University of Rijeka
Faculty of Economics Rijeka

PhD RESEARCH PROPOSAL

Macroeconomic effects of fiscal policy in a small open economy: case of Croatia

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Motivation

- Croatia is a **small open** economy with a **managed floating exchange rate regime (quasi-fixed?)**

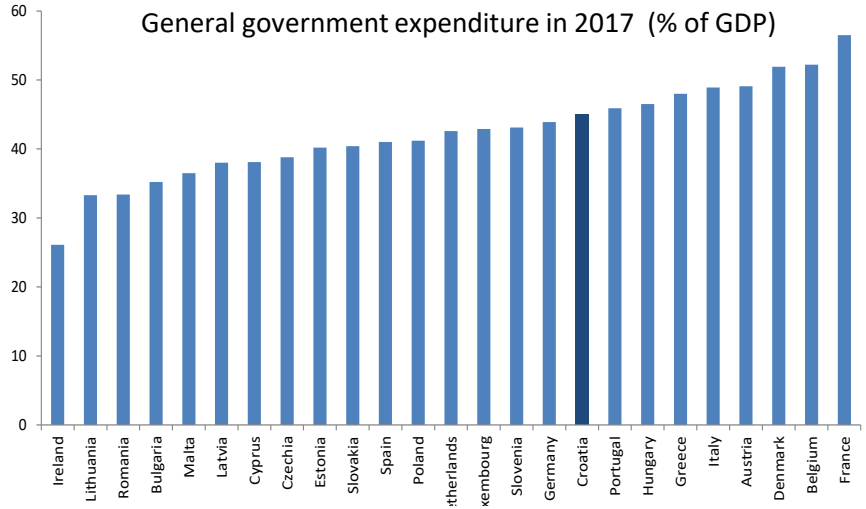
- Effectiveness of monetary policy is **constrained** (exchange rate regime, domination of foreign banks, no reference rate)

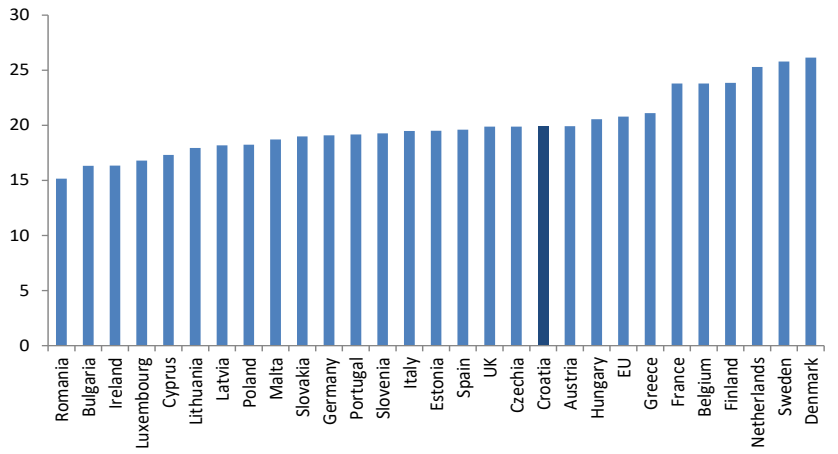
- Fiscal policy is a **key economic policy instrument** – (too?) many discretionary measures

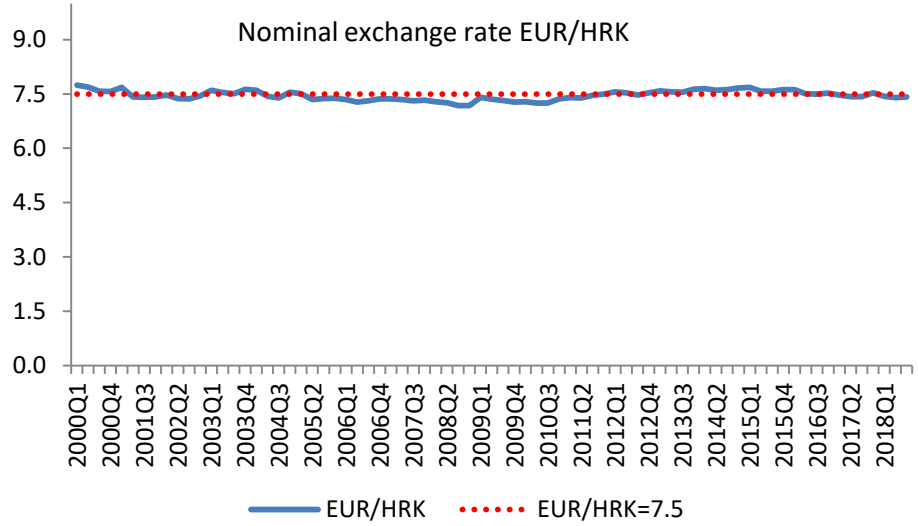
- Government plays (too?) **important role** in Croatian economy

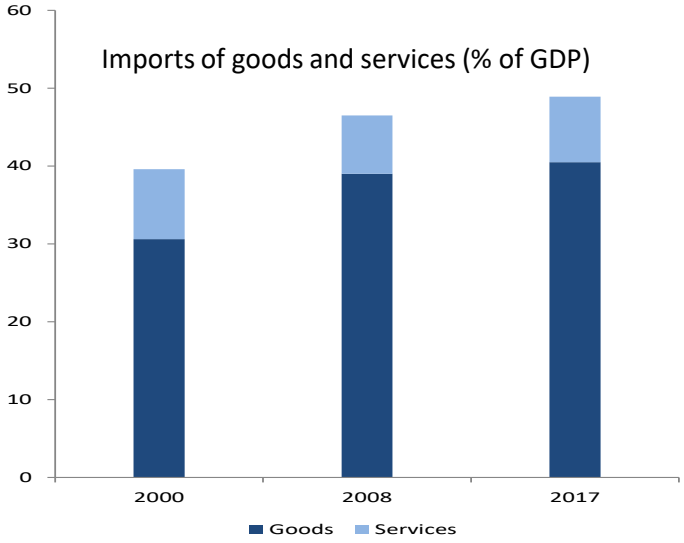
- Importance of fiscal policy will get even greater after Croatia **adopts euro**

A picture is worth a thousand words









Source: Eurostat

Theoretical background and important empirical facts

Fiscal policy in a small open economy (I)

- theoretical foundations (I) – **Keynesian cross in open economy**

Closed economy multiplier

$$T = tY$$
$$Y = a + c(Y - tY) + I + G$$
$$Y = \frac{1}{1 - c(1-t)}(a + I + G)$$

$$\Delta Y = \frac{1}{1 - c(1-t)}\Delta G \langle \Delta Y = \frac{1}{1-c}\Delta G$$

Open economy multiplier

$$Y = C + I + G + (X - M)$$
$$M = mY$$
$$Y = a + c(Y - tY) + I + G + X - mY$$
$$Y = \frac{1}{1 - c(1-t) + m}(a + I + G + X)$$

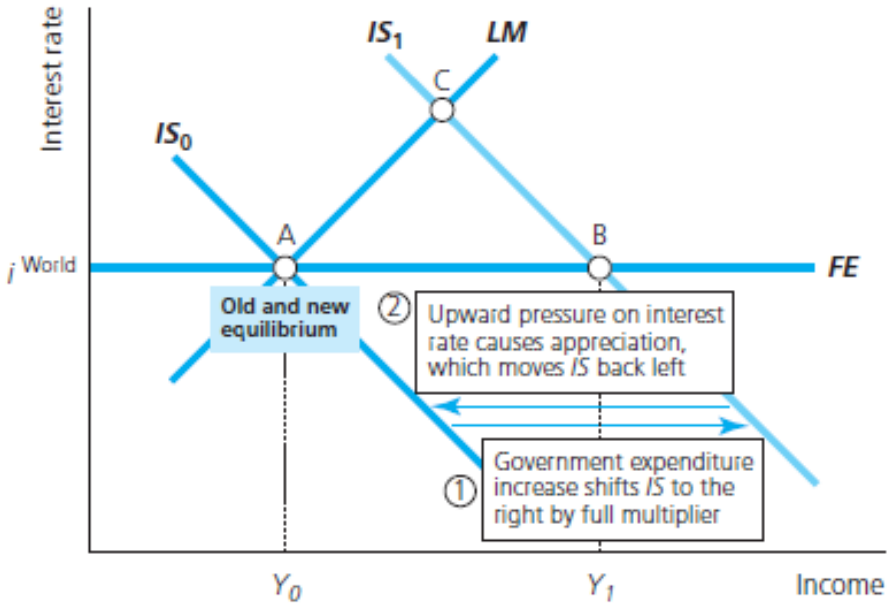
$$\Delta Y = \frac{1}{1 - c(1-t) + m}\Delta G$$

Fiscal multipliers are smaller in open economies – „leakage effect"

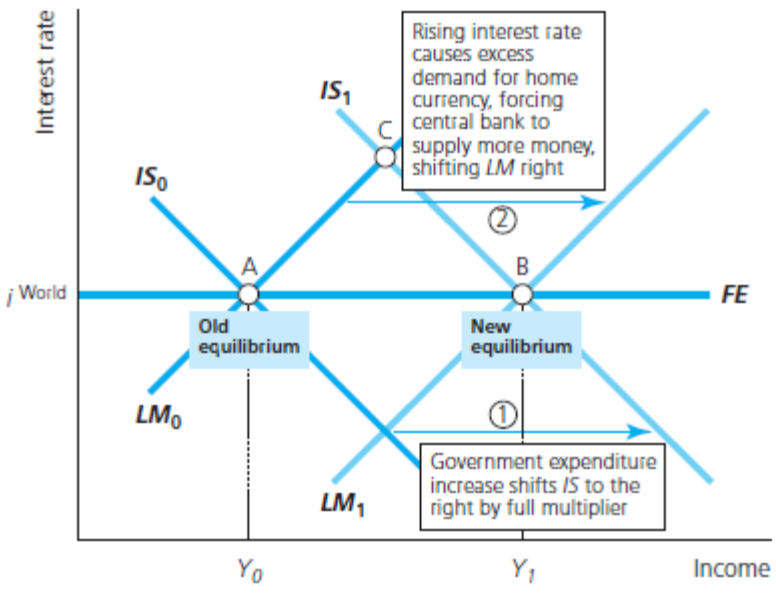
Fiscal policy in a small open economy (II)

- theoretical foundations (II) – **Mundell-Fleming model**

Flexible exchange rate



Fixed exchange rate

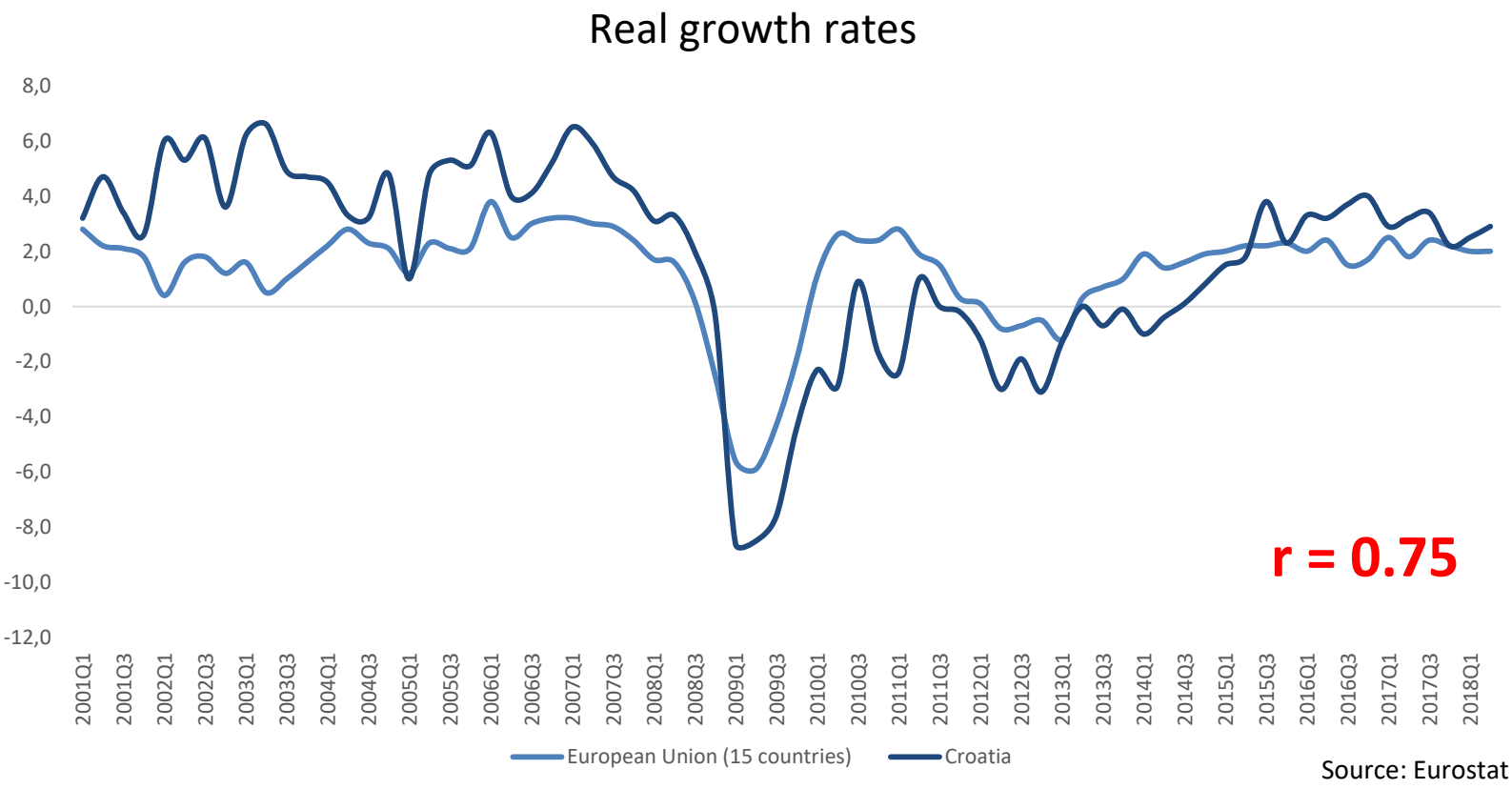


Source: Gartner (2009)

Fiscal policy is effective under fixed exchange rate regime - „monetary policy accomodation channel"

Fiscal policy in a small open economy (III)

- empirics (I) – **synchronization of business cycles**

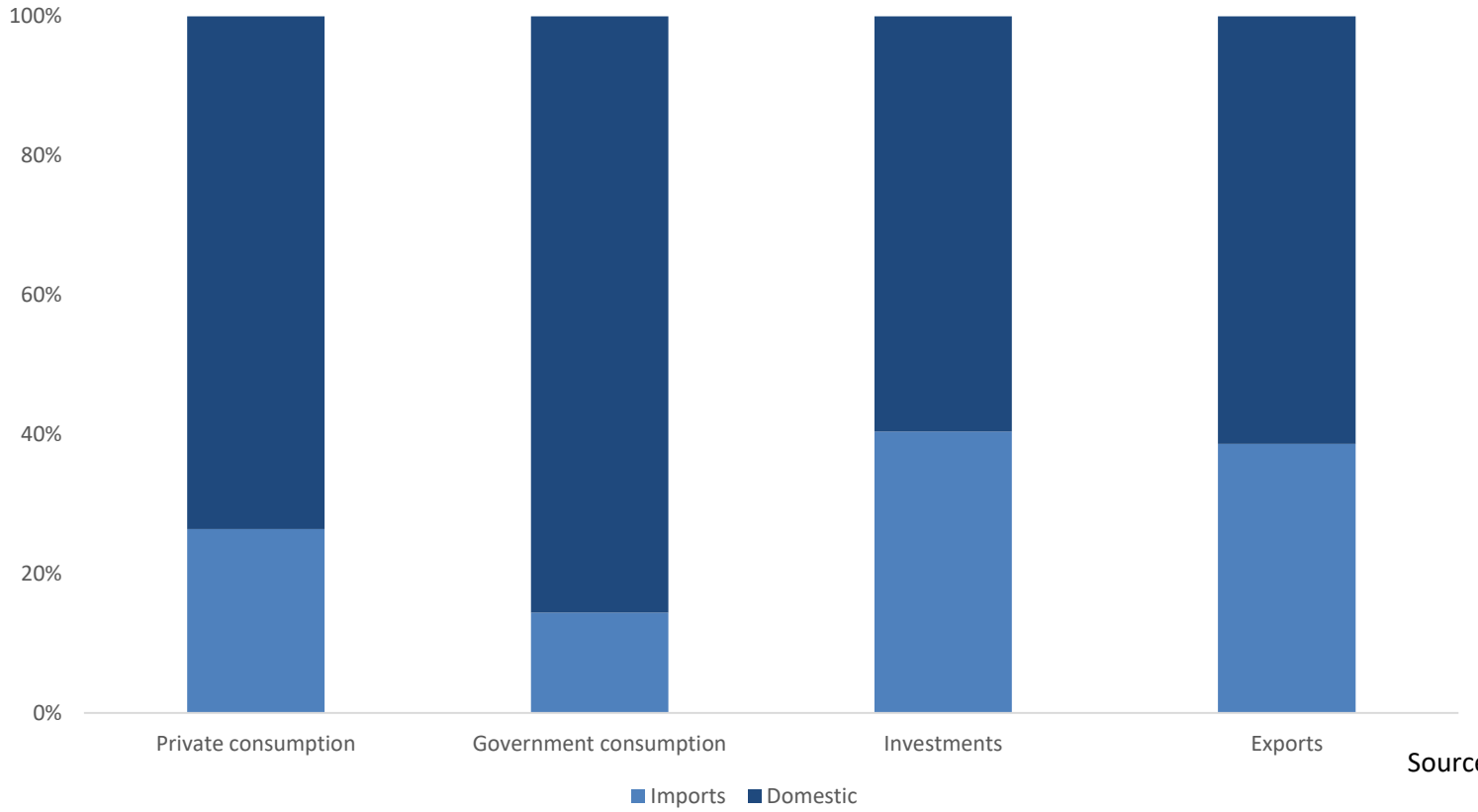


Source: Eurostat

Foreign shocks have notable effects on domestic economic activity

Fiscal policy in a small open economy (IV)

- empirics (II) – **import-oriented economy**

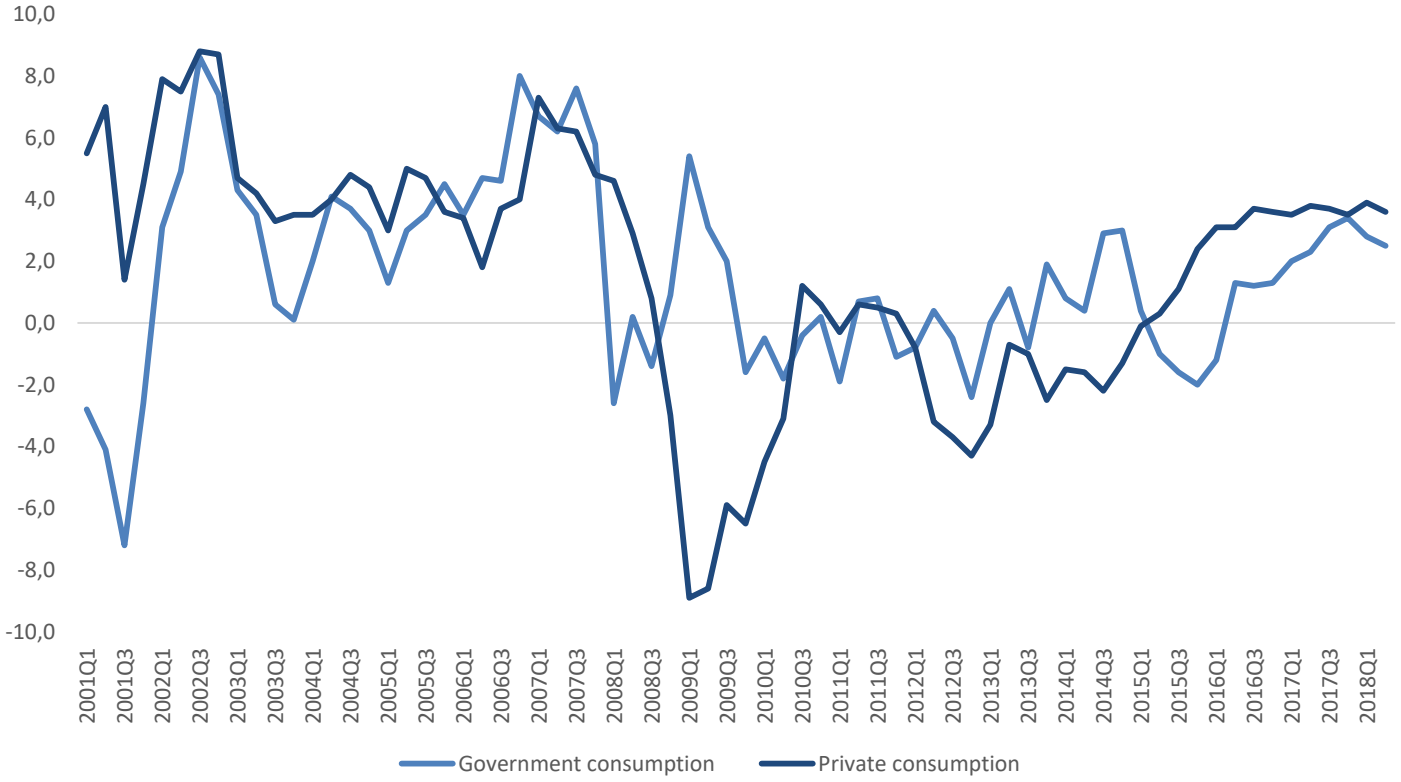


Source: Mikulić (2018)

Government consumption has direct and indirect effects on imports

Private and government consumption – complements?

- empirics (iii) – **positive correlation between C and G**



Source: Eurostat

A brief literature review – fiscal policy and economic modelling in Croatia

Literature review (fiscal policy and economic growth)

Authors	Main conclusions
Pivac & Jurun (2002) Benazić (2006) Rukelj (2009) Šimović (2009) Darvas (2010) Ravnik & Zilić (2011) Sever, Drezgić, Blažić (2011) Tkalec & Vizek (2011) Šimović & Deskar-Škrbić (2013) Grdović Gnip (2013; 2014) Ćorić, Šimović, Deskar-Škrbić (2015) No effects of external shocks	• fiscal policy has significant effect on economic activity in Croatia • productive expenditures vs unproductive expenditures • size of expenditure multipliers between 0.9 and 2.18 • size of tax multiplers between -0.03 and -1.5 • fiscal multipliers are larger on general government level than on the central government level • fiscal policy more effective in recession • fiscal expansion puts appreciation pressures on nominal exchange rate

Source: author

Literature review (economic modelling in Croatia)

Authors	Model	Research area
Adelman and Šohinger (2000)	CGE	• effects of tarrifs and taxes on welfare
Šohinger, Galinec and Harrison (2001)	CGE	• Trade integraton effects (WTO)
Škare and Stjepanović (2011)	CGE	• Effects of external shocks
Škare and Stjepanović (2013)	CGE	• Effects of exchange rate and
Nadoveza, Sekur and Beg (2016)	CGE	• Effects of income tax
Bokan et al. (2009)	**DSGE**	• External shocks and monetary policy
Palić (2015)	**DSGE**	• RBC/NK model – various shocks
Arčabić et al. (2016a; 2016b)	**DSGE**	• NK model – prod. and ext. shocks
Palić (2018)	**DSGE**	• NK model – monetary policy

No fiscal shocks

Source: author

Structure of PhD research

Structure – three parts

- **Part one**
  - effects of government spending and indirect taxes on private private consumption and private aggregate demand in Croatia in the **open economy analytical framework**
- **Part two**
  - effects of **openness** and level of public debt on the size of fiscal multipliers in Croatia and **two comparable small open economies** (Slovenia and Serbia)
- **Part three**
  - calibration of the **small open economy DSGE** model with fiscal authority and import share of private and government consumption
  - analysis of the **adequacy** of this model for the simulation of the effects of fiscal policy in Croatia by comparing the impulse response functions from the calibrated model and the empirical vector autoregression model

Research goals

Research goals

Main goals of this doctoral dissertation are:

- to empirically determine and analyze the **effects** of discretionary measures of fiscal policy (**government consumption**) on various **macroeconomic variables in Croatia**
  - GDP, private consumption, private aggregate demand
  - CPI
  - trade balance
  - employment
- to calculate and compare fiscal multipliers in Croatia in **closed economy and open economy analytical framework**
- to calculate and compare fiscal multipliers **in Croatia and comparable SOEs**
- to test the **adequacy of a small open economy DSGE model** for the analysis and simulations of the effects of fiscal policy in Croatia

Hypotheses

Hypotheses

H1: Government consumption has a significant effect on macroeconomic developments in Croatia

- **H1a:** Government consumption has positive effect on GDP, private consumption and private domestic demand
- **H1b:** Government consumption has positive effect on employment
- **H1c:** Government consumption has negative effect on trade balance
- **H1d:** Government consumption has positive effect on CPI

H2: Government counsumption multipliers in Croatia estimated in the open economy analytical framework are lower compared to multipliers estimated in the closed economy analytical framework

H3: Trade openness and public debt level have significant effect on the size of government consumption multipliers in Croatia

H4: Net indirect taxes have negative effect on private consumption and aggregate demand

H5: New-Keynesian DSGE models can be used for simulations of the effects of fiscal policy in Croatia

Methodology and data

Methodology (Part 1 and Part 2)

- structural VAR model with Blanchard and Perotti (1999) identification strategy, augmented by Ravn and Spange (2012)

Blanchard and Perotti (1999)

$$Y_t = A(L,q)Y_{t-1} + U_t$$

RF

$$Y_t = [T_t, G_t, X_t]$$

$$U_t = [t_t, g_t, x_t]$$

$$\begin{aligned} t_t &= a_1\, x_t + a_2\, e_t^g + e_t^t \\ g_t &= b_1\, x_t + b_2\, e_t^t + e_t^g \\ x_t &= c_1\, t_t + c_2\, g_t + e_t^x \end{aligned}$$

e^t, e^g, e^x - structural shocks

9 restrictions (6 from baseline model)

elasticites assumptions

Ravn and Spange (2012)

no t, introduction of c and f

$$t_t = a_1 c_t + a_2 f_t + \beta_2 e_t^G + \beta_1 e_t^t,$$

$$g_t = b_1 c_t + b_2 f_t + \beta_4 e_t^T + \beta_3 e_t^g,$$

$$c_t = c_1 t_t + c_2 g_t + c_3 f_t + \beta_5 e_t^c,$$

$$f_t = d_1 t_t + d_2 g_t + d_3 c_t + \beta_6 e_t^f$$

e^t, e^g, e^c, e^f - structural shocks

22 restrictions (16 from baseline model)

elasticites assumptions

Methodology (Part 3)

Three steps

1. Calibration of a small open economy DSGE model based on data sutaible for the analysis of Croatian economy

2. Estimation of VAR model

3. Comparison of model impulse responses with empirical impulse responses from VAR model

Main characteristics of SOE NK DSGE model

- Benchmark Gali (2008) model - *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and Its Applications (Chapter 7)*

- Castanheira (2015) extended Gali (2008) model

  - **government expenditure** in the **utility function**
  - **non-separable preferences** over **private** consumption and **government** expenditure
  - private consumption and government expenditure with **asymmetric propensities to import**

Model – only few main equations

Utility function

$$E_0 \sum_{t=0}^{\infty} \beta^t U(\hat{C}_t, N_t) = E_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{\hat{C}_t^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi}\right)$$

$$\hat{C}_t \equiv \begin{cases} \left[(1-\vartheta) C_t^{1-\nu} + \vartheta G_t^{1-\nu}\right]^{\frac{1}{1-\nu}}, & \text{for } \nu \neq 1, \\ C_t^{(1-\vartheta)} G_t^{\vartheta}, & \text{for } \nu = 1. \end{cases}$$

$$C_t = \left[(1-\alpha)^{\frac{1}{\eta}} (C_{H,t})^{\frac{\eta-1}{\eta}} + \alpha^{\frac{1}{\eta}} (C_{F,t})^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta-1}{\eta}}$$

$$G_t = \left[(1-\chi)^{\frac{1}{\eta}} (G_{H,t})^{\frac{\eta-1}{\eta}} + \chi^{\frac{1}{\eta}} (G_{F,t})^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta-1}{\eta}}$$

Government consumption shock

$$g_t = \rho_g g_{t-1} + \varepsilon_t^g$$

Output developments

$$Y_t(j) = (1-\vartheta)\left(\frac{P_{H,t}(j)}{P_{H,t}}\right)^{-\varepsilon}\left[(1-\alpha)\left(\frac{P_{H,t}}{P_t^C}\right)^{-\eta} C_t + \alpha \int_0^1 \left(\frac{P_{H,t}}{\varepsilon_{i,t} P_{F,t}^i}\right)^{-\gamma}\left(\frac{P_{F,t}^i}{P_t^{C,i}}\right)^{-\eta} C_t^i \, di\right]$$
$$+ \vartheta\left(\frac{P_{H,t}(j)}{P_{H,t}}\right)^{-\varepsilon}\left[(1-\chi)\left(\frac{P_{H,t}}{P_t^G}\right)^{-\eta} G_t + \chi \int_0^1 \left(\frac{P_{H,t}}{\varepsilon_{i,t} P_{F,t}^i}\right)^{-\gamma}\left(\frac{P_{F,t}^i}{P_t^{G,i}}\right)^{-\eta} G_t^i \, di\right]$$

Net exports

$$nx_t = \frac{NX_t}{Y} \approx \frac{1}{Y}\left[Y_t - \frac{P_{H,t}}{P_t^C} C_t - \frac{P_{H,t}}{P_t^G} G_t\right]$$

New-Keynesian Phillips curve

$$\pi_{H,t} = \beta E_t\{\pi_{H,t+1}\} + \kappa_\alpha \tilde{y}_t,$$

Calibration – deep parameters

Parameter	Description	Value	Source
α	share of private imports	0.21	authors calculations
χ	share of public imports	0.14	Mikulić (2018)
ϑ	share of government expenditures in effective consumption	0.25	authors calculations
φ^{-1}	elasticity of labour supply	0.33	Bokan et al. (2010)
υ^{-1}	intratemporal elasticity of sub. btw private and public consumption	0.33	Bouakez & Rebei (2007)
σ^{-1}	intertemporal elasticity of substitution of effective consumption	0.50	Havranek et al. (2013)
γ	substitutability between goods produced in different foreign countries	1.00	assumption
η	substitutability between domestic and foreign goods	1.00	assumption
ε	elasticity of substitution between varieties produced within countries	4.00	Bokan et al. (2010)
β	time discount factor	0.99	Bokan et al. (2010)
θ	share of firms unable to reset prices	0.72	Pufnik & Kunovac (2013)
ρ_g	autocorrelation of government expenditures	0.80	authors calculations
e	exchange rate regime	0	assumption

Source: author

Data

Data	Source
Macroeconomic data	
GDP (HR, SI, RS, old EU members)	Eurostat
Private consuption (HR, SI, RS)	Eurostat
Private investments (HR, SI, RS)	Eurostat
CPI (HR)	Eurostat
Share of imports in GDP (HR, RS, SI)	Eurostat
Trade balance (HR)	Eurostat
Employment (HR)	Eurostat
Fiscal data	
Final consumption expenditure of general government (HR, RS, SI)	Eurostat
Net indirect taxes (HR, RS, SI)	Eurostat
Share of public debt in GDP (HR, RS, SI)	Eurostat

Source: author

Contributions

Contributions to exisitng literature

- First **estimation** of fiscal multipliers in **Croatia** in a **small open economy analytical framework**
- First **comparison** of the size of fiscal multipliers in **Croatia** in a **closed economy** and **open economy** analytical frameworks
- First **comparison** of the size of fiscal multipliers in **Croatia** and **peer countries**, based on the **comparable methodology**
- First analysis of the effects of fiscal policy on **trade balance** in **Croatia**
- First **calibration** of a small open economy **New-Keynesian DSGE** model with fiscal shocks for **Croatia**

Thank you!

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