The Exchange Rate Floor as the Instrument of Monetary Policy:
The Ex-post Assessment of the Czech Experience

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Summary of the paper

- ▶ The goal is to ex-post assess the effect of the introduction of the exchange-rate floor on the Czech economy .

- ▶ Two approaches have been used:

    1. Simulations with structural models (g3 and Tonner et al., 2015)

    2. Empirical methods (SCM and GSCM).

- ▶ We have found positive effects on nominal and real variables

Simulations with structural models /1

To get the effect of the ER commitment, we compare two scenarios:

1. filtration under the ZLB and ER floor (actual outcome);
2. simulations under the ZLB (i.e., without the ER floor);

We estimate the effects as the difference between scenarios (Scenario 1 - Scenario 2).

- ▶ It is a lower bound of the estimates as it ignores non-linearities stemming from deflation spiral.

Simulations with structural models /2

We use two DSGE models:

1. g3 model;
2. g3 model with labour market block (Tonner et al., 2015)

Technically, the ZLB and ER floor are simulated using the 'shadow shock' approach:

▶ A combination of expected and unexpected shocks (MP and UIP shocks respectively);

▶ the shadow shocks can be jointly determined as a solution to a straightforward quadratic programming problem;

▶ we use exactly the same numerical approach that was used in the FP during the ER commitment.

Simulations with structural models: results

	g3	Tonner et al. (2015)
CPI inflation (2014)	1.2	1.3
CPI inflation (2015)	1.7	1.7
Core inflation (2014)	1.4	1.6
Core inflation (2015)	2.1	2.0
GDP growth (2014)	0.8	0.9
GDP growth (2015)	0.2	0.3
URX (2014)		-0.3
URX (2015)		-0.3

Synthetic Control Method /1

The contra-factual outcome is estimated as:

$$\text{effect}_t = Y_t^{CZ} - Y_t^{\textsf{syn}},$$

where $Y_t^{\textsf{syn}}$ is the linear combination of the observed outcomes of control countries:

$$Y_t^{\textsf{syn}} = \sum w_i Y_t^i + \mu. \tag{1}$$

The literature offers various ways of estimating the weights w_i:

- Original formulation by Abadie et al. (2010).
    - For the CZ case, used by Opatrny (2016) and Caselli (2017)

- Recent paper by Doudchenko and Imbens (2016) suggests to use elastic net regression on the pre-intervention outcomes.

Synthetic Control Method /2

We consider four control sets:

1. the union of the new accession countries and non euro EU countries plus Germany and Austria as main important partners (BG, EE, HU, LT, LV, PL, RO, SK, SI, DK, SW, UK, DE, AT).

2. all EU countries;

3. new accession countries;

4. non euro area EU countries.

Synthetic Control Method: Results

	Benchmark set		New Accession countries		Non euro EU countries		All EU countries	
	2014	2015	2014	2015	2014	2015	2014	2015
GDP growth	0.30^+	1.68^*	0.57	2.18	-0.05	1.00	0.40	1.79
URX	-0.23	-0.61	-0.17	-0.45	-0.45	-0.90	-0.36	-0.75
CPI inflation	0.10^+	0.58^+	0.10^+	0.68^+	0.48^+	0.36^+	0.10	0.61^+
Core inflation	2.18^+	2.16^{**}	1.15^*	0.78^{**}	0.58^*	0.43^+	0.86^+	0.89^+
Cons. growth	0.36	1.47	0.50	1.51	0.14	0.96	0.42	1.51
Export growth	2.89^+	1.70^+	4.64^+	4.04^+	3.49^+	1.00^+	3.70^+	2.79^+
RER	8.1^+	7.5^+	8.9^+	7.4^+	9.1^+	6.7^+	9.0^+	8.1^+

Note: $^+$ denotes the significance on 32 %, * denotes the significance on 10 %, and ** denotes the significance on 5 %.

Results:

▶ the results for the core inflation are significant and moreover it passes the placebo test;

▶ results for real variables are less significant;

▶ we can be confident that the floor introduction increased inflation and prevented it from falling to negative numbers.

Generalized Synthetic Control Method: Model

GSCM has been introduced by Xu (2015) and we extend it slightly to the following model:

$$Y_{it} = \delta_{it}D_{it} + x_{it}\beta + z_t\gamma_i + \lambda_i f_t + \varepsilon_{it}. \tag{2}$$

The object of interest is δ_{it} and parameters Equation (2) can be estimated by a straightforward adaptation of Bai (2013) factor augmented panel data model.

- ▶ Among controls, we include commodity prices (z_t) and Gov/GDP ratio (x_{it}).
- ▶ The same set of control countries as for SCM.
- ▶ Confidence intervals set using bootstrap (see Xu, 2015, for details).

Generalized Synthetic Control Method: Results

	Benchmark set		New accession countries		Non euro EU countries		All EU countries	
	2014	2015	2014	2015	2014	2015	2014	2015
GDP growth	0.43	1.81*	0.37+	1.88*	0.25*	1.51*	0.28*	1.27*
URX	-0.12	-0.46+	-0.31+	-0.87*	-0.25*	-0.86**	-0.61+	-1.02*
CPI inflation	0.22	0.77+	1.90*	2.50+	0.97+	0.35	0.52+	0.79*
Core inflation	1.36+	1.11*	1.86*	1.04*	2.09+	1.66*	2.53*	1.74**
Cons. growth	0.40*	1.66*	0.76*	2.04*	-0.17	0.78*	0.14	1.17*
Export growth	5.32*	3.20*	5.56*	3.20*	1.76	2.71*	6.09	-0.31
RER	9.73+	8.81**	7.17+	5.4*	10.7+	9.5*	8.14+	8.45*

Note: + denotes the significance on 32 %, * denotes the significance on 10 %, and ** denotes the significance on 5 %.

Results:

- the GSCM, which controls for confounders such as fiscal expansion and commodity prices, does not overturn the results of the SCM: the point estimates of the two empirical methods are similar.

Comparison of results

| | g3 | Our approaches | | | Independent approaches | Caselli (2017) | |
		Tonner et al. (2015)	SCM	GSCM	Other studies	(SCM)	(DiD)
CPI inflation (2014)	1.2	1.3	0.1	0.2	0 − 0.5	0	0.5 − 1.0
CPI inflation (2015)	1.7	1.7	0.6	0.8	0 − 1.5	0.5	
GDP growth (2014)	0.8	0.9	0.3	0.4	0 − 0.8		
GDP growth (2015)	0.2	0.3	1.7	1.8	0 − 0.5		
Cons. growth (2014)	0.3	0.2	0.4	0.4			
Cons. growth (2015)	0.2	0.1	1.5	1.7			
URX (2014)		-0.3	-0.4	-0.1	-1.0		
URX (2015)		-0.3	-0.8	-0.5	-1.8		

Conclusion /1

- ▶ Both the model based simulations and the two empirical methods show that the floor introduction prevented the inflation to enter the negative zone.
  - ▶ The ER floor affected inflation in an intended way

- ▶ All methods indicate positive effects on the macro variables, but the statistical significance is weaker.
  - ▶ On the save side, it can be said that there is no evidence that the exchange rate floor introduction would have hurt the real economy.

- ▶ The introduction of the ER floor was a correct policy action that has been retrospectively successful.

Conclusion /2

- ► Our results are in line with other studies

- ► All methods are linear: the benefits of preventing the economy from falling to the vicious deflationary spiral cannot be assessed.
  - ► The magnitude of the risk and costs of the deflationary spirals are currently discussed by academia and by policy makers.
  - ► If one believes that the risk is substantial, then the benefits of ER floor are much higher than indicated by our analysis.