

Macroprudential Policy and the Research-Paved Way to Financial Stability

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Disclaimer: The views expressed are those of the author.

The role of macroprudential policy in the economy

- Macroprudential policy (MaPP) has become a third economic policy

$$\min(L) = \frac{1}{2}(\pi)^2 + \frac{a}{2}(y - y^*)^2 + \frac{b}{2}(\theta - \theta^*)^2 \quad (1)$$

where $(\theta - \theta^*)$ marks the "financial stability" objective

- How to achieve financial stability? MaPP has lots of tools at its disposal
- MaPP effects are not contained in the financial sector

$$y = \hat{y} + \alpha(\pi - \pi^e) + \beta\delta \quad (2)$$

$$\theta = \hat{\theta} - (\pi - \pi^e) + \delta \quad (3)$$

- MaPP easing (δ) increases credit growth (leverage) and lowers the cost of finance
- 10+ years in practice, what have we learned? This presentation is centered around the following topics:

- 1 Financial cycle and setting of MaPP
- 2 What is the transmission of MaPP tools into the financial sector
- 3 Any costs of MaPP along the way?
- 4 Monetary and macroprudential policy interactions

The use of macroprudential policy worldwide

	BBM		CLBM	
	No. of events	No. of countries	No. of events	No. of countries
All countries	285	61	1,296	105
Advanced economies	151	29	539	35
Emerging markets and developing economies	134	32	757	70
Africa	2	1	62	12
Asia and Pacific	103	14	267	21
Europe	136	31	664	41
Middle and South America	9	5	152	15
Middle East and Central Asia	20	8	120	14
North America	15	2	31	2
1990–1999	7	6	67	39
2000–2009	87	30	233	72
2010–2019	191	49	996	96

Note: The table shows the total number of macroprudential policy actions in 105 countries. We differentiate between borrower-based measures (BBM) and capital- and liquidity-based measures (CLBM).

Source: Malovaná *et al.* (2023)

Financial Cycle and Setting of MaPP

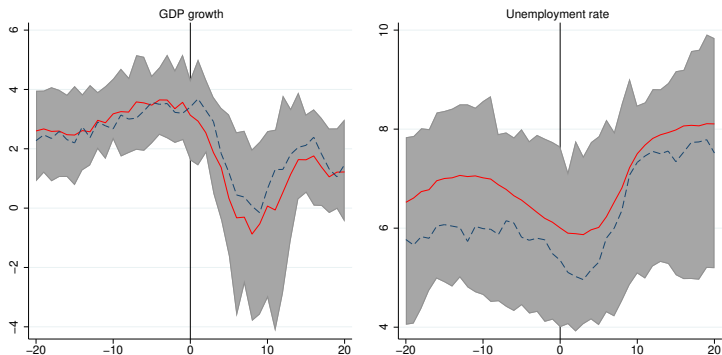
Credit and house price growth peak well before crises



Note: 0 = crises start date; sample: 30 (mostly OECD) countries over the period 2006Q1–2019Q4
Source: Hodula *et al.* (2022)

- Rate of credit and house price growth are sometimes considered to be the **intermediate target of macroprudential policy**
- Main input variables for most existing financial cycle indexes

Crises are costly

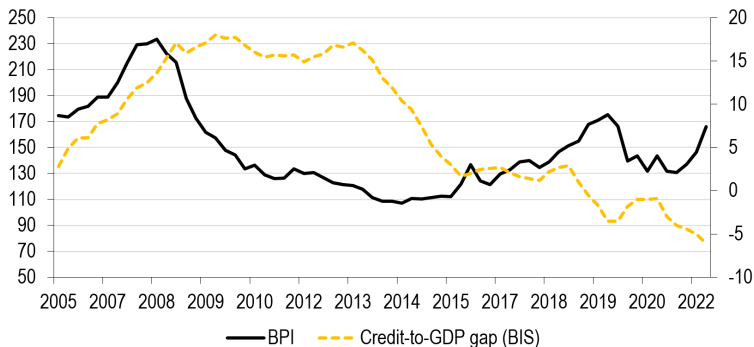


Note: 0 = crises start date; sample: 30 (mostly OECD) countries over the period 2006Q1–2019Q4

Source: Hodula *et al.* (2022)

- Following a crisis, GDP contracts sharply followed by an upswing in the unemployment rate

Financial cycle - tricky to measure, crucial to know

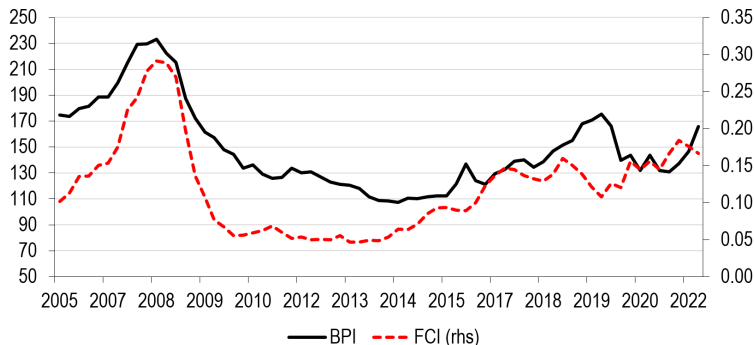


Note: BPI = Banking prudence indicator; data for Czech Republic

Source: Pfeifer & Hodula (2021)

- CCyB is the main macroprudential instrument aimed at addressing cyclical risks
- **Setting of the CCyB** is based mainly on the financial cycle
 - ▶ Using credit-to-GDP gap turned out problematic (Geršl & Seidler, 2015)
- We proposed a **profit-to-provisioning approach** that can be used to set the CCyB

Measuring financial cycle in the Czech Republic



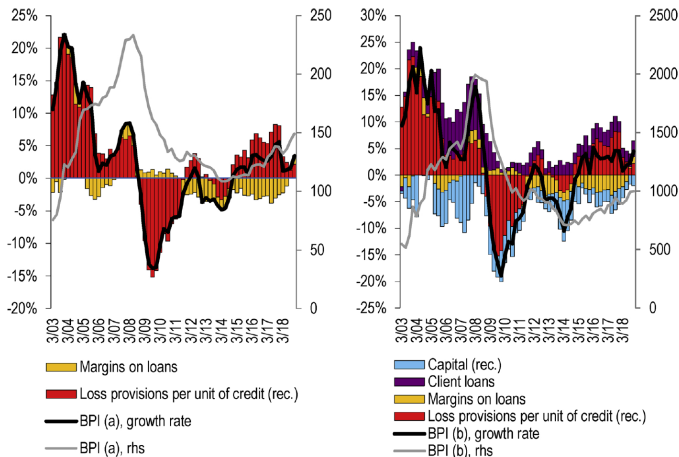
Note: The BPI expresses the ratio of the margin on the stock of loans (difference between the client lending rate and the client deposit rate) to provisions per unit of credit. FCI is the Financial cycle index.

- BPI takes into consideration banks' prudential behavior over the cycle

$$BPI = \frac{\text{interest margin}}{\left(\frac{\text{loss provisions}}{\text{private loans}} \right)}$$

- ▶ After the GFC, the risks expressed by the BPI do not fall to the pre-crisis level

Banking prudence indicator (Czech Republic)

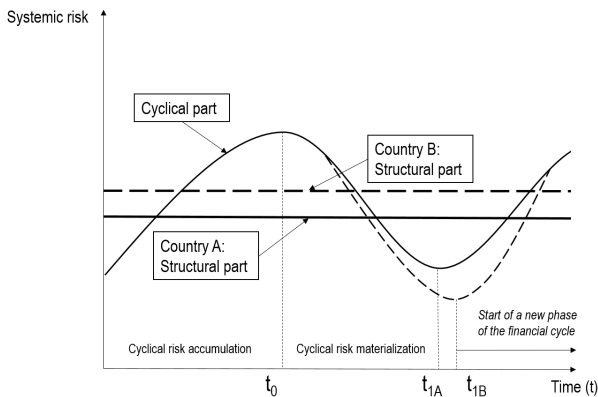


Source: Pfeifer & Hodula (2021)

- A simple ratio, allowing for decomposition of the individual factors
 - ▶ Highlights the risks of underestimating expected losses (and overestimating profit) in the banking sector

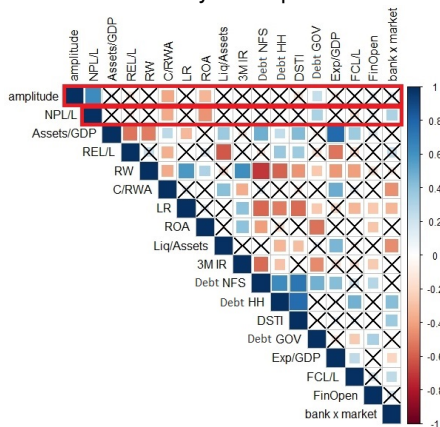
One (systemic) risk to bound them all

- Systemic risk is the risk of disruptions in the provision of financial services
- It has two components:
 - 1 A cyclical component – related to the dynamic evolution of the financial cycle
 - 2 A structural component – related to the distribution of risks in the financial sector

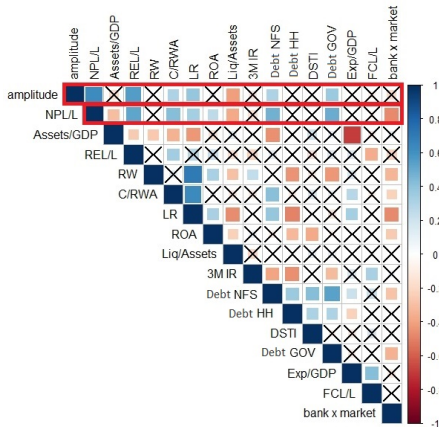


Cyclical risk and structural risks are correlated

(A) What structural risks correlate with financial cycle amplitude?



(B) What happens to structural risks after crises?



Source: Hodula *et al.* (2022), based on a sample of 30 (mostly OECD) countries over the period 2006Q1–2019Q4

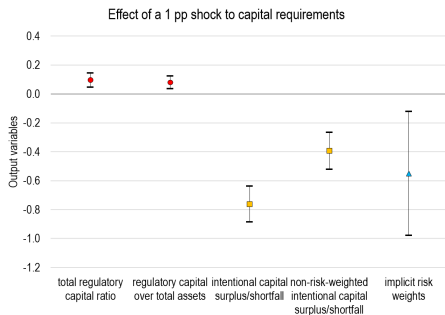
- Private and public indebtedness, banking sector resilience and concentration of real estate exposures contributed to cyclical risk materialization over 2006–2019

MaPP Transmission in the Financial Sector

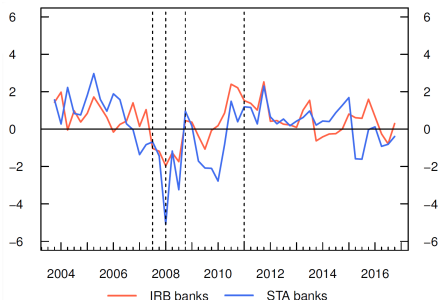
Capital-based measures (CCyB, CCoB, SRB, etc.)
Borrower-based measures (LTV, DTI, DSTI)

How do banks cope with increased capital requirements?

(A) Banks reduce capital surplus



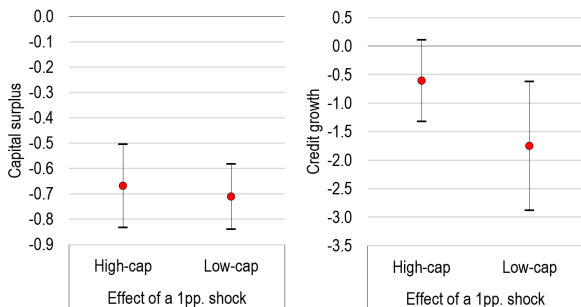
(B) Speed of adjustment



Source: Malovaná (2017), 14 banks in the Czech Republic over 2002 Q4 – 2016 Q4

- Banks shrink their capital surplus in response to higher capital requirements
 - ▶ Substantial portion of this adjustment seems to be delivered through changes in risk weights

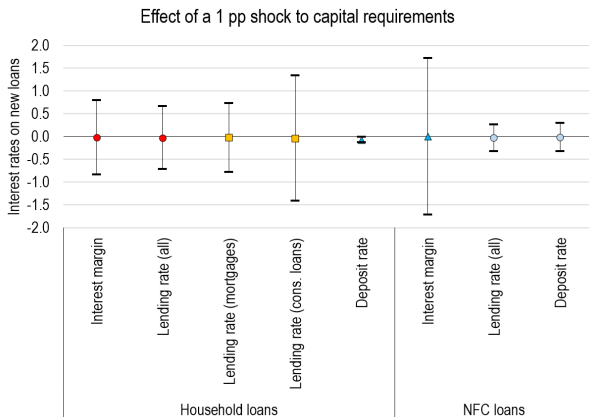
Higher capital requirements lead to credit compression



Source: Malovaná & Ehrenbergerová (2022), 14 banks in the Czech Republic over 2013 Q1 – 2017 Q4

- The effect of higher capital req. on annual credit growth is estimated to be between 1.2 and 1.8 pp
- The impact on bank credit growth differs for banks with relatively high and relatively low capital surplus

...but they do not impact bank loan pricing

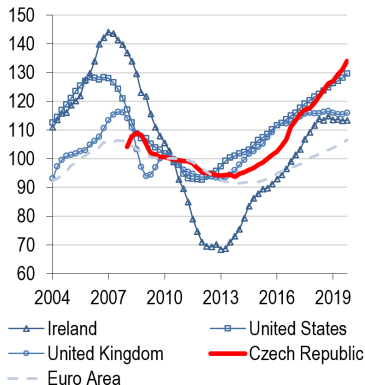


Source: Ehrenbergerová *et al.* (2022), 14 banks in the Czech Republic over 2004 Q1 – 2019 Q2

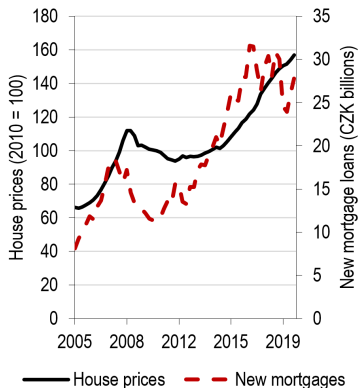
- Impact on bank interest margins and loan rates lies in a narrow range around zero irrespective of loan category
- Estimates hold even for less-capitalised banks and small banks

The Property Cycle and House Prices

(A) House Prices: International Comparison



(B) The Property Cycle in the Czech Republic



- Soft landing after the GFC, no major increases in non-performing mortgage loans or funding dry-ups
- This allowed mortgage lending to grow and property prices to bounce back soon after the GFC and to grow rapidly between 2015 and 2017

The Czech Residential Mortgage Market and Regulatory Measures During 2015–2018

Announced	Effective (A)	Hard caps (B)	Soft limits
16 June 2015	16 June 2015	LTV 100%	10% (LTV 90–100%)
14 June 2016	1 October 2016	LTV 95%	10% (LTV 85–95%)
14 June 2016	1 April 2017	LTV 90%	15% (LTV 80–90%)
12 June 2018	1 October 2018	LTV 90% DTI 9; DSTI 45%	15% (LTV 80–90%) 5% (debt limits)
1 April 2020	1 April 2020	LTV 90% DTI and DSTI abolished	5% (<i>LTV</i> > 90%)

- We analyzed the regulatory tightening (red) and easing (green)
- Interesting policy setup to evaluate – value-based and income-based limits.

Effects of BBMs tightening on loan size and collateral

	LTV	LTV-DTI-DSTI
A) Size of mortgage loan		
Average Treatment Effect (ATE)	-18,973 (-33,104; -4,841)	-342,290 (-378,988; -305,593)
Heterogeneous Treatment Effect (HTE)	7,278 (-17,162; 31,718)	364,051 (295,636; 432,466)
No. of observations	65,123	44,825
B) Value of pledged property		
Average Treatment Effect (ATE)	223,331 (127,309; 319,353)	43,024 (-881; 86,930)
Heterogeneous Treatment Effect (HTE)	214,721 (63,781; 365,660)	161,291 (33,541; 289,041)
No. of observations	65,123	44,825

Source: Hodula *et al.* (2023), loan-level analysis of Czech mortgage market (2016–2019)

- Compare mortgages granted pre- and post-regulation
- After LTV limit, average loan size dropped by approximately 1.2%, while collateral value increased by 8.5%.
- After the DTI/DSTI limits, average loan size dropped by more than 20%.
 - ▶ Income-based limits may have provided for "belt-and-braces" incentives that left little room for arbitrage by both borrowers and banks.

Effects of BBMs 2020 easing

(This slide contains preliminary results which are subject to change, do not cite)

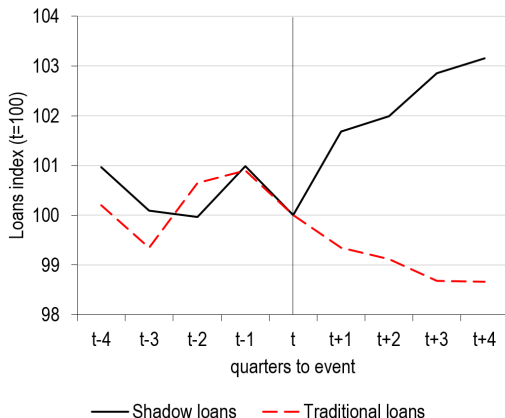
	LTV	DTI Constrained	DSTI	All Unconstrained
Mortgage size	162436*** (7532)	349244*** (28890)	252947*** (20927)	35053*** (4981)
Collateral value	-237524*** (16701)	218365** (81896)	141604** (53312)	-10781 (23285)
Property price	40585** (18600)	611980*** (68980)	200215*** (46463)	28208 (22992)
Downpayment	-186975*** (13259)	153457*** (43406)	-92796** (33131)	-9256 (19052)
Borrower's debt total	111922*** (11406)	458841*** (32705)	184665*** (19892)	-9694 (7757)
Borrower's debt (other)	32295*** (3548)	72492*** (9768)	101367*** (6328)	898 (1882)
First mortgage	0.028*** (0.005)	-0.229*** (0.011)	-0.107*** (0.009)	0.001 (0.003)
No. of co-applicants	-0.048*** (0.005)	-0.099*** (0.013)	-0.056*** (0.010)	0.007* (0.004)
Mortgage rate	0.054*** (0.003)	-0.019** (0.009)	0.038*** (0.006)	0.007*** (0.002)
N	80,967	67,049	69,586	108,501
Treated	17,704	3,786	6,323	45,238
Control	63,263	63,263	63,263	63,263

Note: Matching performed using borrower, loan, and spatial characteristics and regulatory distance.

- Compare constrained mortgages (would exceed tighter limits) with all mortgages granted before easing
- LTV constrained opted for higher mortgage and lower collateral (liquidity preference)
- DTI(DSTI) constrained went for more expensive houses, mostly second+ time borrowers (classic accelerator)
- More indebted borrowers entered the market
- Lower incentives to invite co-applicants

Costs of MaPP

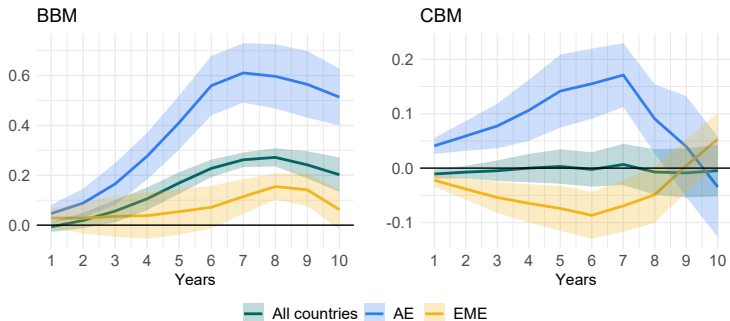
Possible leakages/costs associated with MaPP tools



Source: Hodula *et al.* (2021), 23 EU countries over 1999 Q1 – 2019 Q4

- Following a macroprudential policy tightening, shadow bank lending increases
 - ▶ The effect applies especially to low-capitalized banking sectors, credit migration?

Responses of Gini Index to MaPP



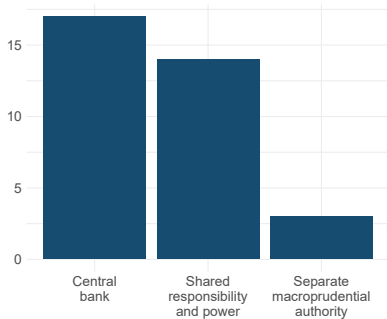
Source: Malovaná *et al.* (2023), 105 countries over 1990 – 2019

- Macroprudential policy actions have a significant effect on income inequality
- The direction and magnitude of the effect depend on the type of macroprudential policy used and the region
- Two channels identified:
 - ▶ Prevention and mitigation: inequality decreases if MaPP used before crises
 - ▶ Redistribution: inequality rises due to MaPP negative effect on credit and house price growth

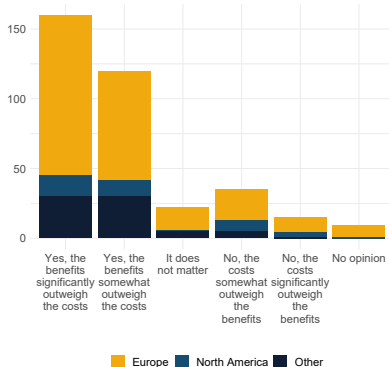
Monetary – Macroprudential Policy Interactions

Is there an optimal institutional setup to MaPP?

(A) Who is responsible for macroprudential policy?



(B) Should the central bank conduct both policies?

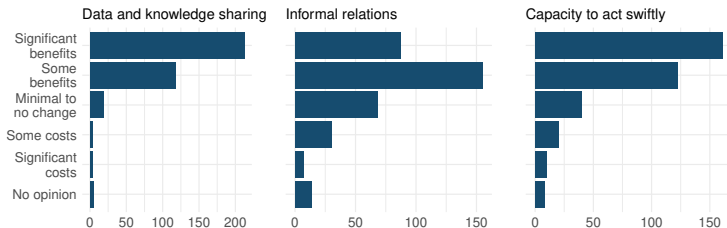


Source: Malovaná *et al.* (2023)

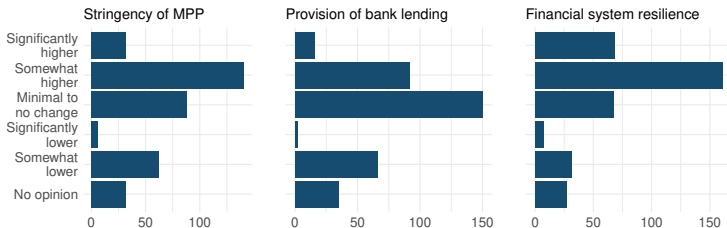
- Insights from our [macroprudential and monetary policy survey](#)
- Substantial support for the integration setup (all under one roof)
 - ▶ Large degree of interdependence of the policies, potential information gains from keeping them “under one roof”, greater capability to resolve strategic conflicts

Thoughts on the integration setup

(A) What are the benefits of the integration setup?



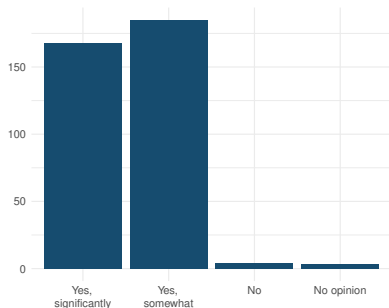
(B) What will change after adoption of the integration setup?



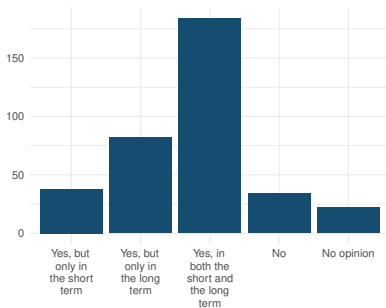
Source: Malovaná *et al.* (2023), CNB WP No. 3/2023

Monetary and macroprudential policy interactions

(A) Do MaPP and MP measures influence each other?



(B) Does LIRE contribute to a build-up of financial imbalances?



Source: Malovaná *et al.* (2023)

● Why do the policies clash sometimes?

- ▶ Accommodative monetary policy contributes to a build-up of financial vulnerabilities (Malovaná & Frait, 2017; Malovaná *et al.*, 2022)
- ▶ Time inconsistency of policy transmission, different length and depth of the business and financial cycle (Malovaná *et al.*, 2023)

Closing Remarks

- It's not just about the cycle, structural risks matters too!
- Banks' capital stock dictates the strength of capital-based MaPP effects
- It is better to combine value-based with income-based borrower limits
- MaPP could spur increased activity in NBFIs sector but redistribution effects could be minimized
- Close talks with monetary to avoid conflicts, best to keep them under one roof

Thank you for your attention!

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