Do macroprudential policies play any role in mitigating boom-bust cycles in capital flows in CESEE?

Markus Eller
Principal Economist
Oesterreichische Nationalbank (OeNB)

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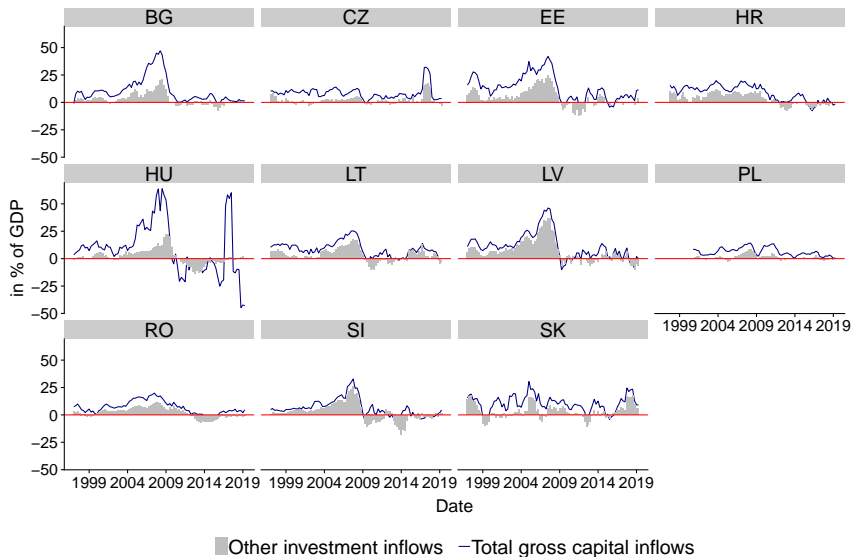# Severe boom-bust cycle in capital flows in CESEE

Chart: Gross capital inflows (incurrence less repayment of direct, portfolio, other investment and financial derivatives liabilities, % of GDP, cumulative four-quarter moving sums, 1997–2019:H1). Source: IMF FSI, authors' calculations.

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A major share of capital flow volatility in CESEE can be explained by global factors, particularly by global financial factors
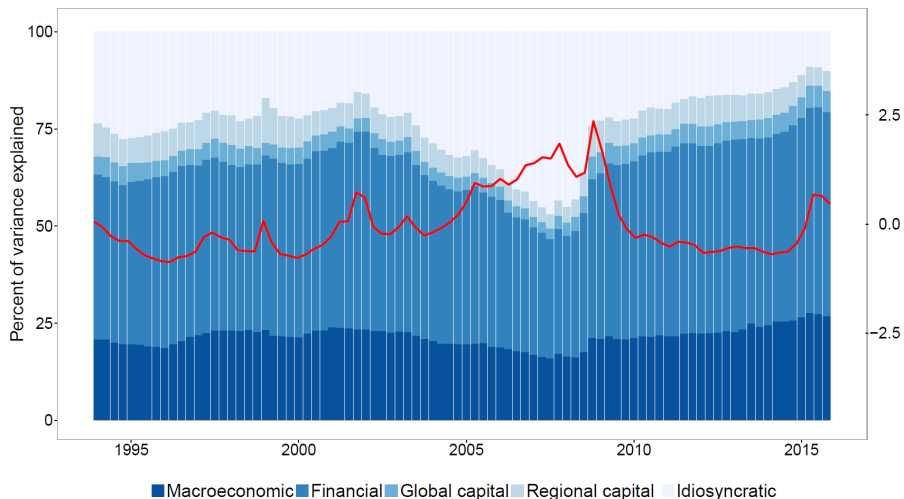
Chart: Variance shares of gross capital inflows explained by global macro factors, global financial factors, the global capital factor, the regional capital factor and idiosyncratic factors. Time-varying standardized volatility of gross capital inflows in red. Unweighted averages across 12 CESEE countries. Source: Eller et al. (2018).

Potential impact of macroprudential policies on capital flows

MPPs (examples)	Impact on the domestic economy	Potential impact on capital flows
• Broad-based prudential tools, including MPPs to limit systemic risk	• Enhance **resilience of the financial system** to cope with shocks, to vulnerabilities created at the global level	• Countries should be less prone to the global financial cycle • **Capital flow volatility** should **decline**
Several specific MPPs impacting bank lending: • *Borrower-based tools* (e.g. LTV, DSTI) • *Lender-based tools* (e.g. CCyB, sectoral capital requirements, liquidity tools) • *Direct restriction of bank lending* (e.g. tighter liquidity requirements)	• Contain and mitigate the **procyclical interplay** between asset prices, private credit and non-core bank funding (predominantly in foreign currency)	• Boom phase: **decline in gross capital inflows** (if no leakage via direct cross-border borrowing) • **Reduction in non-core funding of banks** (if reliance on volatile funding sources is weakened and credit no longer outpaces deposit growth)

Macroprudential policy is complex, has numerous instruments at its ⊖NB disposal and is subject to numerous policy interactions . . .

So how does it feel to make macroprudential policy decisions?

⟶ Composite indicators can simplify life for decision-makers – but awareness of limitations is important!

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A novel index for measuring the intensity of macroprudential policies in CESEE

- ▶ **Most of the literature** that tries to quantify MPPs **uses very simple indices**
  - ▶ Binary indicators – measure in place or not?
  - ▶ Tightening / loosening / ambiguous measures given $+/- 1$ or 0
  - ▶ Some studies cumulatively sum up tightening / loosening measures over time
    (Shim et al., 2013; Ahnert et al., 2018; Alam et al., 2019)
- ▶ **We constructed an intensity-adjusted macroprudential policy index**, accounting not only for the occurrence but also for the strength of implemented measures (Eller et al., 2019)
- ▶ For 11 CESEE EU Member States, **we integrate** the information provided over the period 1997–2018 in **four different databases**:
  - ▶ Vandenbussche et al. (2015) – IMF/CESEE
  - ▶ Alam et al. (2019) – IMF/global
  - ▶ Kochanska (2017) – ESRB
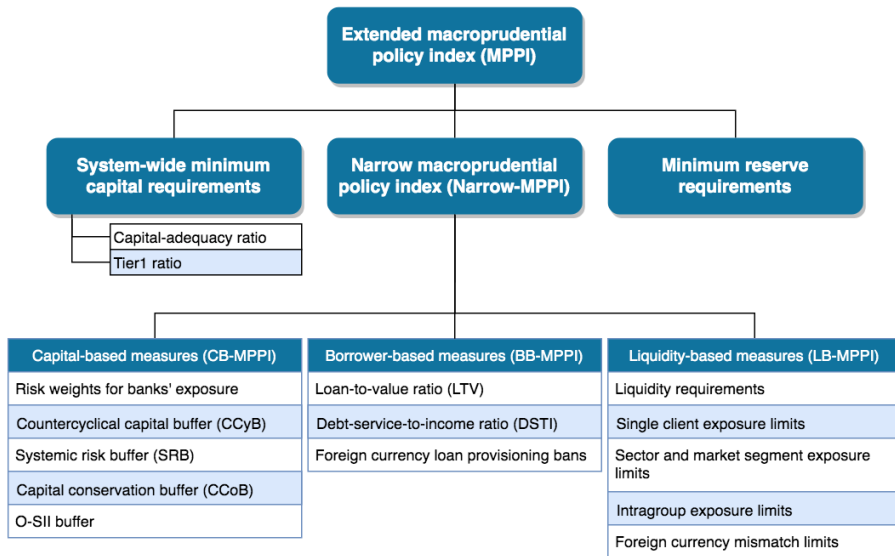 - ▶ Budnik and Kleibl (2018) – ECB

Overview of included MPP measures

Chart: Schematic overview of macroprudential policy index (MPPI) and its subindices.

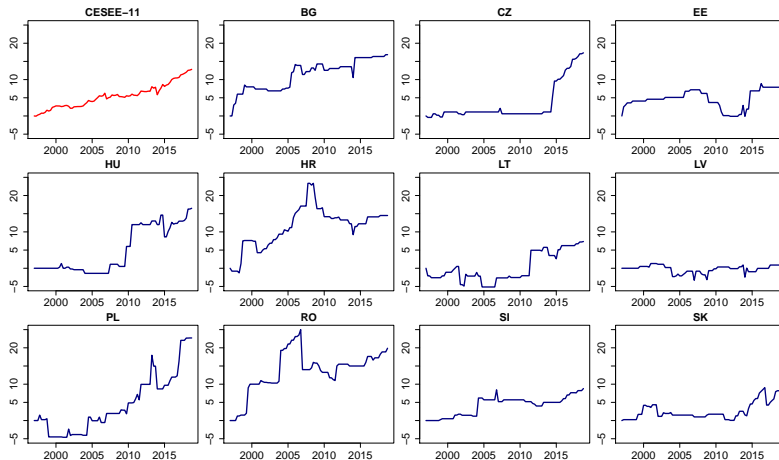# Gradual increase in the intensity of macroprudential policy use

Chart: **Intensity-adjusted macroprudential policy index** (MPPI).

▶ BG, HR and RO and to some extent PL and SI appear as regional "frontrunners"
▶ In recent years, CZ, HU, PL and also LT and SK have considerably intensified their use of MPP instruments

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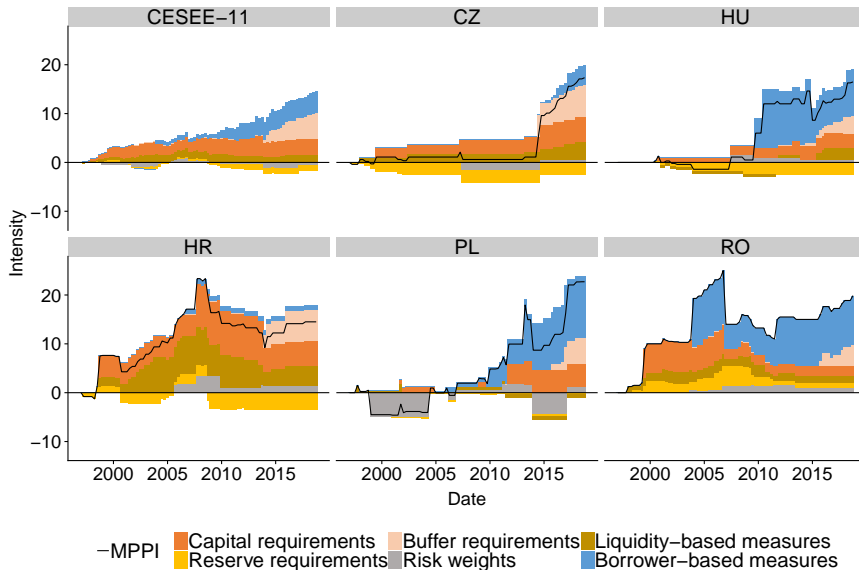# The composition of MPP measures has changed significantly

Chart: Subindices of the intensity-adjusted MPPI and their respective contribution to the overall index.

Recent MPP tightening alongside cautious credit growth but widespread house price increases
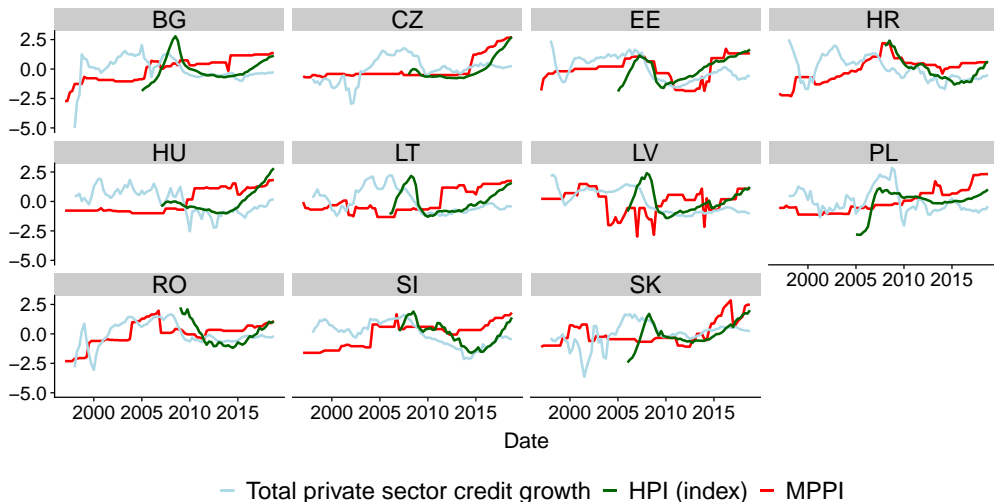
Chart: Annual real private sector credit growth (light blue), house price index (HPI, 2015=100, green) and the **macroprudential policies index** (MPPI, red). All variables standardized. Source: IMF FSI, Eurostat, authors' calculations.

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A novel framework for studying the responses of capital flows to macroprudential policies

Modeling framework – a **nonlinear factor-augmented VAR** model:

▶ We establish in a VAR model a relationship among observed domestic macroeconomic and financial quantities, while **capturing international co-movements in financial quantities**

▶ We extract **responses of capital inflows** (levels and volatilities) to a macroprudential policy shock

▶ **Regime-switching** feature: we study whether responses differ over time, distinguishing between high-interest and low-interest rate episodes

▶ **Shock identification**: we assume that macroprudential policy responds in the period of the shock only to (exogenous) global financial cycle movements, but not to other (faster) variables in the system (lead times of macroprudential measures due to legislation process)

For each CESEE country the variable set contains 12 indicators:

▶ One **global factor**, controlling for a global financial cycle
- extracted from financial variables (equity price growth, private sector credit growth and private sector deposit growth) across 45 countries worldwide

▶ **Domestic variables**
- intensity-adjusted MPPI
- slow macroeconomic variables
  * real GDP growth, consumer price inflation and private sector credit growth
- short-term interest rate
- fast macrofinancial variables
  * equity price growth and exchange rate volatility
- gross capital inflows *and* outflows
  * volumes *and* volatilities

Identified peak responses to an MPP tightening shock: linear model, <u>entire period</u>

(a) Private sector credit growth (b) Gross total capital inflows (level) (c) Gross other investment inflows (level)
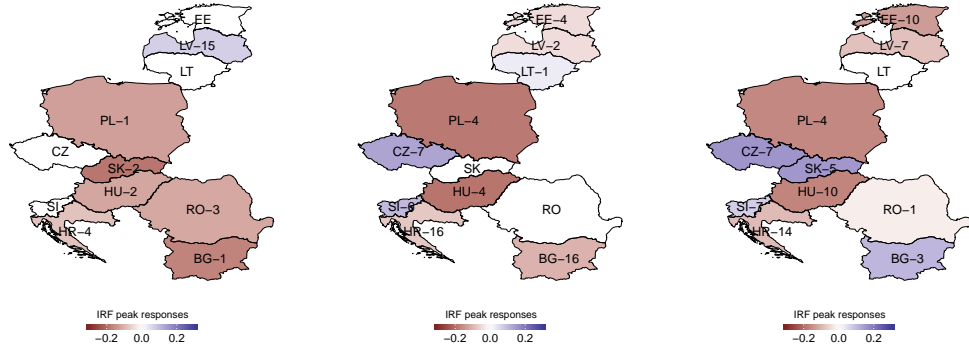

Chart: Peak responses to a 1 SD tightening shock in the MPPI, based on linear FAVAR estimates, **entire period** (2000–2018). Red/blue/white shaded countries denote negative/positive/insignificant responses. Numbers indicate the quarter after the shock when the responses reach their peak. Significance inference based on 68% credible interval.

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Summary of impact analysis

As a result of a MPP tightening shock:

- ▶ **Credit growth** responds **negatively** in a majority of countries
- ▶ **Negative responses dominate** also in the case of **capital flow levels**
- ▶ The responses of **capital flow volatilities** display a more **mixed pattern**:
  - Positive volatility responses often dominate in the case of total capital inflows, . . .
  - . . . while positive and negative volatility responses are rather equally pronounced in the case of OI inflows
- ▶ The underlying impulse-response functions reveal that MPPs have **mostly a short-run impact** on the mentioned variables
- ▶ A few countries deviate from these general patterns ⟶ **cross-country heterogeneity** remains to be investigated (e.g. role of different MPP composition, domestic financial cycles, exchange rate regimes, . . .)

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General conclusions

⊖NB

1. **CESEE countries**: substantial boom-bust cycle in capital flows, already considerable MPP activity before the crisis, role of global financial cycle

2. Our novel index for measuring the strength of MPPs reveals a **gradual increase in the intensity of macroprudential policy use**
   - Use of *borrower-based MPPs* gained prominence after crisis but has stagnated more recently
   - *Buffer requirements* have increased significantly in importance since 2013

3. Our impact analysis shows that **tighter MPPs** do *not* seem to generally shield CESEE countries from capital flow volatility, but **could apparently be effective in containing credit growth and the volumes of gross capital inflows** in a number of CESEE countries

4. The **recent MPP tightening**, mostly related to capital-based measures, **coincides with a widespread increase in house prices**
   - **Other factors offsetting** the impact of MPPs? Lag effects?
   - Is there **room to optimize instrument selection?** E.g. borrower-based MPPs are often considered to be more effective in dampening asset price growth

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Appendix slides

Existing MPP databases used for construction

Database	Pros	Cons
Vandenbussche et al. (2015)	▶ Clear focus on CESEE countries ▶ Detailed information from primary sources ▶ Instruments also intensity-adjusted	▶ Rather short time period; ends with Q4 2010 ▶ No information about timing ▶ Does not cover newer instruments (e.g. CCyB, CCoB)
Kochanska (2017)	▶ Detailed description of MPP measures ▶ Provides information about timing ▶ Continually updated	▶ Focus on more recent past; not much information for historical events ▶ No explicit distinction between tightening/loosening measures ▶ No intensity adjustment
Budnik and Kleibl (2018)	▶ Extensive coverage ▶ Provides information about timing ▶ Covers all countries and whole time period	▶ RRs coverage not that extensive ▶ Updated, however measures of most recent past partly missing ▶ No intensity adjustment
Alam et al. (2019)	▶ Global coverage of MPPs ▶ Incorporates 6 former databases	▶ Ends with Q4 2016 ▶ CESEE not in focus ▶ No intensity adjustment

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Different approaches for **weighting rules** depending on complexity of instrument:

- ▶ **Face value aggregation**: Most simple form of aggregation, used mainly for capital-based measures (buffers).
  - ▶ Example: An increase in the CCyB by 1% increases the index by 1
- ▶ **Formula-based aggregation**: More complicated, requiring a considerable degree of judgement. Used for example for borrower-based measures or large exposure limits
  - ▶ Example: decrease of the maximum LTV ratio by 5 pp's increases the index by 1
- ▶ **Tightening / loosening** (T/L) **aggregation**: Used for particularly complex and / or hard to aggregate measures. Considerable judgement applied.
  - ▶ Example: Liquidity ratios often target different capital bases → tightening measure increases the index by 0.5

Considerable use of expert judgment is unavoidable. Impact assessments of specific measures, country-specific bank balance-sheet analysis etc. help, however, to objectify the aggregation.
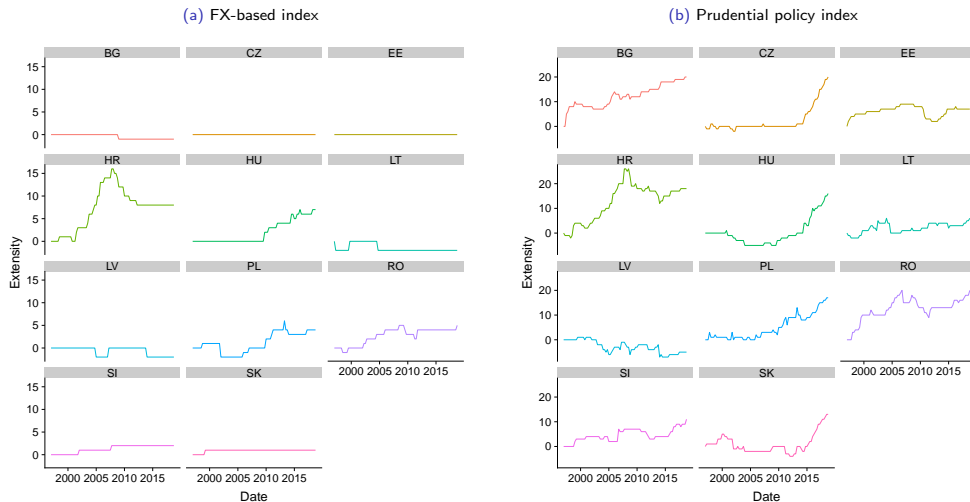
Foreign currency-based measures in comparison

Chart: (a) Foreign currency-based subindex of T/L index (no intensity adjustment) together with (b) overall macroprudential T/L index using implementation (announcement) date for tightening (loosening) measures.

▶ Some evidence that MPP tightening **reduces the vulnerability to global financial shocks** (Cesa-Bianchi et al., 2018)

▶ Already a large literature on the efficacy of MPP measures to **tame credit cycles** and several of them build already a link to capital flow dynamics (Aizenman et al., 2017; Bambulović and Valdec, 2019; Beirne and Friedrich, 2017; Fendoğlu, 2017; Forbes et al., 2015; Igan and Tan, 2017)

▶ A small, but growing, strand of the literature addresses the efficacy of MPPs to **stabilize domestic real economy quantities** (Kim and Mehrotra, 2018; Richter et al., 2018)

▶ Only a few papers have already studied the **direct response of capital flows** to MPP measures (Ahnert et al., 2018; Aysan et al., 2015; Cerutti and Zhou, 2018)

Identified peak responses to an MPP tightening shock: non-linear model, high interest rate regime
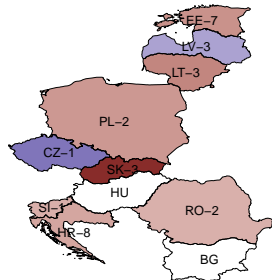
(a) Private sector credit growth   (b) Total gross capital inflows (level)   (c) Gross other investment inflows (level)
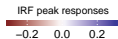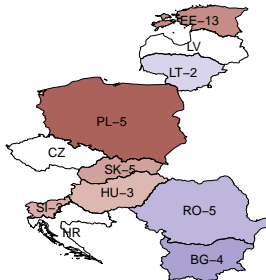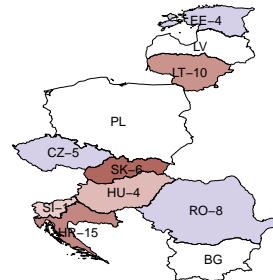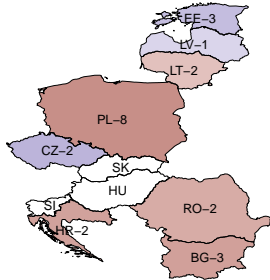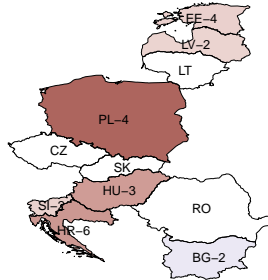
Chart: Peak responses to a 1 SD tightening shock in the MPPI, based on non-linear FAVAR estimates, **high interest rate regime**. Red/blue/white shaded countries denote negative/positive/insignificant responses. Numbers indicate the quarter after the shock when the responses reach their peak. Significance inference based on 68% credible interval.

Identified peak responses to an MPP tightening shock: non-linear model, low interest rate regime

(a) Private sector credit growth   (b) Total gross capital inflows (level)   (c) Gross other investment inflows (level)
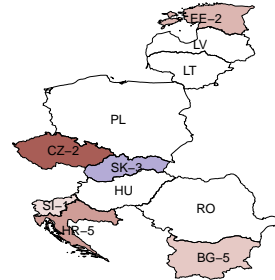
Chart: Peak responses to a 1 SD tightening shock in the MPPI, based on non-linear FAVAR estimates, **low interest rate regime**. Red/blue/white shaded countries denote negative/positive/insignificant responses. Numbers indicate the quarter after the shock when the responses reach their peak. Significance inference based on 68% credible interval.

Ahnert, T., Forbes, K., Friedrich, C. and Reinhardt, D. (2018), Macroprudential FX regulations: shifting the snowbanks of FX vulnerability?, Working Paper 25083, National Bureau of Economic Research.

Aizenman, J., Chinn, M. D. and Ito, H. (2017), Financial spillovers and macroprudential policies, Working Paper 24105, National Bureau of Economic Research.

Alam, Z., Alter, A., Eiseman, J., Gelos, R. G., Kang, H., Narita, M., Nier, E. and Wang, N. (2019), Digging deeper – evidence on the effects of macroprudential policies from a new database, Technical report, International Monetary Fund.

Aysan, A. F., Fendoğlu, S. and Kilinc, M. (2015), 'Macroprudential policies as buffer against volatile cross-border capital flows', *The Singapore Economic Review* **60**(01), 1550001.

Bambulović, M. and Valdec, M. (2019), The impact of macroprudential policies on foreign and domestic bank lending in Croatia. Mimeo.

Beirne, J. and Friedrich, C. (2017), 'Macroprudential policies, capital flows, and the structure of the banking sector', *Journal of International Money and Finance* **75**, 47–68.

Budnik, K. B. and Kleibl, J. (2018), Macroprudential regulation in the European Union in 1995–2014: introducing a new data set on policy actions of a macroprudential nature, ECB Working Paper 2123, European Central Bank. Updated dataset as of February 22, 2018.

Cerutti, E. and Zhou, H. (2018), Cross-border banking and the circumvention of macroprudential and capital control measures, IMF Working Paper 18/217, International Monetary Fund.

Cesa-Bianchi, A., Ferrero, A. and Rebucci, A. (2018), 'International credit supply shocks', *Journal of International Economics* **112**, 219–237.

Eller, M., Huber, F. and Schuberth, H. (2018), How important are global factors for understanding the dynamics of international capital flows?, Working Papers in Economics 2018-2, University of Salzburg.

Eller, M., Martin, R., Schuberth, H. and Vashold, L. (2019), Taxonomy of macroprudential policy measures and banking sector characteristics in CESEE. Mimeo.

Fendoğlu, S. (2017), 'Credit cycles and capital flows: effectiveness of the macroprudential policy framework in emerging market economies', *Journal of Banking & Finance* **79**, 110–128.

Forbes, K., Fratzscher, M. and Straub, R. (2015), 'Capital-flow management measures: what are they good for?', *Journal of International Economics* **96**, S76–S97.

Igan, D. and Tan, Z. (2017), 'Capital inflows, credit growth, and financial systems', *Emerging Markets Finance and Trade* **53**(12), 2649–2671.

Kim, S. and Mehrotra, A. (2018), 'Effects of monetary and macroprudential policies – evidence from four inflation targeting economies', *Journal of Money, Credit and Banking* **50**(5), 967–992.

Kochanska, U. (2017), 'The ESRB macroprudential measures database', *IFC Bulletins chapters* **46**.

Richter, B., Schularick, M. and Shim, I. (2018), The macroeconomic effects of macroprudential policy, BIS Working Papers 740, Bank for International Settlements.

Shim, I., Bogdanova, B., Shek, J. and Subelyte, A. (2013), 'Database for policy actions on housing markets', *BIS Quarterly Review* **September**, 83–95.

Vandenbussche, J., Vogel, U. and Detragiache, E. (2015), 'Macroprudential policies and housing prices: a new database and empirical evidence for Central, Eastern, and Southeastern Europe', *Journal of Money, Credit and Banking* **47**(S1), 343–377.