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IMPACT OF EXTERNAL IMBALANCES ON THE COUNTERCYCLICAL CAPITAL BUFFER DECISIONS IN SLOVAKIA

VPLYV VONKAJŠÍCH NEROVNOVÁH NA ROZHODNUTIA O PROTICYKLICKOM KAPITÁLOVOM VANKÚŠI NA SLOVENSKU

ABSTRAKT
Proticyklický kapitálový vankúš patrí medzi hlavné nástroje makroprudenciálnej politiky v oblasti cyklických rizík. Jeho cieľom je zvyšovať odolnosť bankového sektora v dobrých časoch, aby lepšie zvládol vyššie straty v čase krízy. Preto je správna identifikácia finančného cyklu kľúčová pre efektívne fungovanie celej schémy. V našej práci pomocou jednoduchých empirických metód testujeme, či sú v prípade Slovenska údaje z platobnej bilancie relevantné na popísanie finančného cyklu. Ukazuje sa, že deficit bežného účtu platobnej bilancii má potenciál byť zaradený medzi podkladové indikátory pre proticyklický kapitálový vankúš.

ABSTRACT
The countercyclical capital buffer is one of the main instruments of macroprudential policy in the field of cyclical risks. Its main objective is to contribute to the banking sector resilience in good times in order to absorb greater losses during a crisis. Thus, appropriate identification of the financial cycle is essential for the effective functioning of this framework. In our study, we use simple empirical methods to test whether balance of payments data are relevant for the description of the financial cycle in Slovakia. It turns out that current account deficit of the balance of payments could be potentially included among the leading indicators for the countercyclical capital buffer.

KĽÚČOVÉ SLOVÁ
proticyklický kapitálový vankúš, bežný účet, cyklické riziko

KEY WORDS
countercyclical capital buffer, current account, cyclical risk

1. INTRODUCTION
Although the concept of financial and business cycle has been known for decades, it was only in 2010 when the Basel Committee of Banking Supervisors published its first policy proposal on this topic [1]. At this stage, countercyclical capital buffer was introduced as a new tool of macroprudential policy. Its transposition into national law followed its implementation in the European Directive (CRD IV). Discussions about the countercyclical capital buffer were further accelerated based on the experience with recent financial and economic crisis. In many countries, the concept of cyclical systemic risk and its relationship to the countercyclical capital buffer became a standard part of macroprudential policies.

Nevertheless, there are still many ambiguities concerning the practical use of the countercyclical capital buffer. The most prominent unknown is still related to

an appropriate selection of variables indicating the build-up phase. Even if this is absolutely crucial from the activation of the perspective of the countercyclical capital buffer, there is still little experience with its real use. This is largely due to the fact, that the credit-to-GDP gap as the leading indicator is not returning reliable results for most of the countries [3]. Therefore, macroprudential authorities around the EU introduced the additional credit gap metrics and worked further on additional variables either inspired by the ESRB Recommendation 2014/1 [6] or by other available research.

Slovakia belongs to the group of countries where the standardized credit-to-GDP gap metrics does not appropriately reflect financial cycle. Therefore, the National Bank of Slovakia has implemented a policy framework independent from this standardized Basel credit-to-GDP gap measure. Its monitoring dashboard contains simple indicators of credit growth, composite indicator of financial cycle [10] and also a modified additional credit-to-GDP gap measure. Although the monitoring framework of the National Bank of Slovakia seems to be rather complete at this stage, there is no reference to the use of external imbalances as an indicator of financial cycle. According to the ESRB recommendation [6], measure of external imbalances is one of the variables with a potential to indicate the build-up phase of financial cycle and thus could be helpful in decisions on the countercyclical capital buffer.

2. LITERATURE

A number of authors tried to analyze the impact and effectiveness of the credit-to-GDP gap as a potential indicator for the countercyclical capital buffer decisions which could effectively predict upcoming financial instability. In a wider outlook, we bring an opinion of two different approaches on the credit-to-GDP gap and summarize the key advantages and shortcoming of the credit-to-GDP gap.

Repullo and Saurina in their work[1] provided a critical assessment of the credit-to-GDP gap as an effective indicator. They argued, that the credit-to-GDP gap is not an appropriate indicator for the countercyclical capital buffer decisions due to its mechanical calculation and negative correlation with the GDP growth. They also claimed that credit usually lags the business cycle and mechanical application of the countercyclical capital buffer may lead to a reduction of minimum capital requirements during the GDP growth (named as “good times”) and vice versa. As mentioned above, the authors are concerned about the potentially opposite consequences of the countercyclical capital buffer impact, i.e. forced capital accumulation during crisis periods by regulators. Although their arguments backed up by real economic situations are pertinent, they are rather focused on the business cycle analysis, which is not a benchmark cycle for the countercyclical capital buffer decisions.

The counter-arguments by Drehmann and Tsatsaronis from their paper[2] exactly describe the calculation methodology and give an overview of another potential indicator. First of all, the key first step is the definition of cycles. According to

[1] REPULLO, R. – SAURINA, J.: The countercyclical capital buffer of Basel II – A critical assessment. Available on URL: <ftp://ftp.cemfi.es/pdf/papers/repullo/Repullo-Saurina%20Final%20R.pdf>. [cited 10th December 2017].

[2] DREHMANN, M. – TSATSARONIS, K. [2010]: The credit-to-GDP gap and countercyclical capital buffer: questions and answers. Available on URL: <http://www.bis.org/publ/qtrpdf/r_qt1403g.pdf>. [cited 10th December 2017].

the authors, the financial cycle differs from the business cycle: the financial cycle has a greater amplitude, duration and the recessions have shorter impact on the business cycle than on the financial cycle[3].

Drehmann and Tsatsaronis consider as the main objective of the countercyclical capital buffer the protection of the banking sector from negative influences and financial cycle fluctuations. They do not see the countercyclical capital buffer as a tool to manage the financial cycle as a whole. However, a positive influence of the countercyclical capital buffer was also proven in financial cycle mitigation. According to their research, the credit-to-GDP gap is considered to be an appropriate indicator of financial cycle which performs well as an early warning indicator with low degree of false signals.

3. BACKGROUND INFORMATION

Decisions on the countercyclical capital buffer rate should generally follow a guided judgment concept. This means the decision should be based on quantitative indicators translated into benchmark buffer rate but can deviate from this calculation taking into account the additional qualitative or quantitative information. This process is often compared to monetary policy rate setting exercise, where sophisticated quantitative background models influence the judgment of policymakers.

Regarding the countercyclical capital buffer, the framework contains three steps. First, the indicators are selected and calculated. Second, the value of indicators is transformed into a countercyclical capital buffer rate, i.e. the buffer guide. Third, the buffer guide is discussed and interpreted against a wider qualitative backdrop also including potential changes in regulatory or accounting environment (e.g. IFRS 9) potentially changing magnitude or timing of credit losses. Other things playing important role in guided judgment encompass the level of indebtedness or other imbalances accumulated in the system but not reflected by the leading indicators. An important input in the guided discretion framework for the countercyclical capital buffer decisions is also the general monetary policy environment, since a prolonged period of low interest rates is often linked to excessive lending.

The official methodology is largely based on a general rule of comparing ratio of credit and the GDP to its long-term trend. According to the ESRB recommendation 2014/1, the member states should base their decisions on a standardised and additional credit gaps and other variables that indicate the build-up of system-wide risk associated with periods of excessive credit growth.

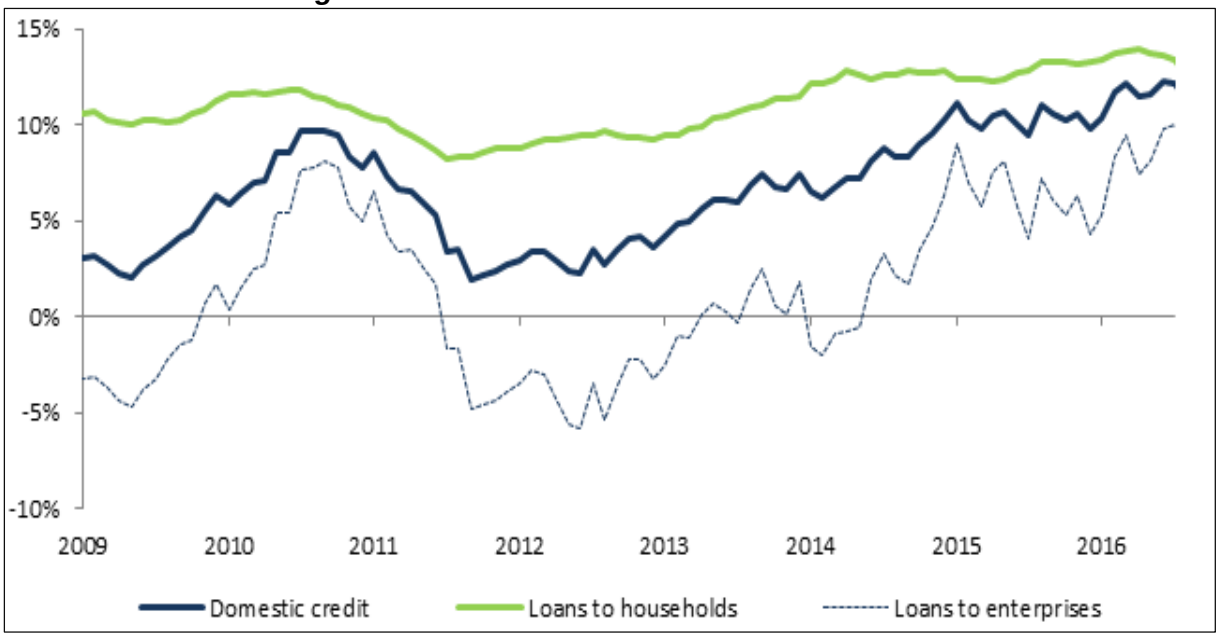
Currently, decisions of the National Bank of Slovakia on the countercyclical capital buffer are based on three groups of indicators: (i) credit growth, (ii) credit gaps and (iii) composite indicator Cyclogram.

The first indicator, i.e. the credit growth refers to annual nominal change in the outstanding amount of loans to households and enterprises. This indicator is

[3] *BORIO, C. – DREHMANN, M. – TSATSARONIS, K. [2010], Kostas: BIS Working Papers No 380 – Characterising the financial cycle: don´t lose sight of the medium term! Available on URL: <http://www.bis.org/publ/work380.pdf>. [cited 12th December 2017].*

actively used by many macroprudential authorities as it is rather clear, comparable with other jurisdictions and available in a timely manner.

Chart 1: Annual credit growth

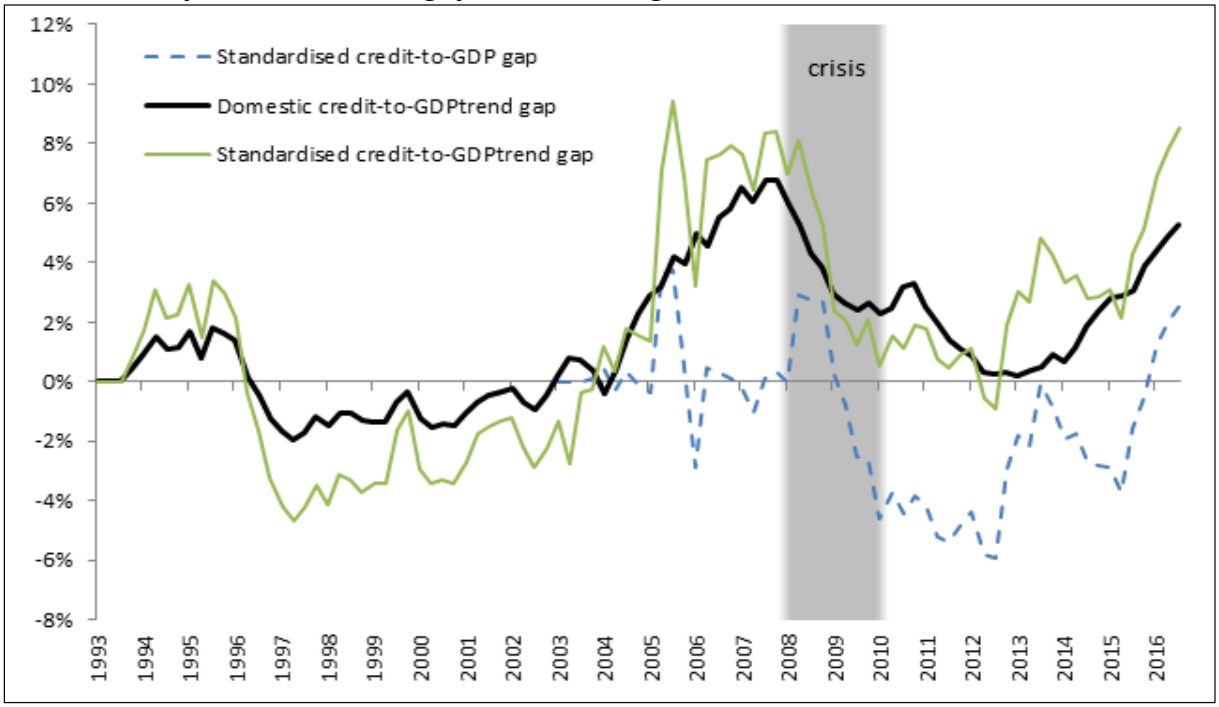


Source: NBS

The second set of indicators, i.e. credit gaps are calculated in accordance with the methodology outlined in the Directive 2013/36/EU [4] and the ESRB Recommendation 2014/1 [6]. The calculation and the publication of the first metrics (Standardised credit-to-GDP gap) is universally binding for all member states. However, it cannot be practically used in the decision making process in Slovakia as it returns counterintuitive results: it was low in the pre-crisis period (2005–2008) and subsequently increased during the times of crisis (2009–2010). There are two major reasons behind this. Firstly, the short time series does not include the period of 1993–2003 and it only begins in 2004. Since the period of excessive credit growth (2004–2008) is at the beginning of the time series it cannot be identified by a positive gap. Secondly, the Slovak GDP proved to be rather volatile in both the pre-crisis and the crisis period. In other words, the excessive lending activity in 2005–2008 was masked by an excessive GDP growth, while the sudden and abrupt drop in the GDP in 2009 led to a positive credit gap. Therefore, the National Bank of Slovakia calculates two additional gaps (Domestic credit-to-GDP_{trend} gap and Credit-to-GDP_{trend} gap). These additional indicators do not have the problems mentioned above, as they use longer time series and the denominator is a GDP_{trend} instead of a simple GDP. This minimises the negative effects of GDP volatility. They differ in the nominator using either the domestic credit (loans extended to households and enterprises by local banks) or credit (total debt of households and enterprises including bonds issuance).

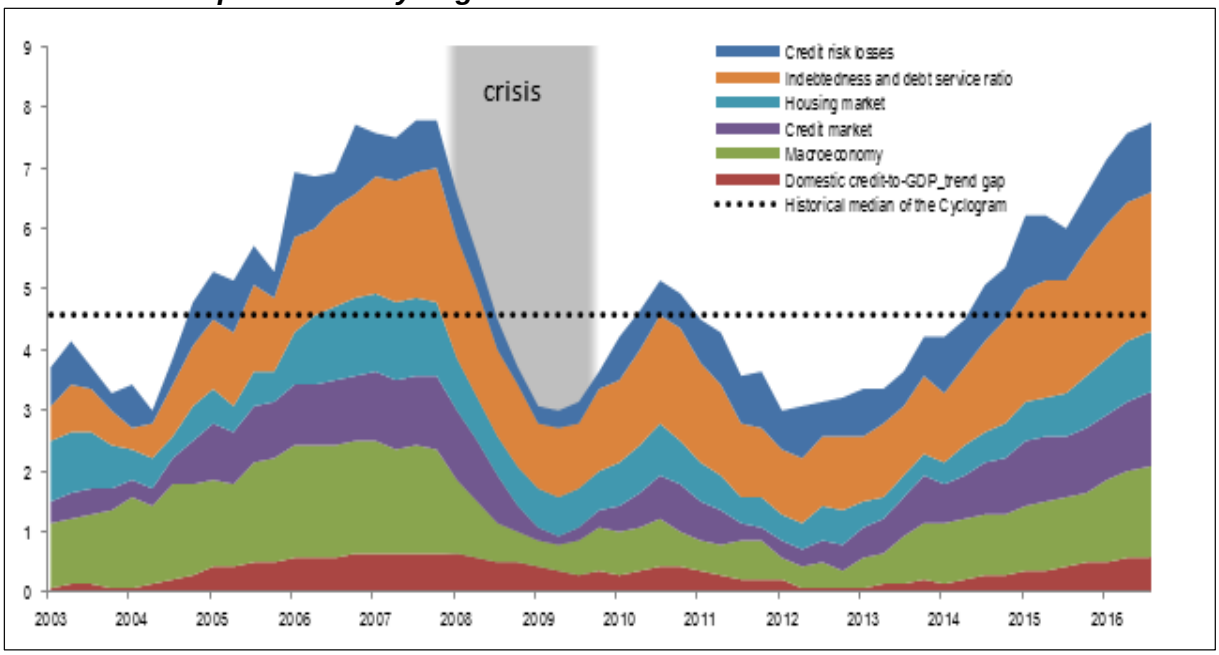
The third leading measure is a composite indicator of the financial cycle, i.e. the Cyclogram [10]. This indicator benefits from 14 underlying variables covering different methodologies (trend indicators, growth indicators and level indicators) as well as more areas than just the lending market (property market, risk appetite and macroeconomy).

Chart 2: Comparison of credit gaps methodologies for Slovakia



Source: NBS

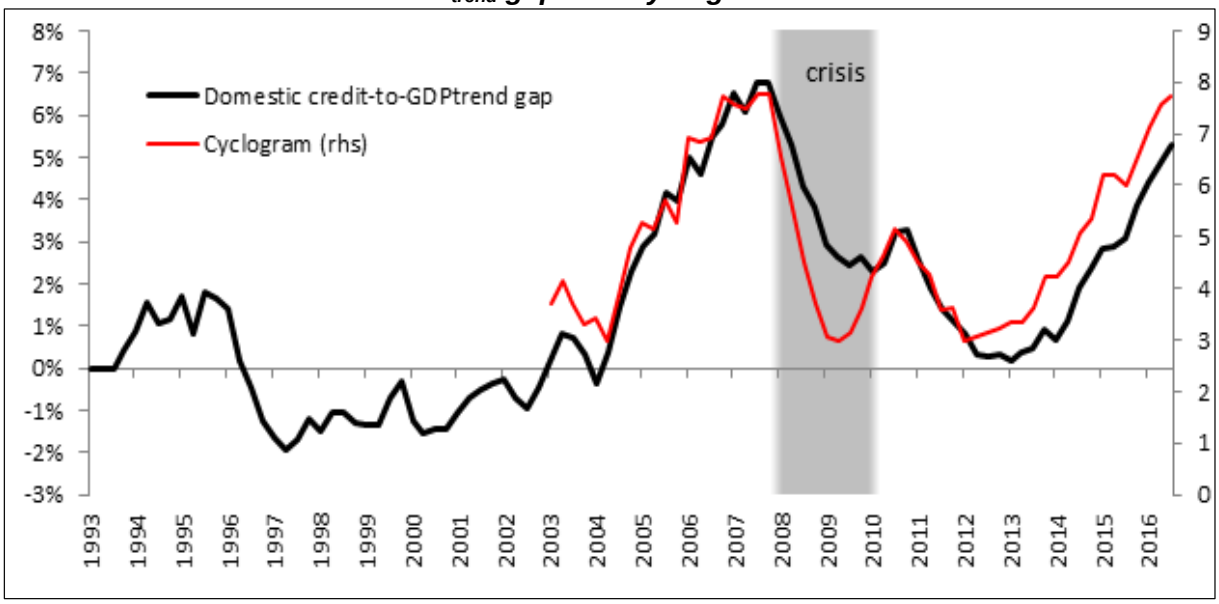
Chart 3: Decomposition of Cyclogram



Source: NBS

For the purpose of our work we have decided to choose the Domestic credit-to-GDP_{trend} gap at the explanatory variable when testing the current account imbalance cyclical properties. This version of credit gap offers sufficiently long-time series (1994–2017), its definition of credit has lower volatility compared to the Credit-to-GDP_{trend} gap and it generally gives reliable results. It has reached its maximum in the second half of 2008, at the peak of the build-up phase and it fell afterwards in 2009 as the crisis unfolded. Moreover, it is correlated with the Cyclogram so it implicitly contains some information on the additional areas and markets explicitly covered by the Cyclogram. It is also one of the official leading indicators used by the NBS in its quarterly decisions on the countercyclical capital buffer rate [8].

Chart 4: Domestic credit-to-GDP_{trend} gap and Cyclogram



Source: NBS

4. METHODOLOGY

As already mentioned, the external imbalances are one of the variables with a potential of indicating the build-up phase of the financial cycle. We decided to analyze, whether there is any relationship between the Domestic credit-to-GDP_{trend} gap (as an accepted indicator of a build-up phase on the financial cycle in Slovakia) and data from balance of payments of Slovakia.

The National Bank of Slovakia divides the balance of payments into three main accounts – current account, capital account and financial account. In comparison, the IMF Manual[4] does not distinguish between the capital and financial account. However, for Slovak data, all three accounts will be considered.

Each account could be divided into credit and debit sub-account, but we assume, the balance accounts will provide sufficient information.

[4] *International Monetary Fund: Balance of payments manual. International Monetary Fund. Available on URL: <https://www.imf.org/external/pubs/ft/bopman/bopman.pdf>. [cited 8th December 2017].*

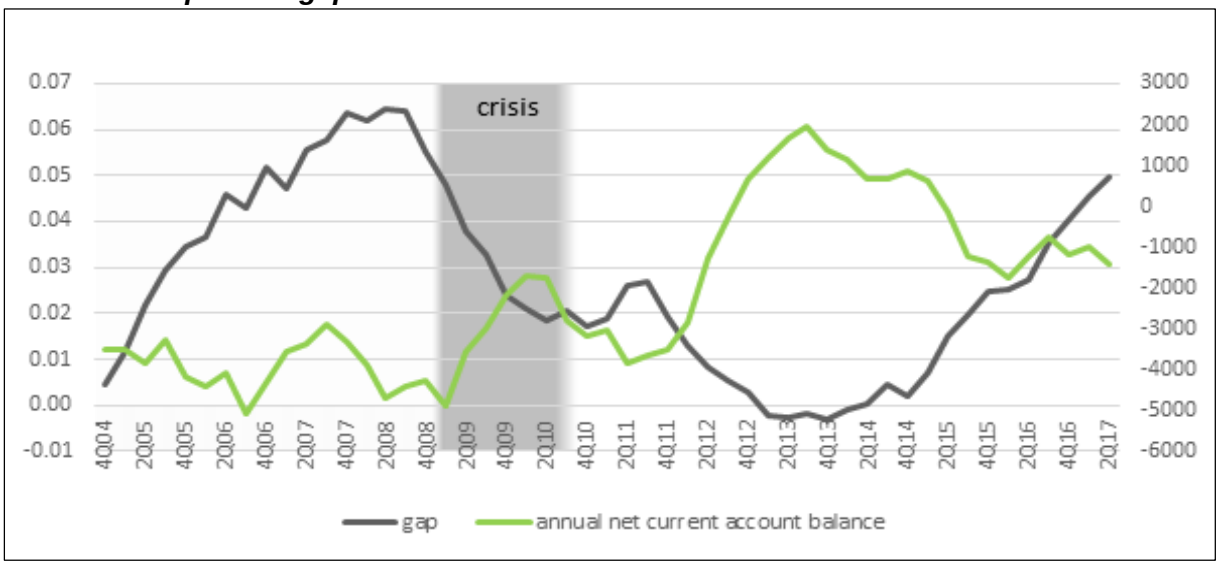
We could divide our calculation into two simple parts:

- comparison of correlation coefficient with Domestic credit-to-GDP_{trend} gap measuring linear dependence between the Domestic credit-to-GDP_{trend} gap and the chosen account
- simple linear regression – the Domestic credit-to-GDP_{trend} gap as dependent variable and the chosen account as independent variable

Based on our analysis of the balance of payments of Slovakia, we have identified items with the best correlation with our variable - domestic credit-to-GDP_{trend} gap. We have analyzed different linear combinations of each account, such as: net quarterly values, net annual values, quarterly values to nominal GDP ratio, annual values to nominal GDP ratio without any significant result.

Consequently, we have identified the net annual cumulative values of each account on quarterly basis as the best option for the next calculations. The net annual cumulative values of accounts indicated strong negative correlation with our variable, what could be considered as potential early warning indicator for the decisions on the countercyclical capital buffer.

Chart 5: Comparison gap vs. annual net current account balance



Source: NBS

$$Pearson\ correlation\ coefficient: \rho_{GapCurrAcc} = -0{,}722$$

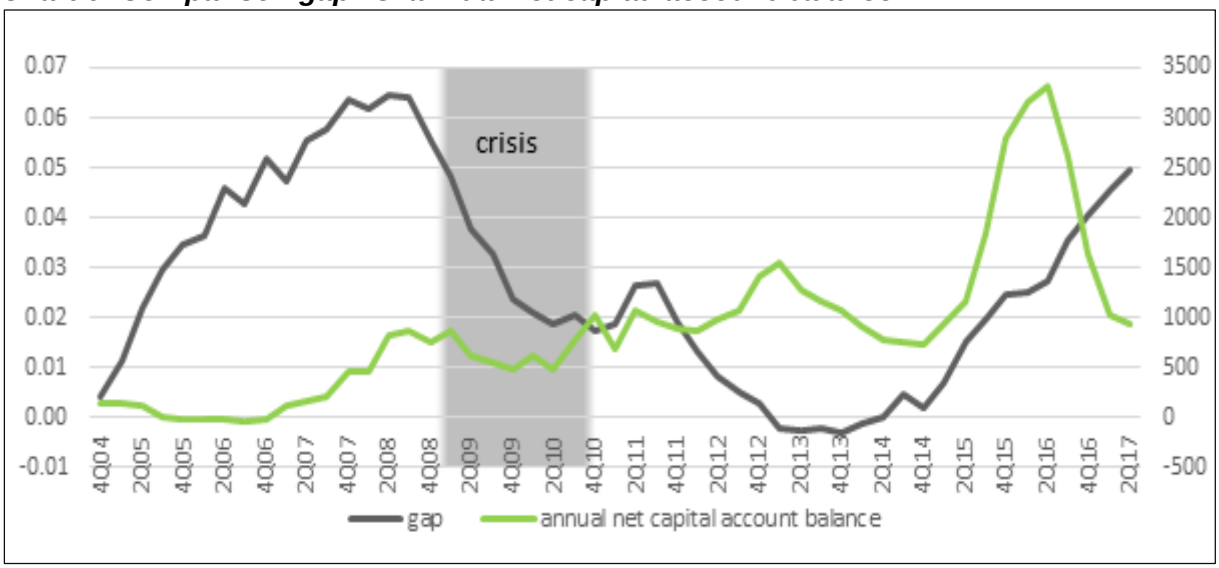
Formulation of the simple linear model:

$$\boldsymbol{Model\ 1:\ Gap_t = \beta_0 + \beta_1 \cdot CurrAcc_t + \varepsilon_t}$$

$Gap_t - domestic\ credit - to - GDP_{trend}\ gap\ in\ quarter\ t$
$CurrAcc_t - annual\ net\ current\ account\ balance\ in\ quarter\ t$
$t = 1{,}2, \ldots, 51$

$$Model\ 1:\ \widehat{Gap_t} = 0{,}01145 - 7{,}364 \cdot 10^{-6} \cdot CurrAcc_t$$

Chart 6: Comparison gap vs. annual net capital account balance



Source: NBS

$$Pearson\ correlation\ coefficient: \rho_{GapCurrAcc} = -0{,}222$$

Formulation of the simple linear model:

$$\boldsymbol{Model\ 2:\ Gap_t = \beta_0 + \beta_1 \cdot CapAcc_t + \varepsilon_t}$$

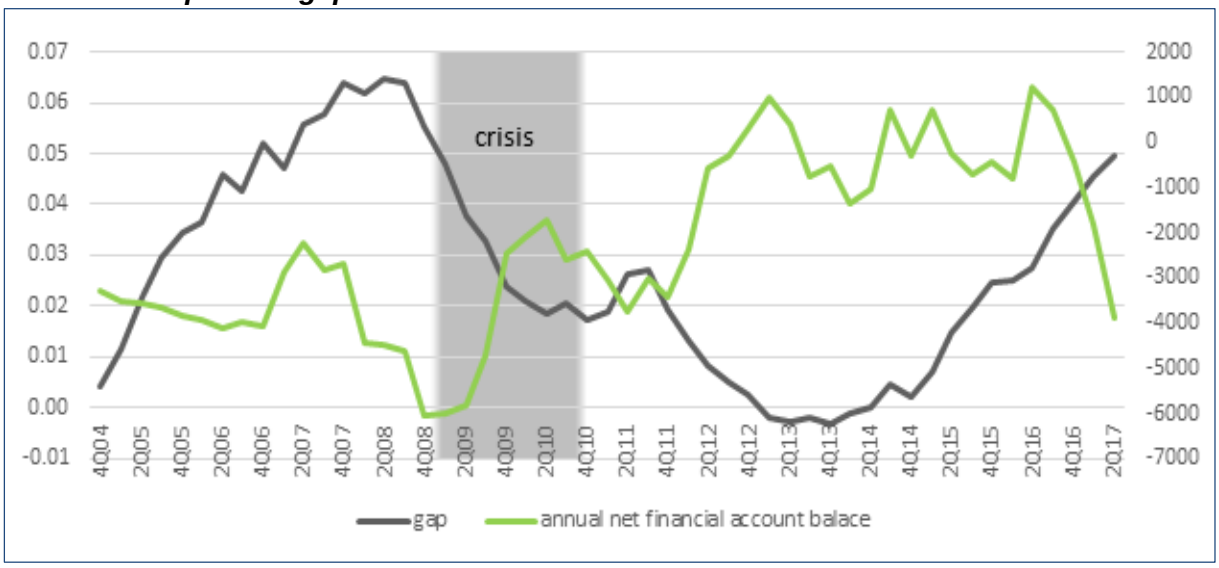
$Gap_t - domestic\ credit - to - GDP_{trend}\ gap\ in\ quarter\ t$

$CapAcc_t - annual\ net\ capital\ account\ balance\ in\ quarter\ t$

$t = 1{,}2, \ldots, 51$

$$Model\ 2: \widehat{Gap_t} = 0{,}0322 - 5{,}93 \cdot 10^{-6} \cdot CapAcc_t$$

Chart 7: Comparison gap vs. annual net financial account balance



Source: NBS

$$Pearson\ correlation\ coefficient: \rho_{GapCurrAcc} = -0{,}635$$

Formulation of the simple linear model:

$$\boldsymbol{Model\ 3:\ Gap_t = \beta_0 + \beta_1 \cdot FinAcc_t + \varepsilon_t}$$

$Gap_t - domestic\ credit - to - GDP_{trend}\ gap\ in\ quarter\ t$
$FinAcc_t - annual\ net\ balance\ financial\ account\ in\ quarter\ t$
$t = 1,2, \dots ,51$

$$Model\ 3:\ \widehat{Gap_t} = 0{,}018 - 6{,}69 \cdot 10^{-6} \cdot FinAcc_t$$

Table 1: Model 1-3 summary

Simple Linear Regression Summary			
Account	Current	Capital	Financial
adjusted R^2	0,51	0,03	0,39
F-test value (crit. value = 4,039)	53,5	2,56	33,19
Variable significance (sign. level α = 0,05)	$2{,}17 \cdot 10^{-9}$	0,12	$5{,}45 \cdot 10^{-7}$

Source: Author´s calculation

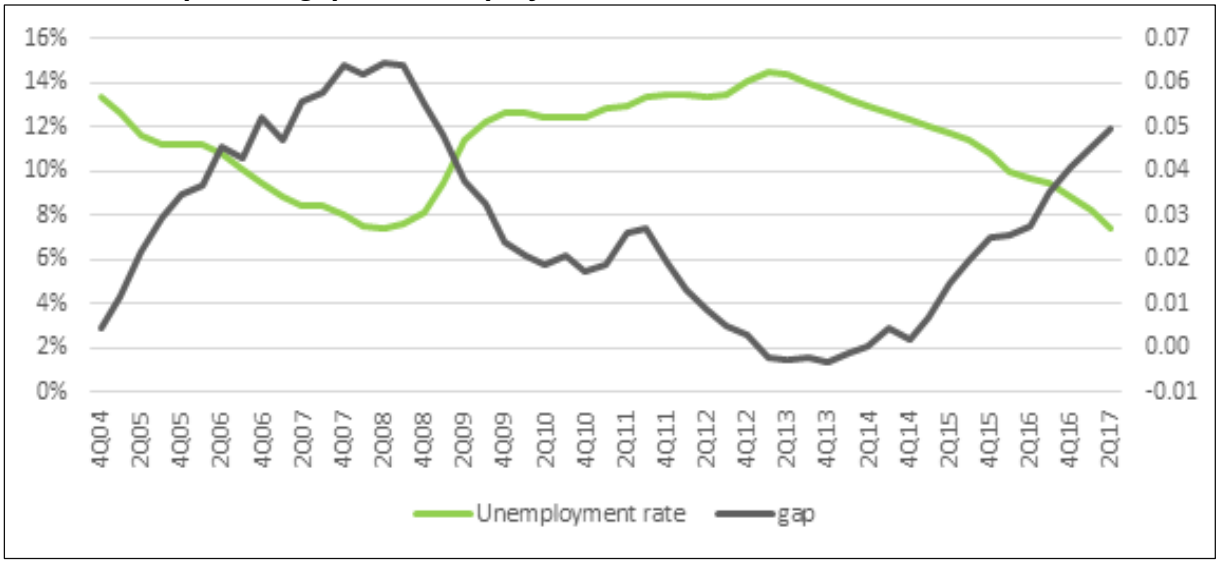
We also tried to put all three accounts into one model, but it has returned less significant results as shown in the **Model 1**.

5. COMMENTS AND EXPLANATION OF RESULTS

In summary, we can consider the annual net current account balance as a variable potentially relevant for the Domestic credit-to-GDP_{trend} gap simulation based on linear regression function. There is a strong negative correlation between Gap and annual net current account balance. That means they tend to move in the opposite direction along the financial cycle.

As mentioned above, there are two relevant cycles, the economic and the financial. The financial cycle is perceived as a benchmark for the countercyclical capital buffer decisions and related calculations. In general, financial and economic indicators do not necessarily tend to move simultaneously. However, there is no independent financial market in Slovakia, which is not substantially affected by economic influences. The Slovak financial market comprises almost exclusively credit market. In accordance with these findings, we assume that in Slovakia there is only one aggregate cycle composed of economic and financial indicators. Based on this assumption only one aggregate cycle, the Domestic credit-to-GDP_{trend} gap could be also explained by indicators of economic cycle. That is why we have chosen as another independent variable the unemployment rate on a quarterly basis.

Chart 8: Comparison gap vs. unemployment rate



Source: NBS

$$Pearson: \rho_{Gap,UnempRate} = -0{,}912$$

$$\boldsymbol{Model\ 4:\ Gap_t = \beta_0 + \beta_1 \cdot UnempRate_t + \varepsilon_t}$$

$Gap_t - domestic\ credit - to - GDP_{trend}\ gap\ in\ quarter\ t$
$UnempRate_t - unemployment\ rate\ in\ quarter\ t$
$t = 1{,}2, \ldots, 51$

$$Model\ 4:\ \widehat{Gap_t} = 0{,}126 - 0{,}009 \cdot UnempRate_t$$

Table 2: Model 4 summary

Statistics	Linear regression
adjusted R^2	0,824
F-test value	235
Variable significance	$< 2{,}2 \cdot 10^{-16}$

Source: Author´s calculation

There is a strong negative correlation between these two variables and the *Model 4* confirmed the significance of the unemployment rate as an independent variable to explain the credit-to-GDP gap. Now, we try to add annual net balance current account to the *Model 4* and analyze its impact on the model characteristics.

$$\boldsymbol{Model\ 5:\ Gap_t = \beta_0 + \beta_1 \cdot UnempRate_t + \beta_2 \cdot CurrAcc_t + \varepsilon_t}$$

$Gap_t - domestic\ credit - to - GDP_{trend}\ gap\ in\ quarter\ t$
$UnempRate_t - unemployment\ rate\ in\ quarter\ t$
$CurrAcc_t - annual\ net\ current\ account\ balance\ in\ quarter\ t$
$t = 1{,}2, \ldots, 51$

$$Model\ 5:\ \widehat{Gap_t} = 0{,}0102 - 7{,}297 \cdot 10^{-3} \cdot UnempRate_t - 3{,}549 \cdot 10^{-6} \cdot CurrAcc_t$$

Table 3: Model 5 summary

Statistics		Linear regression
adjusted R^2		0,9
F-test value		331
Variable significance	$UnempRate$	$< 2 \cdot 10^{-16}$
	$CurrAcc$	$2{,}35 \cdot 10^{-11}$

Source: Author's calculation

Model 5 is statistically significant; the F-test value is far over its critical value (=4,039). The coefficient of determination is close to value 1, what means that independent variables are appropriate for explaining the dependent variable. The most important fact for us is that significance values of both independent variables are lower than the significance level 0,05, what makes both of them statistically significant for the given model.

6. CONCLUSION

The countercyclical capital buffer plays a crucial role in the macroprudential policy toolkit. The concept of building capital buffers in good times and use them in bad times is very intuitive and reasonable. But the decision to increase the countercyclical capital buffer must by anchored by quantitative indicators of financial cycle. This is however less clear from a practical point of view. Policymakers should monitor a range of indicators chosen according to their ability to issue appropriate signals along the financial cycle, for this purpose we have tested whether any linear combination of balance of payments data can be used for the purpose of countercyclical capital buffer activation. We have found the annual net current account balance can be used as one of such indicators.

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RESUME
For a countercyclical capital buffer activation it is necessary to have a set of indicators describing the financial cycle. In our work, we have used simple empirical methods to demonstrate the appropriateness of the annual net current account balance used for this purpose.

PROFESIJNÝ ŽIVOTOPIS
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