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# Macroeconomic Imbalances in an Open Economy Stock-Flow Consistent Model

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## Research question:

How can macroeconomic imbalances be dealt with?

## Relevance:

Macroeconomic imbalances have been seen in the build-up of the Great Financial Crisis both in the world economy (for instance, China-US) and inside the euro area (see Borio and Disyatat, 2011).

Some, like former World Bank Chief Economist Justin Lin, argue that *„many emerging countries may not be in the position to afford counter-cyclical policies due to their lack of fiscal space or constraints on foreign exchanges“* (2009, 1).

## Definition:

Macroeconomic imbalances are situation in which the current account is not zero. Either net exports lead to net acquisition of foreign financial assets (or a decrease in foreign debt) or net imports lead to a net increase in foreign debt (or a decrease in foreign financial assets held).

*N.B.: Macroeconomic imbalances are the rule, not the exception.*

## Existing literature:

Barbosa de Carvalho, Laura. 2012. Current account imbalances and economic growth: a two-country model with real-financial linkages. *unpublished manuscript*

Duwicquet, Vincent and Jacques Mazier. 2010. Financial integration and macroeconomic adjustments in a monetary union. *Journal of Post Keynesian Economics* 33(2)

Godley, Wynne and Marc Lavoie. 2006. Comprehensive accounting in simple open economy macroeconomics with endogenous sterilization or flexible exchange rates. *Journal of Post-Keynesian Economics* 28(2), pp.~241-276

Godley, Wynne and Marc Lavoie. 2007b. A simple model of three economies with two currencies: the eurozone and the USA. *Cambridge Journal of Economics* 31, pp.~1-23

Lavoie, Marc and Jun Zhao. 2010. A study of the diversification of China's foreign reserves within a three-country stock-flow consistent model. *Metroeconomica* 61(3), pp.~558-592

Mazier, Jacques and Gnanononbodom Tiou-Tagba Aliti. 2012. World Imbalances and Macroeconomic Adjustments: a three-country stock-flow consistent model with fixed or flexible prices. *Metroeconomica* 63(2), pp.~358-388

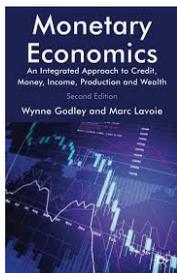
Mazier, Jacques and Jamel Saasaoui. 2012. Financialization and global imbalances: a two-country SFC model. *unpublished manuscript*

Valdecantos Halporn, Sebastian and Gennaro Zezza. 2013. Reforming the International Monetary System. A stock-flow-consistent approach. *unpublished draft*

## Own contribution:

Existing models focus on the portfolio of financial assets. While this is interesting in its own right, I perceive a gap. I'd like to show with a relatively simple model whether nominal exchange rate changes can turn around macroeconomic imbalances.

I build on the SIM model of Godley/Lavoie (2007, ch. 3).



Godley, Wynne and Marc Lavoie. 2007a. *Monetary economics: an integrated approach to credit, money, income, production and wealth*. Basingstoke, UK: Palgrave Macmillan

## Assumptions:

I look at a country A which you should think of as a developing country. It fixes its exchange rate vis-a-vis the US-dollar.

There is only money, no bonds → No interest rates.

Country A has foreign currency reserves.

Exchange rate rule: if foreign currency reserves drop below twice the value of imports the currency is devalued by 35%.

Initial situation with a balanced current account shocked by an increase in government spending.

## The model: Accounting matrix

Table 1: Accounting (transaction) matrix

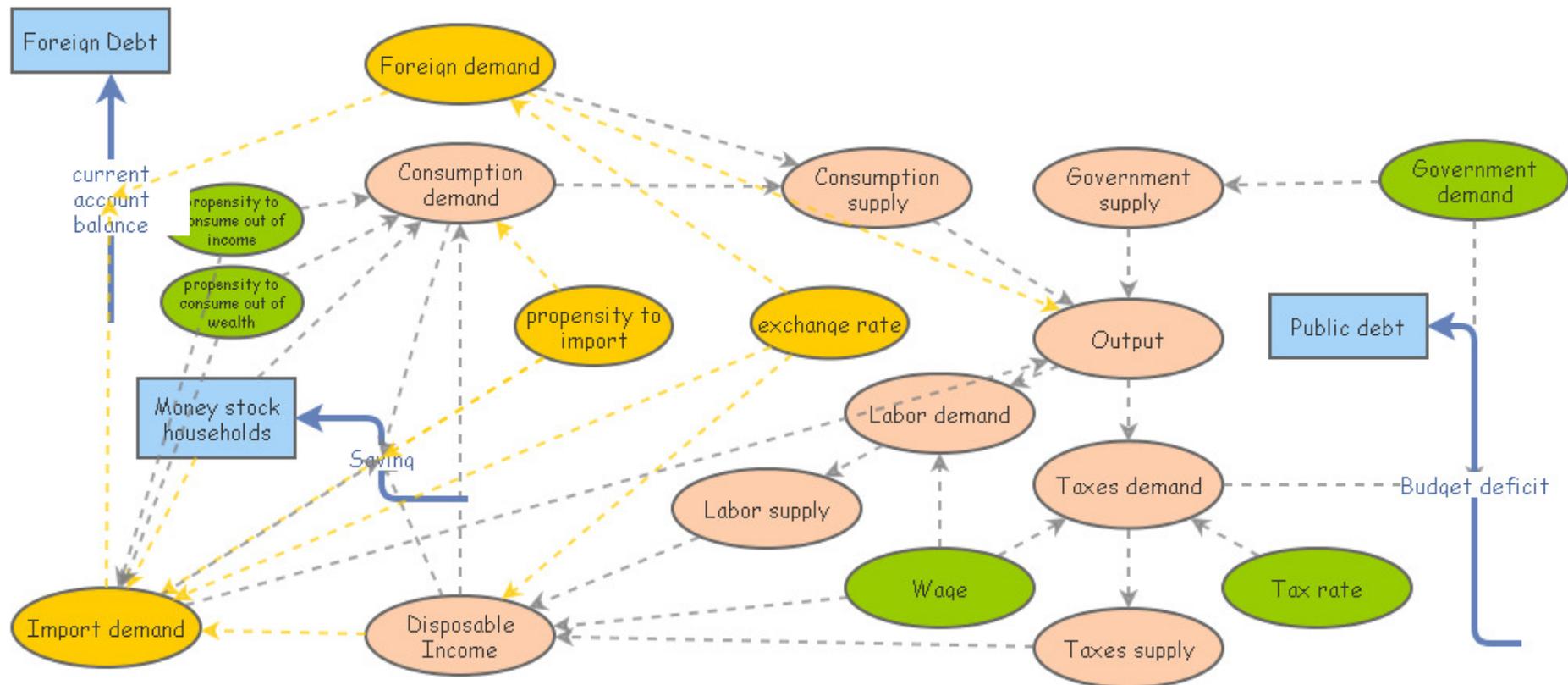
	1. HHs	2. Firms	3. Gov	Ext	$\Sigma$
1. Domestic consumption	-C	+C			0
1a. Exports		+EX		-EX	0
1b. Imports		-IM		+IM	0
2. Govt. expenditures		+G	-G		0
3. [Output]		[Y]			
4. Factor income (wages)	+WB	-WB			0
5. Taxes	-T		+T		0
6. Changes in money	$-\Delta H$		$+\Delta H$		0
7. Changes in foreign wealth		$-\Delta F$		$+\Delta F$	0
$\Sigma$	0	0	0	0	0

## The model: Behavioral matrix

Table 2: Behavioral (transaction) matrix

	1. HHs	2. Firms	3. Gov	Ext	$\Sigma$
1. Consumption	$-C_d$	$+C_s$			0
1a. Exports		$+EX_s$		$-EX_d$	0
1b. Imports		$-IM_d$		$+IM_d$	0
2. Govt. expenditures		$+G_s$	$-G_d$		0
3. [Output]		[Y]			
4. Factor income (wages)	$+W*N_s$	$-W*N_d$			0
5. Taxes	$-T_s$		$+T_d$		0
6. Changes in money	$-\Delta H_h$		$+\Delta H_s$		0
7. Changes in foreign wealth		$-\Delta F$		$+\Delta F$	0
$\Sigma$	0	0	0	0	0

# The model: A graphical representation



<http://insightmaker.com/insight/7017>

## The model: 22 equations (1-9)

1.  $y = cd + x + g$

2.  $t = \text{trate} * wb$

3.  $wb = y$

4.  $n = y / pr$

5.  $wage = wb / n$

6.  $gdef = g - t$

7.  $cab = x - m$

8.  $y_k = cd_k + g_k + x_k$

9.  $y_{dk} = (wb - t) / p_{cons}$

## The model: 22 equations (10-18)

$$10. yd = ydk * pcons$$

$$11. m = mk * pf * xr$$

$$12. pcons = 0.9 * p + 0.1 * pf * xr$$

$$13. mk = mp1 * ydk + mp2 * hd(-1) / pcons + mp3 * pf * xr / p$$

$$14. xk = mp1 * yfk + mp2 * hfd(-1) / pfcons - mp3 * pf * xr / p$$

$$15. cdk = alpha1 * ydk + alpha2 * hd(-1) / pcons - alpha3 * mp3 * pf * xr / p$$

$$16. cd = cdk * p$$

$$17. g = gk * p$$

$$18. x = xk * p$$

## The model: 22 equations (19-22, a-c)

$$19. hd = hd(-1) + (yd - cd - m)$$

$$20. hf = hf(-1) + x - m$$

$$21. hs = hs(-1) + gdef$$

$$a. gov = (t - g) / y$$

$$b. trade\_inv = (m - x) / y$$

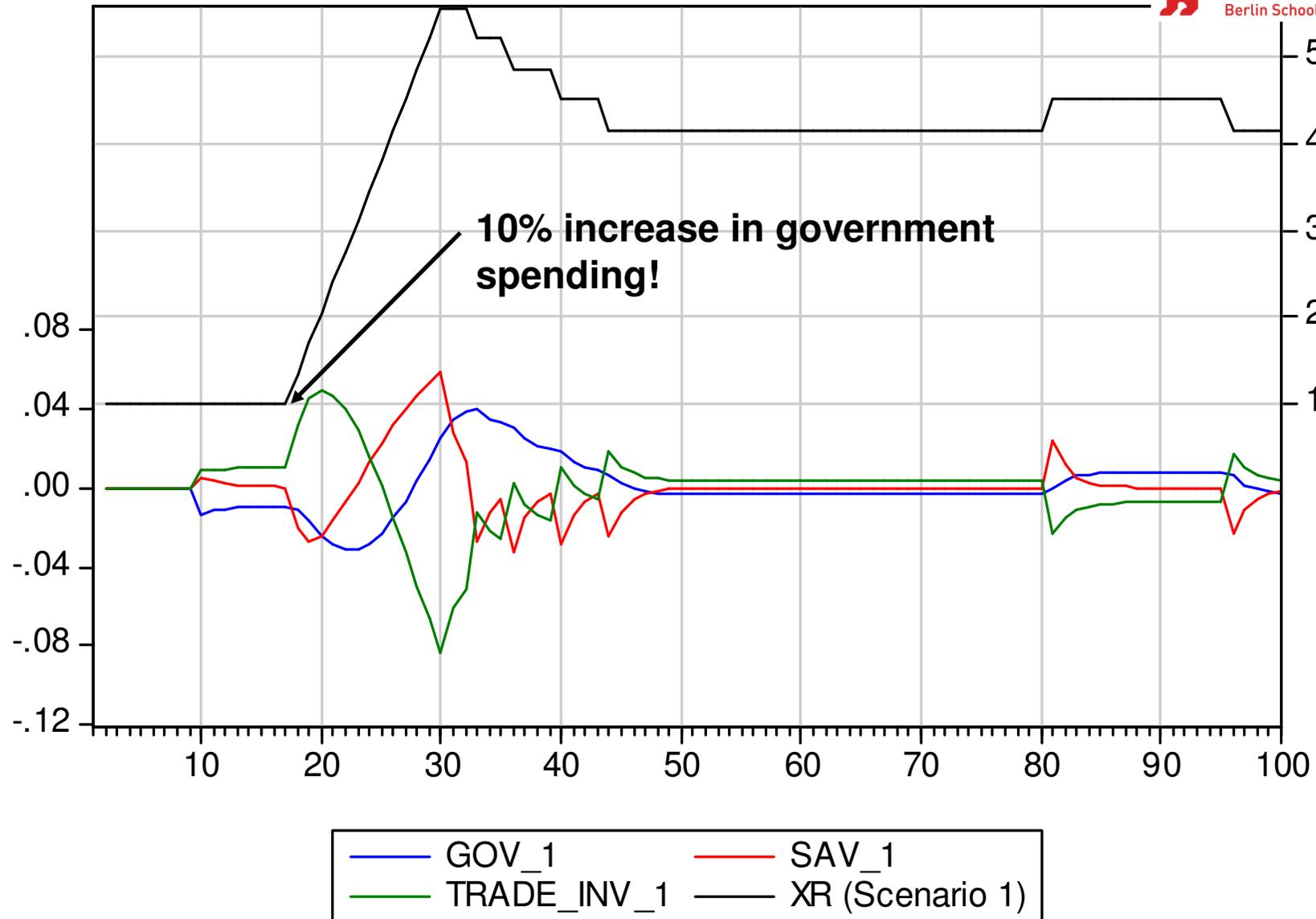
$$c. sav = (yd - cd - m) / y$$

*in % of GDP*

$$22. xr = xr(-1) + (hf(-1) / m(-1) < 2) * 0.35 + (hf(-1) / m(-1) > 3) * (-0.35)$$

## The model: some parameters and initial values

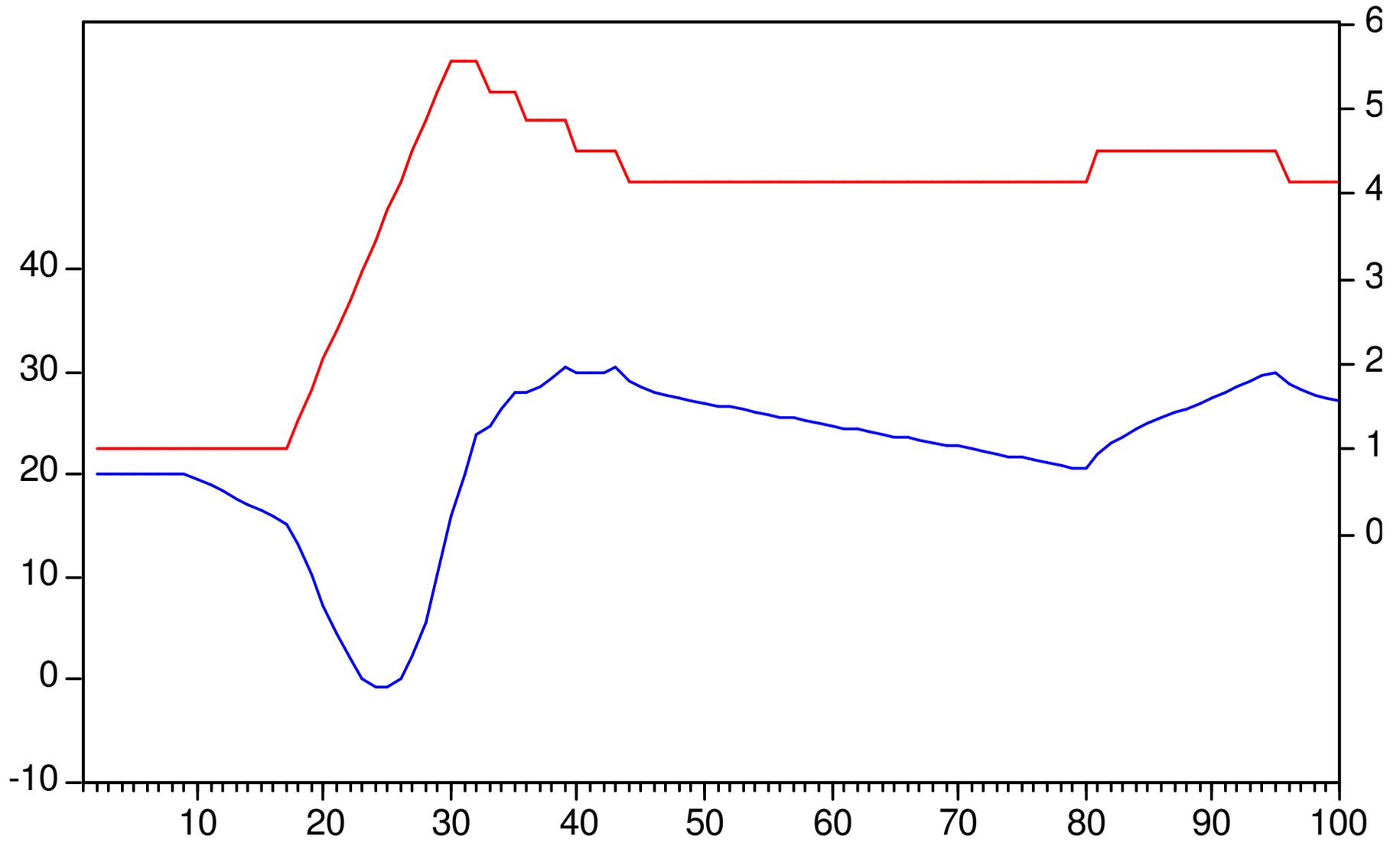
1. series  $cd = 13.8$
2. series  $m = 8$
3. series  $x = 7$
4. series  $g = 30$
5. series  $y = cd+x+g$
6. series  $wb = y$
7. series  $trate = 0.5$
8. series  $t = trate*wb$
9. series  $pr = 1$
10. series  $n = y/pr$
11. series  $wage = wb/n$
12. series  $gdef = g - t$
13. series  $cab = x - m$
14. series  $p=1$
15. series  $pf=1$
16. series  $xr=1$
17. series  $cdk = cd/p$
18. series  $mk = m/(xr*pf)$
19. series  $xk = x/p$
20. series  $gk = g/p$
21. series  $yk=cdk+xk+gk$
22. series  $pcons=0.9*p+0.1*pf*xr$
23. series  $alpha1 = 0.6$
24. series  $alpha2 = 0.4$
25. series  $mp1 = 0.25$
26. series  $mp2 = 0.05$
27. series  $mp3 = -1$
28. series  $alpha3 = 1$
29. series  $hd = 10$
30. series  $hf = 20$
31. series  $hs = 20$
32. series  $yfk = 20$
33. series  $pfcons = 1$
34. series  $hfd=20$
35. series  $xr0=xr$



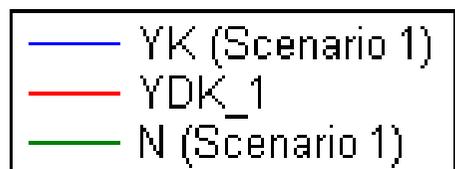
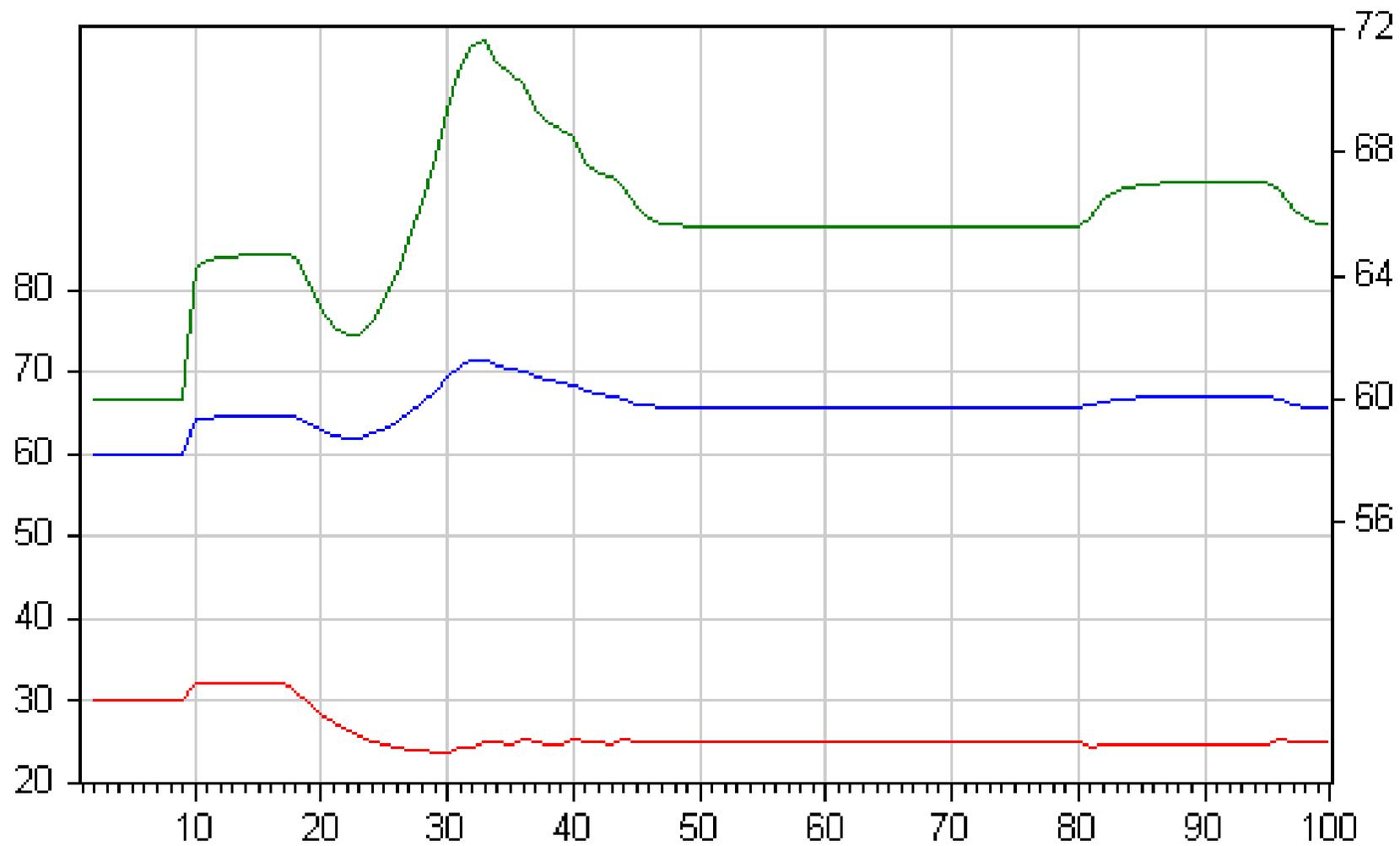
@IDENTITY gov =  $(t - g) / y$

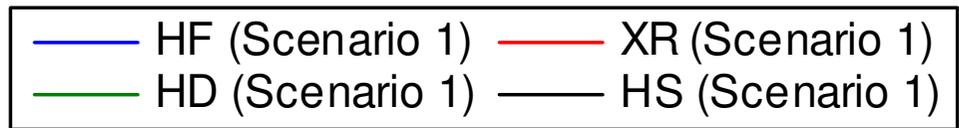
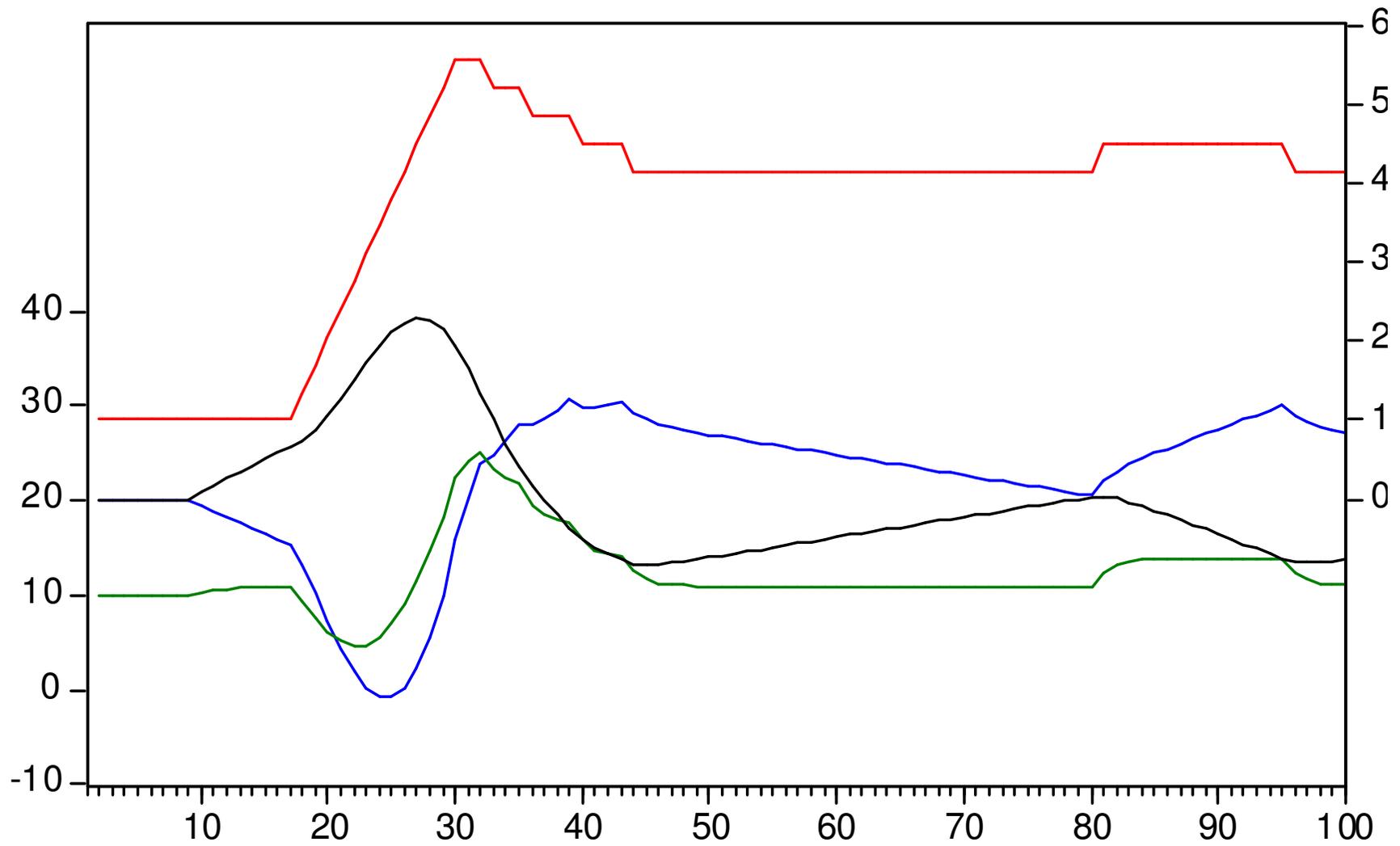
@IDENTITY trade\_inv =  $(m - x) / y$  (INVERTED current account)

@IDENTITY sav =  $(yd - cd - m) / y$



— HF (Scenario 1) — XR (Scenario 1)





## Conclusions:

Given the assumptions – among them, no „original sin“ – the fiscal space of country A is in no way limited. A current account deficit arising from an increase in government spending can be offset by a change in the nominal exchange rate.

Macroeconomic imbalances are a sign of different growth rates, but they are not problematic if country A uses an exchange rate rule which devalues the currency when reserves fall below some threshold, i.e. twice the value of imports.



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***On a green island with rocks***

***Models were treated with shocks***

***The economists swore***

***Not to confuse anymore***

***financial flows with stocks.***

**Thank you.**