

# Fiscal multipliers in the Slovak economy

DSGE simulation

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# Fiscal multipliers - motivation

- In the aftermath of financial crisis countries have to consolidate fiscal budgets (Fiscal compact)
- Consolidation is harmful to the economic activity
- Policy makers desire to assess the impact and want to know an optimal (the least harmful) way of consolidation
- Impact assessed through fiscal multipliers
- Various instruments
  - on expenditure side
  - on revenue side
  - at different time horizons
- Consolidation package

## Fiscal multipliers - stylized facts

- Fiscal multiplier – change of GDP caused by unit change of budget deficit
- Fiscal multipliers are bigger for large (more closed) economies than for small open ones
- Temporary reduction of gov. expenditure are associated with larger short-run GDP effects than temporary increases of tax rates
- but in the medium to long-run this relationship reverses
- permanent change of a fiscal instrument has bigger effect on GDP than a temporary one

# Fiscal multipliers in Slovakia, estimates

## – SVAR (Pecsyova, 2013)

• taxes	0,29 (1Y)	0,75 (2Y)	1,02 3(Y)	(cummulative)
• social contributions	0,79	2,23	3,8	
• gov. expenditure	0,29	0,26	0,08	
• gov. investment	0,46	0,66	0,13	

## – ECM (Pecsyova, 2013)

• income side,	short term	0,19	long term	0,25
• spending side		0,57		0,93

## – DSGE (QUEST III, 2014)

• direct taxes	0,19 (1Y)	0,10-0,30
• indirect taxes	0,20	0,10
• gov. expenditure	0,25	0,30
• gov. investment	0,58	0,70

## -OECD (Outlook, 2012)

# Model

- Medium size New Keynesian small open economy model
  - Production sector
    - Final goods – consumption, investment, public goods, perfect competition, non-tradable
    - Intermediate goods – produced of capital, labor and oil, producers have market power in setting prices , tradable
  - Household sector
    - 50% Ricardian and 50% liquidity constrained households , workers have market power in setting wages, habit formation, capital adjustment cost in transforming investment into capital
  - Trade
    - Domestic firms export a fraction of their intermediate goods abroad, pricing to market, importing firms have market power in setting the price of import
  - Financial market
    - a portfolio of domestic bonds and foreign assets, the prices of foreign assets increase with their level in order to avoid their excessive accumulation

# Model

- Overall
  - 106 endogenous variables
  - 17 exogenous variables
  - 73 parameters
- Variables of the model are made stationary
  - real – detrended by common trend of technological progress
  - nominal – detrended by common nominal trend

# Fiscal sector

- gov. expenditure – gov. consumption, gov. investment and social transfers to liquidity constrained households
- gov. revenue – employee income tax, employer social contributions, consumption tax and lump-sum tax
- budget deficit and non-zero public debt allowed in s.s.
- sustainability of public debt in the long-run attained by stabilization lump-sum tax rule (non-distortionary)
- Fiscal authority has 6 instruments
  - 3 on spending side – consumption, investment and social transfers
  - 3 on revenue side – VAT and income taxes and social contributions by employer
- Monetary policy
  - Active MP, CB sets short term interest rate
  - Passive MP, interest rate exogenous (achieved by specific path of monetary shocks)

# Calibration of fiscal sector

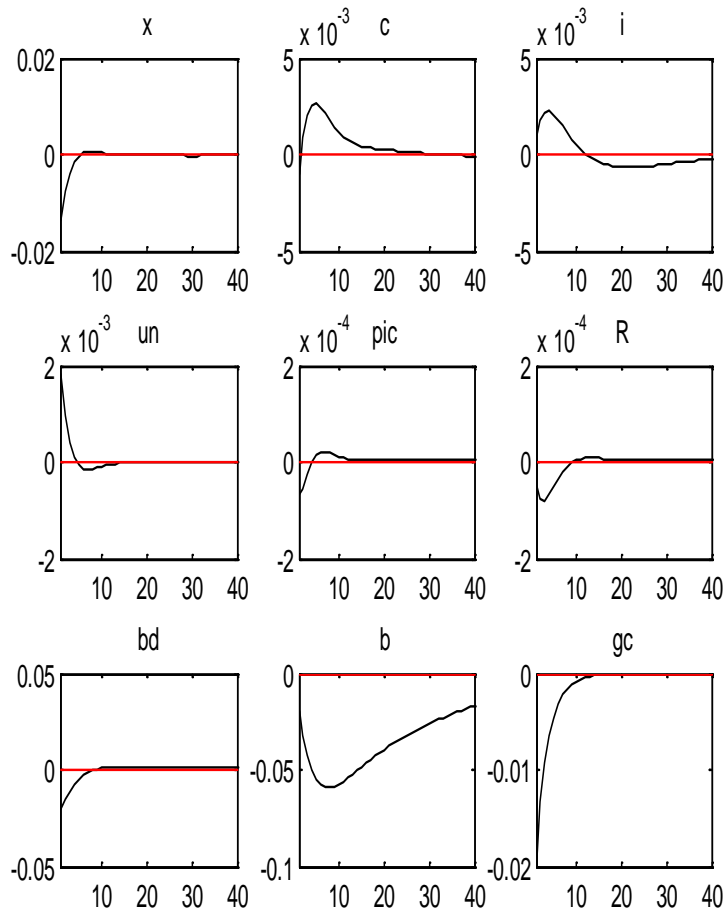
- Effective tax rates – ratio of actual tax collection to tax base
  - labor income tax (DPFO/wage base) –18%
  - consumption tax (VAT+cons.tax/consumption) - 14%
  - social security contributions (soc. contr./wage base) –38%
- Steady state ratios
  - public consumption to GDP – 18%
  - public investment to GDP – 2%
  - social tranfers to GDP – 18%
  - Labour income tax revenues-to-GDP - 8%
  - VAT revenues-to-GDP – 12%
  - Wage levy paid by employer-to-GDP – 16%
  - Value of the public debt-to-GDP – 50%
  - Value of the budget deficit-to- GDP – 2,8%



# Simulation design

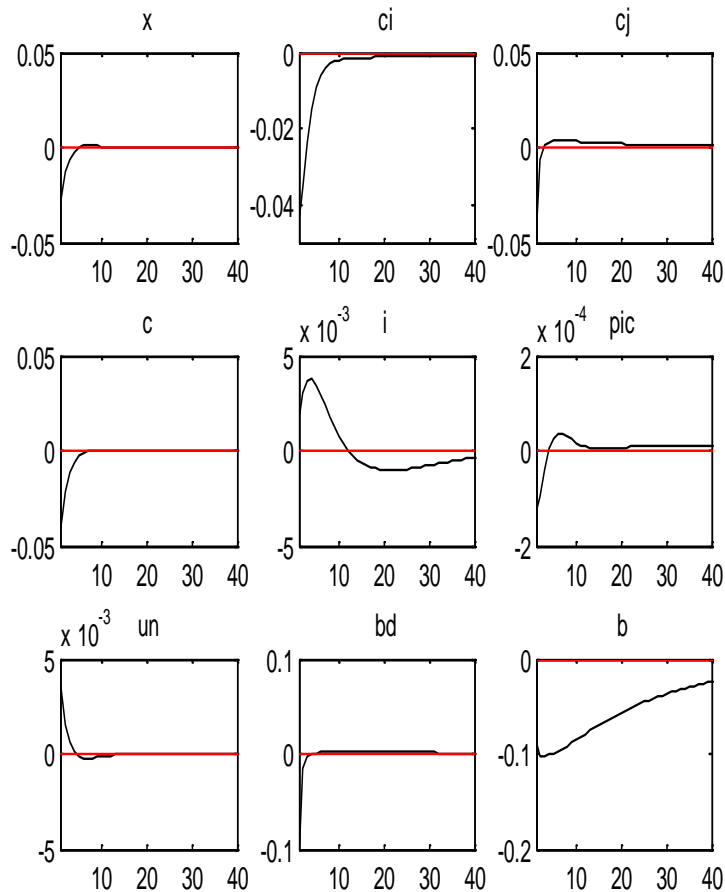
- Before fiscal change – economy in s.s.
- permanent change of fiscal instruments aimed at achieving fiscal consolidation
  - on expenditure side – decrease of fiscal instrument by 1% of its original value
  - on revenue side – increase of tax rate by 1 p.p.
- permanent change – kept constant for the whole horizon
- Fiscal rule with
  - Lump-sum tax
  - Income tax
- Active vs pasive MP
- Fiscal multiplier -net present value, i.e., the discounted sum of output changes until each horizon divided by the sum of discounted spending changes (or tax receipt changes) until the same horizon (discounted by s.s. real interest rate)

# Spending shock – gov. consumption decrease



- Lower demand decreases GDP and employment
- Private consum. increases (Ric.hh expect lower taxes in future due to improved fiscal balances).
- Private investment increases (investors switch from gov. bonds to private bonds)
- Original fall in aggregate demand decreases prices
- Negative output gap and deflation leads to accomodative monetary policy

# Tax shock – VAT increase



- goods and services more expensive, leads to private consumption reduction
- lower demand leads to lower output and employment
- due to decrease of ex-ante real interest rate, private investment increases (marginally)
- before-VAT cpi inflation decreases
- fiscal balances improve
- monetary policy (not shown here) becomes more accommodative

# Fiscal multipliers

## Active MP, Fiscal rule – lump-sum

	4q	8q	12q	16q	100q
gc	0,55	0,47	0,44	0,44	0,89
ig	0,57	0,50	0,48	0,49	1,20
tr	0,59	0,45	0,37	0,33	0,41
tax_n	0,26	0,45	0,53	0,58	2,09
tax_w	0,17	0,18	0,20	0,22	0,92
tax_c	0,40	0,44	0,45	0,47	0,99

- for permanent changes – expenditure instruments having larger effect on GDP in the short run, revenue instruments have larger impact as time proceeds
- in the long-run – employer contributions and public investment most damaging (multipliers bigger than 1) while social transfers and income tax with the least effect on GDP

# Fiscal multipliers

## Active MP, Fiscal rule – income tax

	4q	8q	12q	16q
<b>gc</b>	0,57	0,47	0,38	0,28
<b>ig</b>	0,58	0,50	0,43	0,36
<b>tr</b>	0,61	0,44	0,29	0,15
<b>tax_n</b>	0,30	0,67	0,84	0,89
<b>tax_w</b>	0,17	0,13	0,08	0,02
<b>tax_c</b>	0,45	0,50	0,49	0,44

- Results are qualitatively similar, multipliers are a bit larger in general, as income tax more distortionary to the economy than lump-sum tax (which is not)

# Fiscal multipliers

## Passive MP

	4q	8q	12q	16q
<b>gc</b>	0,63	0,62	0,61	0,59
<b>ig</b>	0,65	0,66	0,67	0,68
<b>tr</b>	0,69	0,63	0,57	0,52
<b>tax_n</b>	0,34	0,79	1,04	1,13
<b>tax_w</b>	0,18	0,17	0,14	0,10
<b>tax_c</b>	0,52	0,67	0,76	0,82

- all multipliers are larger at the impact and as time goes by, the difference widens further
- Restrictive fiscal policy is not counterbalanced by accomodative monetary policy
- Conducting fiscal consolidation in the euro area is more painful as it slows economic activity more

# Consolidation 2013-17

- Stability Program of the SR 2014-17

	Consolidation 2013-17				
	2013	2014	2015	2016	2017
mil €	506	748	407	188	444
% GDP	0,70	1,00	0,52	0,23	0,52

Its effect on GDP

Cumulative effect of 2013-17 consolidation on GDP p.p.					
2013	2014	2015	2016	2017	
-0,2	-1,1	-1,8	-2,1	-2,5	

# Summary

- consolidation through the expenditure instruments is more damaging initially
- negative effect dissipates faster with time
- the least desirable way of consolidating on the expenditure side in the longer run is cutting public investment
- On the revenue side -; immediate effect of increasing taxes is mild but is getting more harmful with time,
- increasing employer social transfers the most harmful instruments
- Results robust with respect to fiscal rule
- consolidation is less harmful in an environment of autonomous monetary policy where negative impact of restrictive fiscal policy can be counterbalanced by active monetary policy