the IMF – and most other forecasters – have repeatedly made large errors
- Actual growth has repeatedly turned out to be less than predicted

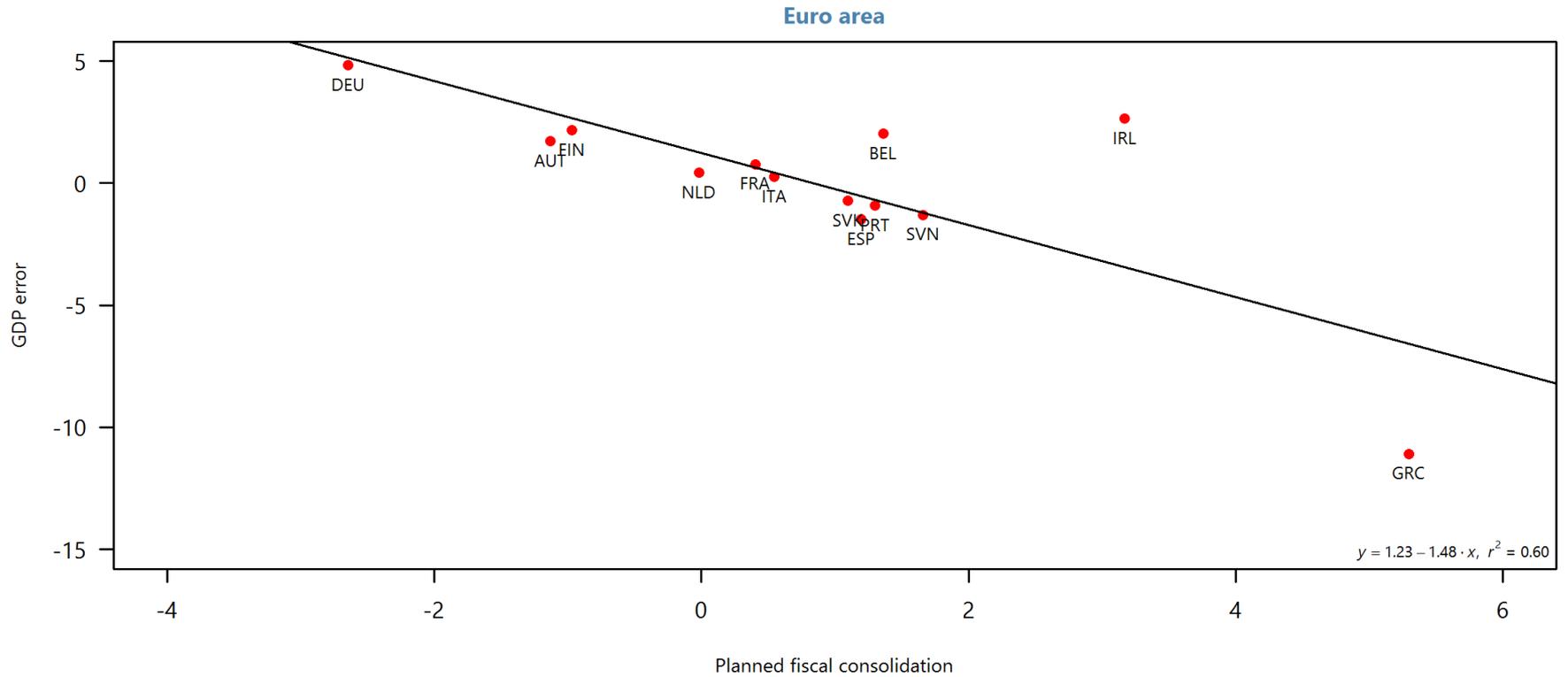
Understanding the errors

- Three broad theories
- Forecasters have underestimated:
 - Balance sheet constraints holding back growth
 - Secular stagnation (collapse of productivity)
 - Weakness of aggregate demand

Understanding the errors

- Three broad theories
- Forecasters have underestimated:
 - Balance sheet constraints holding back growth
 - Secular stagnation (collapse of productivity)
 - Weakness of aggregate demand

Blanchard-Leigh 2010 discovery



Explaining the correlation

- Why should there be a *systematic* relationship between ex ante consolidation plans and ex post forecast errors?
- Implies forecasts not efficient
- Specifically: misspecified relationship between fiscal adjustment and growth
- That is: forecasters underestimated the fiscal multiplier

Blanchard-Leigh results

- BL finding: every 1 ppt increase in projected fiscal consolidation was associated with a 1 ppt growth forecast error
- BL conclusion: forecasters used multipliers that were too low, by 1; real multiplier was $2\frac{3}{4}$

Paper of the decade

- Dramatic finding
- Elegant reasoning
- Academic rigour
 - Paper not published until 2013
- Policy impact
 - Starting 2011 countries reduced pace of fiscal adjustment

Two questions

- Q1: Was the *finding* correct?
- Q2: Is the *interpretation* correct?

Q1: results replicable

Table 1: Regression of GDP Errors on Planned Consolidation

	Projected consolidation	t-value	R2
All 26 countries (2012 data)	-1.10	-4.29	0.50
With interest proj. (2012 data)	-1.09	-3.83	0.51
Non euro area (2012 data)	-0.38	-0.46	0.02
Euro area (2012 data)	-1.19	-4.61	0.76
All 26 countries (2016 data)	-1.33	-2.95	0.49
With interest proj. (2016 data)	-1.32	-2.41	0.49
Non euro area (2016 data)	-0.26	-0.51	0.02
Euro area (2016 data)	-1.48	-2.60	0.60

Q2: more difficult

- Further data analysis yields results that seem inconsistent with the interpretation
- Explanation is monocausal: is there an omitted variable problem?

Did the IMF learn the right multipliers by 2012?

Table 7: Regression of GDP Errors on Projected Fiscal Consolidation, Various WEO Vintages

	Projected consolidation	t-value	R2
WEO Spring 2010	-1.48	-2.60	0.60
WEO Spring 2011	-1.04	-1.29	0.20
WEO Spring 2012	-0.11	-0.33	0.01

Why did IMF get longer-term multiplier right in 2010?

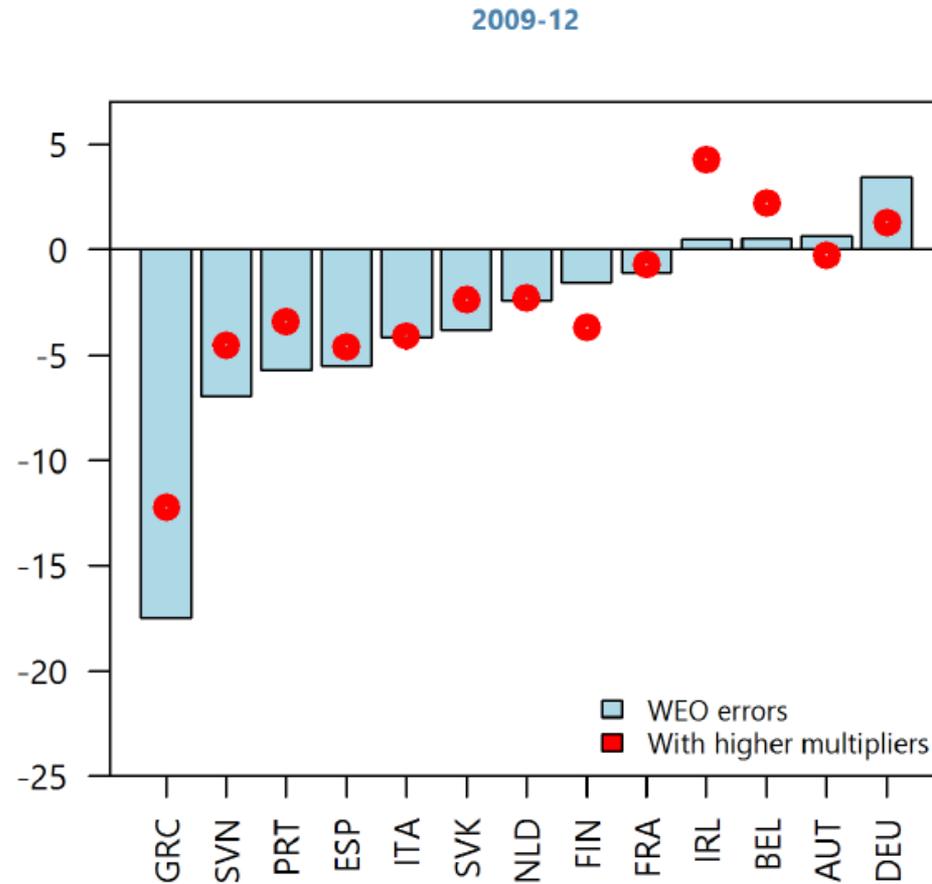
Table 13: Regression of GDP Errors on Planned Consolidation

	Planned consolidation	t-value	R2
2009-11	-1.48	-2.60	0.60
2009-12	-1.64	-2.08	0.46
2009-13	-1.38	-1.52	0.29
2009-14	-0.76	-0.76	0.09

Q2: more difficult

- Further data analysis yields results that seem inconsistent with the interpretation
- Explanation is monocausal: is there an omitted variable problem?

Why would forecast errors remain large with higher multipliers?



Why is result different for non-euro countries?

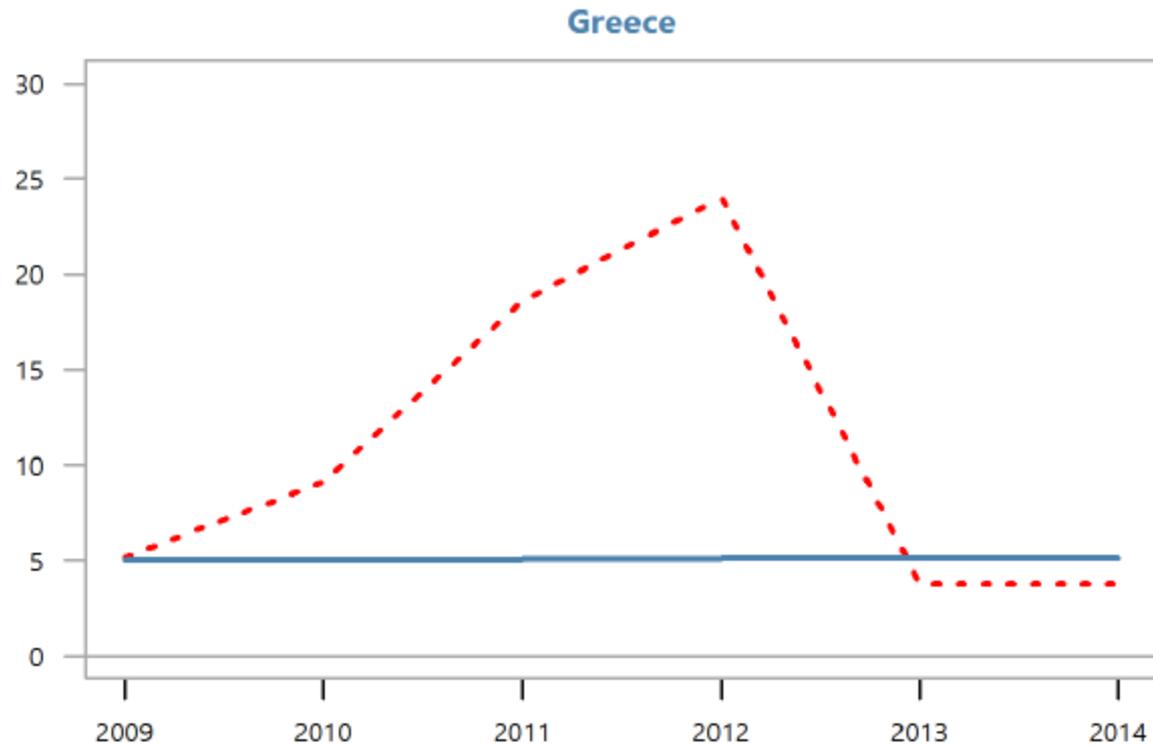
Table 1: Regression of GDP Errors on Planned Consolidation

	Projected consolidation	t-value	R2
All 26 countries (2012 data)	-1.10	-4.29	0.50
With interest proj. (2012 data)	-1.09	-3.83	0.51
Non euro area (2012 data)	-0.38	-0.46	0.02
Euro area (2012 data)	-1.19	-4.61	0.76
All 26 countries (2016 data)	-1.33	-2.95	0.49
With interest proj. (2016 data)	-1.32	-2.41	0.49
Non euro area (2016 data)	-0.26	-0.51	0.02
Euro area (2016 data)	-1.48	-2.60	0.60

Eurozone crisis

- Biggest reason to wonder is that at the same time, the eurozone was hit by a crisis
- BL argue that this explains why the multipliers were so large
- But perhaps the crisis had an *independent* effect on the forecast errors

Interest rate errors



East Asian crisis

- Fall 1997 WEO, Korea 1996-1998:
 - GDP growth of 12 percent
 - Structural fiscal balance +1/2 percentage point
- Actual: GDP declined by 2 percent
- Interpretation:
 - Was fiscal impact underestimated?
 - Or was Asian crisis missed?

BL test

- BL considered this possibility
- Found planned fiscal adjustment remained significant, even after adding rise in CDS spreads

Reversal of fortune!

Table 4: Regression of Growth Errors on Projected Consolidation and CDS Increase

	Project. cons.	t-value	CDS-increase	t-value	R2
October 2012 WEO	-0.77	-2.34	-0.0006	-2.29	0.81
April 2016 WEO	-0.50	-0.88	-0.0014	-3.13	0.79

BL's retort

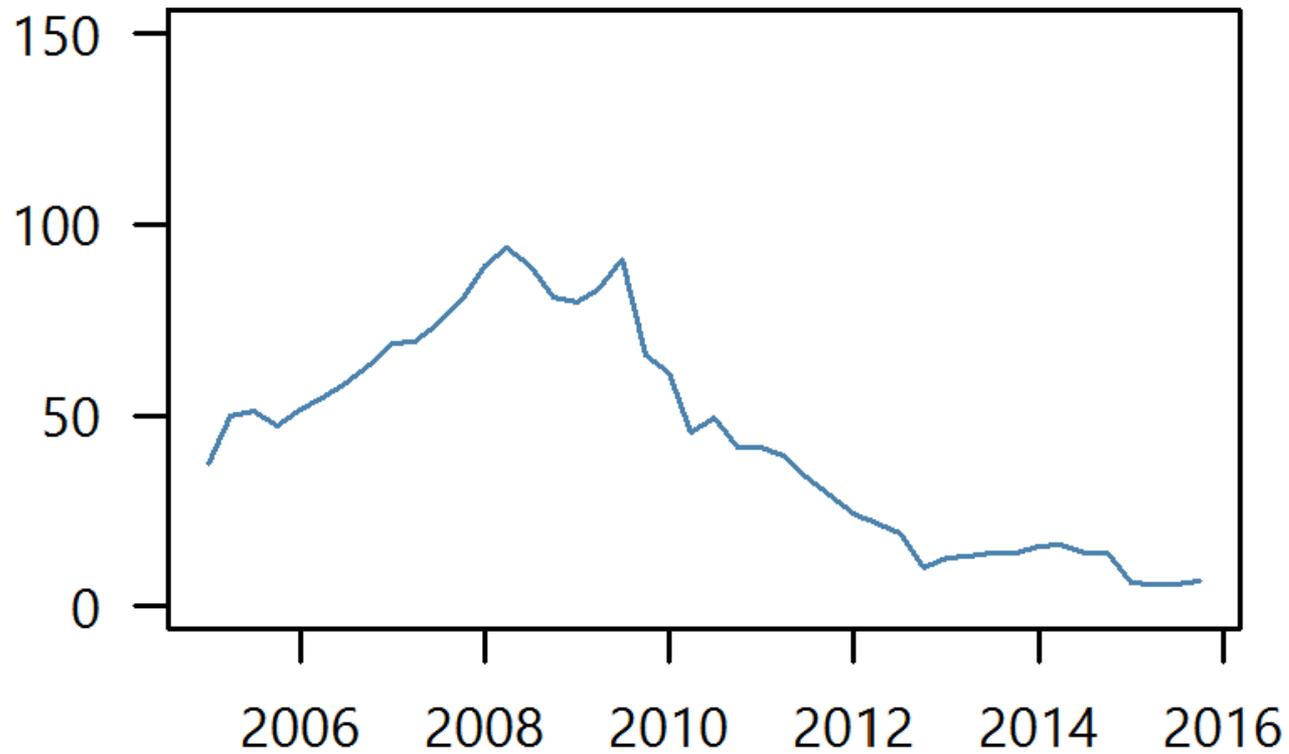
- Perhaps eurozone crisis is not an independent event
- Perhaps higher rates were *caused* by the fiscal adjustment
- That is:
 - Fiscal consolidation depressed growth
 - Growth worries made investors fear fiscal sustainability
 - Panic caused interest rates to soar

Sequencing problem

- Greece suffered sudden stop in 2009:q4
 - Countries then formulated fiscal plans for 2010
 - In Spring 2010, growth forecasts were still reasonable
 - Other countries suffered sudden stop in mid-2010
 - Forecasts subsequently marked downward
-
- Sum: growth markdowns followed sudden stops, did not precede it

Total foreign bank claims (percent of GDP)

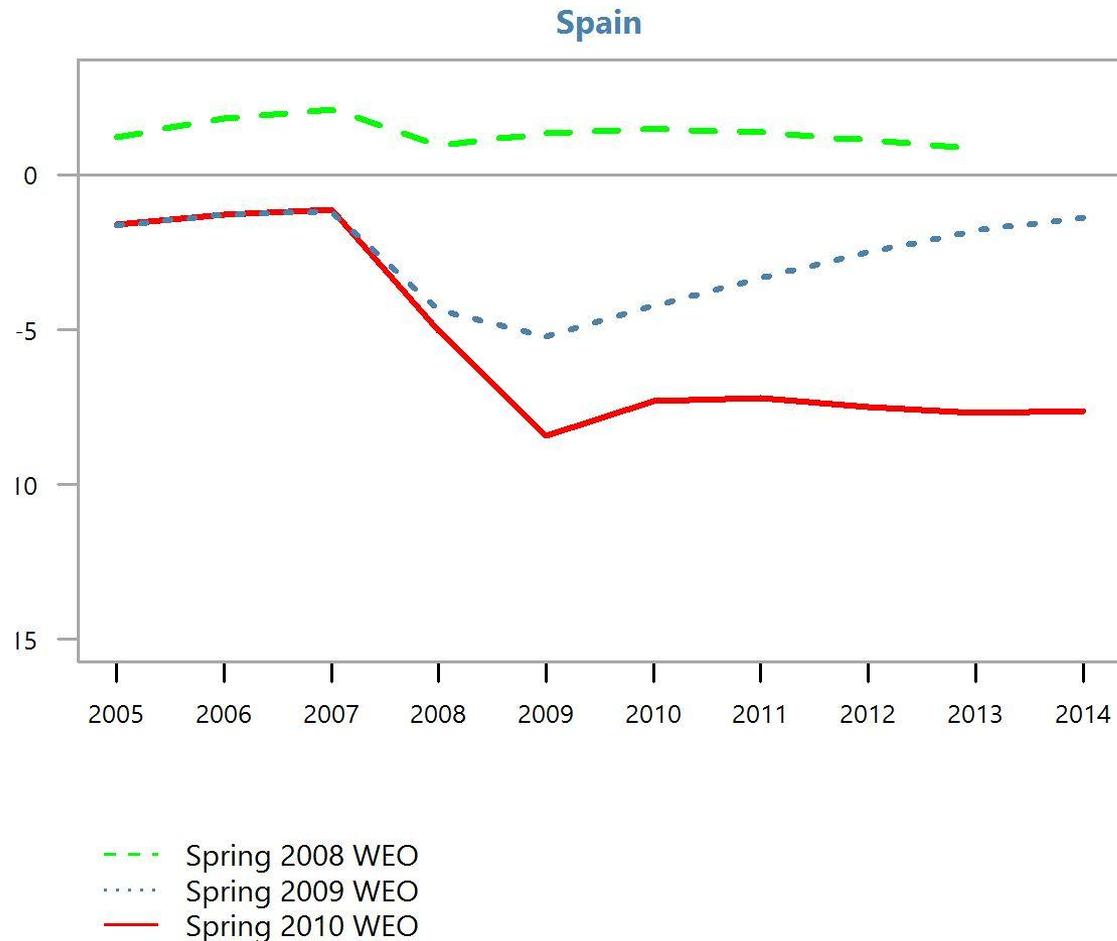
Greece



More plausible explanation

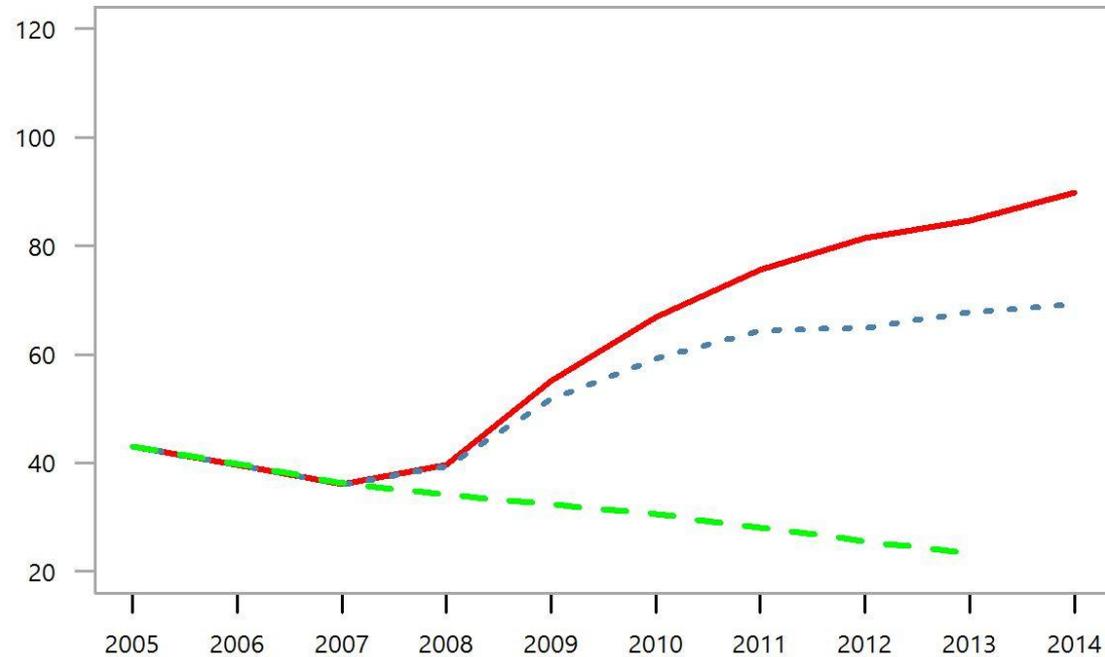
- Perhaps investors in Spring 2010 were not worried about *growth* prospects
- Rather, they were spooked by the deterioration in *structural fiscal balances*

Structural government deficit (percent of GDP)



Public Debt (Percent of GDP)

Spain



- Spring 2008 WEO
- Spring 2009 WEO
- Spring 2010 WEO

Implications

- Assume that the sudden stops can be considered independent events – not caused by the 2010 planned fiscal adjustment
- Will this affect the interpretation of BL's results?
- Answer: yes!

Interpreting BL's results

Assume a Simple Macro Model

$$\Delta Y_i = \alpha_i - \beta \Delta F B_i - \gamma R_i + \epsilon_i \quad (5)$$

$$\Delta Y_i^F = \alpha_i - \beta^F \Delta F B_i^F - \gamma R_i^F \quad (6)$$

$$\Delta Y_i - \Delta Y_i^F = -\Delta F B_i^F (\beta - \beta^F) - \beta (\Delta F B_i - \Delta F B_i^F) - \gamma (R_i - R_i^F) + \epsilon_i \quad (7)$$

BL's Even Simpler Model

$$\Delta Y_i - \Delta Y_i^F = -\lambda \Delta F B_i^F + \epsilon_i \quad (8)$$

Q: Can lambda be interpreted as the multiplier error?

Omitted variable bias?

$$\Delta Y_i - \Delta Y_i^F = -\Delta FB_i^F (\beta - \beta^F) - \beta (\Delta FB_i - \Delta FB_i^F) - \gamma (R_i - R_i^F) + \epsilon_i \quad (7)$$

- Note that if planned adjustment is correlated with the fiscal adjustment forecast error or the interest rate forecast error, the estimate of lamda is biased

An example

- Assume:
 - Forecasters used correct multiplier
 - Planned adjustment depends on existing fiscal balance
 - Intensity of crisis depends on fiscal balance
 - Countries respond to crisis by tightening fiscal policy

Proof

$$\Delta Y_i - \Delta Y_i^F = -\beta (\Delta FB_i - \Delta FB_i^F) - \gamma (R_i - R_i^F) + \epsilon_i \quad (9)$$

$$\Delta FB_i^F = \pi_1 - \theta_1 FB_{i,0} + \eta_i \quad (1)$$

$$R_i - R_i^F = \pi_2 - \theta_2 FB_{i,0} + \nu_i \quad (2)$$

$$\Delta FB_i - \Delta FB_i^F = \pi_4 + \theta_4 (R_i - R_i^F) + \mu_i \quad (4)$$

$$\Delta Y_i - \Delta Y_i^F = \phi - \lambda \Delta FB_i^F + \xi_i \quad (10)$$

Interpretation

- In this case, a regression will show a link between the planned consolidation and growth forecast errors
- But this is an association, not a causal relationship
- Recall: by construction, no multiplier error!

But....

- Why would fiscal balance and interest rate forecast errors be correlated with planned consolidation?
- Put another way, is there any evidence for equations (1), (2), and (4)?

$$\Delta FB_i^F = \pi_1 - \theta_1 FB_{i,0} + \eta_i \quad (1)$$

$$R_i - R_i^F = \pi_2 - \theta_2 FB_{i,0} + \nu_i \quad (2)$$

$$\Delta FB_i - \Delta FB_i^F = \pi_4 + \theta_4 (R_i - R_i^F) + \mu_i \quad (4)$$

Explaining planned adjustment

$$\Delta FB_i^F = \pi_1 - \theta_1 FB_{i,0} + \eta_i \quad (1)$$

- Countries with weaker positions had seen sharp fiscal deteriorations in 2008 and 2009
- So they planned to bring their accounts back to balance

Evidence

Table 9: Regression of Fiscal Consolidation Errors on Interest Rate Errors

	Interest rate error	t-value	R2
2009-11	0.46	5.84	0.57
2009-12	0.72	10.28	0.75
2009-13	0.97	5.34	0.69
2009-14	1.05	6.17	0.61

Explaining sudden stops

$$R_i - R_i^F = \pi_2 - \theta_2 F B_{i,0} + \nu_i \quad (2)$$

- But these planned adjustments were insufficient to redress the fiscal problems
 - By 2014, Greece projected a structural deficit of 8 1/2 percent of potential GDP
- The weaker the 2009 fiscal position, the greater the investor panic

Evidence

Table 10: Regression of Growth Errors on CDS Spread Increases and Planned Consolidation

	CDS increase	t-value	Planned fis. cons	t-value	R2
2009-11	-0.54	-2.59	-0.49	-0.76	0.74
2009-12	-0.30	-3.46	-0.54	-0.77	0.68
2009-13	-0.42	-4.42	-0.36	-0.52	0.58
2009-14	-0.56	-4.30	0.26	0.34	0.42

Explaining fiscal forecast errors

$$\Delta FB_i - \Delta FB_i^F = \pi_4 + \theta_4 (R_i - R_i^F) + \mu_i \quad (4)$$

- Countries responded to soaring interest rates by stepping up fiscal consolidation

Evidence

Table 13: Regression of Fiscal Consolidation Errors on Interest Rate Errors

	Interest rate error	t-value	R2
2009-11	0.46	5.84	0.57
2009-12	0.72	10.28	0.75
2009-13	0.97	5.34	0.69
2009-14	1.05	6.17	0.61

Summing up

- BL's interpretation of their finding may not be correct
- Countries that planned large fiscal adjustments in 2009 were not a random sample:
 - Had weak fiscal positions
 - Were hit hard by the euro crisis
- There is omitted variable bias
- So association between planned adjustment and growth forecast errors might not reflect a higher-than-forecast multiplier

What killed growth?

- Underlying question: was growth undermined by the planned fiscal adjustment... or by the euro crisis?
- Ways of measuring euro crisis
 - Increase in CDS spreads from 2009
 - Increase in long-term sovereign interest rates
 - Interest rate forecast errors

CDS spreads

Table 14: Regression of Growth Errors on CDS Spread Increases and Planned Consolidation

	CDS increase	t-value	Planned fis. cons	t-value	R2
2009-11	-0.54	-2.59	-0.49	-0.76	0.74
2009-12	-0.30	-3.46	-0.54	-0.77	0.68
2009-13	-0.42	-4.42	-0.36	-0.52	0.58
2009-14	-0.56	-4.30	0.26	0.34	0.42

Interest rate increases

Table 15: Regression of Growth Errors on Interest Rate Increases and Planned Consolidation

	Interest rate increase	t-value	Planned fis. cons	t-value	R2
2009-11	-0.82	-1.97	-0.58	-0.88	0.65
2009-12	-1.15	-3.11	-0.16	-0.18	0.68
2009-13	-1.81	-3.68	0.23	0.28	0.59
2009-14	-2.45	-3.65	0.88	1.04	0.47

Interest rate forecast errors

Table 16: Regression Growth Errors on Interest Rate Errors mand Planned Consolidation

	Interest rate error	t-value	Planned fis. cons	t-value	R2
2009-11	-0.74	-2.43	-0.70	-1.33	0.66
2009-12	-1.10	-3.43	-0.24	-0.30	0.69
2009-13	-1.74	-4.44	0.15	0.19	0.60
2009-14	-2.36	-4.81	0.80	1.04	0.50

Conclusion

- BL's results are sound: there is indeed an association between planned consolidation and growth forecast errors
- But their interpretation may be wrong
- Real problem was not that forecasters underestimated multipliers; it was that they missed the euro crisis

THE END