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DYNAMIC PROVISIONING AS AN AUTOMATIC STABILIZER OF THE FINANCIAL INSTABILITY[1]

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The pro-cyclical effect of provision is generally agreed and widely discussed in the context of the current financial crisis. The new model of the dynamic provisions applied in Spain showed countercyclical effects on the credit and business cycle. We simulate development of the dynamic provisions during the financial crisis and discuss the possible consequences. We apply a panel data model of the past credit cycle to calibrate the parameters following the same approach as in the Spanish dynamic provision. Our contribution is in the application of dynamic provisions on the banking systems for the V4 countries.

Keywords: countercyclical provisioning regime, credit cycle, macro-prudential policy

JEL-codes: E58, G28

1. INTRODUCTION

Financial system procyclicality refers to the traditional debates about interactions between the real and financial sector at different phases of the economic cycle. Obviously, *"the financial system typically does not build up sufficient capital and liquidity buffers during benign economic conditions, when it is easier and cheaper to do so, in order to deal with more challenging times. At some point, imbalances have to unwind, potentially causing a crisis, characterized by large*

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losses, liquidity squeezes, and possibly a credit crunch." (Drehmann et al. 2011: 192) We can distinguish two reasons for these procyclicality effects, (1) limitation in risk measurement and (2) conflicts of interest between providers and users of funds (Borio 2003), which result in macroeconomic imbalances and banking system vulnerability. Generally, we can assume that the inability of the financial system to create capital and liquidity buffers has led to international regulatory framework implementation known as Basel I, II and III regulatory frameworks. Although the main objective of the regulation is to protect the international financial system from the risks arising from lending and investment practices by banks, theoretical and empirical literature has pointed out the procyclical effects of bank capital regulation. The reason is that wide discussions focused mostly on the impact of a downturn on the quality of the loan portfolios (Kashyap – Stein 2004 and Bikker – Metzemakers 2005) or restricted access to bank loans after tightening of capital requirements (Fidrmuc et al. 2015). Regardless of its countercyclical character, the role of loan loss provisions has remained largely unresearched.

In principal, and according to the Basel II standards, loan loss provisions should cover expected losses and capital should provide an adequate buffer for unexpected losses. However, the current accounting rules lead to loan loss provisions being underestimated during economic expansion because the model is based on historical loss rates and probability of loss of the current bank's loan portfolio. Consequently, during economic downturns banks increase their loan loss provisions because the quality of bank loan portfolios deteriorates and analogically decrease loan loss provisions under its average during recovery and peak phases of the economic cycle. This problem is solved by a dynamic provisioning model in which banks create a stronger buffer when the economy is growing (Fillat – Garriga 2010).

However, dynamic provisioning is not generally agreed on, not only by accounting authorities but also by regulatory and monetary authorities. The first reason is that there is not sufficient confidence in the available indicators to judge a situation in which the release of capital buffers leads to the undercapitalization and failure of an institution (Osiński et al. 2013).

The second issue is that regulatory standards should ensure the ability of a bank to remain a viable financial intermediary in times of stress. Tarullo (2012) pointed out that capital planning decisions would not be based on mechanical rules and aggregate indicators but on stress testing and scenario analysis of individual firms. The individual diagnostic stress tests are preferred because they provide minimum capital requirements which can be maintained for ensuring the safety and soundness of the financial system, which is in line with the objectives of regulatory standards. Concurrently, Osiński et al. (2013) pointed out differences between capital buffer definition as amounts of capital or capital ratios. They argue that more vulnerable institutions would be required to maintain higher ratios which could be achieved by the definition of the amount of capital rather than capital ratios.

However, current discussions focus mostly on the size of the buffers and the degree of resilience, rather than on meeting specific supervisory ratios. It is important to mention that size of the buffers, degree of resilience, and especially the timing of the build-up is significantly affected by economic cycle turning points. Obviously, both microprudential and macroprudential supervision assume the build-up of the buffers during economic expansion but their preferences differ at the turning points. While microprudential indicators appear positive near to the peak, systemic risks increase. Subsequently, macroprudential policymakers will tend to release buffers and microprudential supervision will tend to raise them when the economic cycle is approaching a trough. The divergence in preferences tend to a paradox of financial instability when *"the financial system can appear strongest precisely when it is most fragile"* (Borio – Drehmann 2009). Borio and Drehmann (2009) pointed out that automatic stabilisers are effective pre-commitment devices because they reduce the political conflict between the supervisors, especially pressures to refrain from acting during peaks. Summarily, dynamic provisions could be regarded as an automatic stabilizer instrument which limits the macroeconomic costs of episodes of financial distress.

The possible effects of dynamic provisioning on the banking industry in the Czech Republic are provided by Frait and Komárková (2009). They showed that dynamic provisioning decreases cyclical movements in total provisions but they pointed out that this system is complicated from the perspective of international accounting standards. They also questioned the sufficient amount of the created fund by dynamic provisions to decrease the impact of the credit fall.

Our contribution is to simulate the impact of dynamic provisioning on the amount of total provisions in the balance of payments. In particular, we simulated the impact of the changing parameters of the Spanish model on the funds created by dynamic provisioning. Moreover, we discuss the macroprudential function of dynamic provisioning related to the paradox of financial instability. We suppose that the model of dynamic provisioning will be much closer to macroprudential than microprudential policymakers because it releases buffers after the trough is reached.

The paper is organized as follows. The following section describes the basic principles of dynamic provisioning and provides a theoretical background for the methodological part of empirical analysis which is described in section three. To simulate parameter changes according to the different phases of the economic cycles we applied the Bry-Boschan algorithm and identified economic cycle turning points. The fourth section presents the results, identification of the turning points of economic cycles, estimated parameters of the dynamic provision model and simulations of the provision development in V4 countries. The paper finishes with a discussion and conclusions of countercyclical character of the dynamic provisions.

2. PRINCIPLES OF DYNAMIC PROVISIONING

The basic principles of dynamic provisioning follow the innovation of Basel regulatory standards presented by the Basel Committee on Banking Supervision (BCBS) in the year 2010 and revised as *A Global regulatory framework for more resilient banks and banking system,* also known as Basel III (BCBS 2011). The presented document highlights procyclical effects of the current banking systems which are especially caused by increasing of a bank's leverage, dividend payments without direct relation to the financial results of banks, and accounting of financial instruments to capture credit risk. Therefore, BCBS (2011) defined 4 basic objectives of banking regulation: (1) to minimize cyclical effects of capital requirements, (2) to enforce provisioning *ex ante,* (3) to create a countercyclical capital buffer in case of financial distress and (4) to achieve greater macroeconomic prudence in the periods of excessive credit growth. Thus, the main objective is to reduce possible causes of systemic risks.

Accounting regulators reacted to Basel III and instigated the accounting standard IFRS in terms of capturing of loan provisions. The new standard IFRS 9 calculates expected losses using a statistical parameter which is estimated from the historical records of losses in the portfolio. Consequently, expected losses are recognized on a portfolio basis and reported separately from the total current loss. Dynamic provisioning is based on the principle of *ex ante* provisions. The model of dynamic provisioning was pioneered by Mann and Michael (2002), Jimenéz and Saurina (2005) and Buvatier and Repetit (2007). There the authors offer dynamic provisioning as the alternative to the commonly-used system of provisioning, which is based on the principle of incurred losses. According to these authors, the dynamic provisioning should smooth the profits but the volatility continues to be captured for accounting purposes (as the important information for accounting authorities and regulators). The key point of the dynamic provision is the robustness of the expected loss estimation.

The countercyclical effects of dynamic provisioning are particularly highlighted after the financial crisis (Saurina 2009; Fernandez De Lis – Garcia-Herrero 2009; Saurina 2011). Fernandez De Lis and Garcia-Herrero (2010) discussed different approaches in Spain, Colombia and Peru (where this model is currently applied) and discussed the impact of dynamic provisioning. In particular, they asked whether the system of dynamic provisioning is a buffer or a dampener. They showed that the model of dynamic provisioning has impact over the whole economic cycle in Spain and its role could be characterized rather as a buffer than dampener. Finally, they pointed out different types of application in industrial and emerging countries.

Fillat and Garriga (2010) simulated the Spanish model of dynamic provisioning in the US banking market in the period 2000–2009. They found that the dynamic provisioning model would increase absorption of loan losses during the financial crisis. However, their simulation showed that the capital buffer created by the generic part of dynamic provisions would be exhausted already during the year 2009. After the exhaustion of this capital buffer the provisions sharply increased. Thus, the model is significantly limited in time depending on the length and intensity of the economic recession.

Similar results were obtained by Wezel (2010) in his simulation of dynamic provisioning in the banking system in Uruguay. He also compared different models (Spanish, Peruvian and Bolivian). The results pointed out differences between the types of dynamic provision models and their suitability for specific credit cycles.

The Spanish model of dynamic provisioning is based on the generic provisions which eliminate the procyclical effects of specific provisions (Saurina 2009):

$$GP_t = \alpha \Delta C_t + \left(\beta - \frac{SP_t}{C_t} \right) C_t, \qquad (1)$$

where *GP* represents generic provisions, *SP* represents specific provisions, *C* represents the amount of credits at the end of the period *t* and ΔC represents changes of credit amounts at subsequent periods. Positive changes of credits are expected during economic expansion, conversely during economic recession. Parameter α is the average amount of loan losses and represents results of a collective evaluation of impairment in each homogeneous group in cyclically neutral years, parameter β is the average amount of specific provisions during the last few economic cycles (Saurina [2009] applied the last two economic cycles).

Both parameters α and β are given by the central bank (Banco de España). These parameters are estimated for six homogeneous groups of financial assets with respect to specific risks within each group. The values of parameter α were in the range of 0–2.5%, values of the parameter β are in the range of 0–1.64%.

The Spanish central bank set the limit for generic provisions, 125% of loan losses of credit portfolio (all groups). The main objective of this limit is to regulate excess of the provision amount in relation to non-performing loans. An extreme situation may occur during the very long phase of economic expansion when specific provisions are under the level of β and α contributes to the accumulation of the provision buffer. The total amount of provisions TP to loan losses is the sum of the specific and generic provisions:

$$TP_t = SP_t + GP_t = SP_t + \alpha \Delta C_t + \left(\beta - \frac{SPt}{C_t} \right) C_t. \quad (2)$$

Summarily, parameter α represents the estimation of the long-term average of loan losses. Formula $\alpha \Delta C_t$ affects the rise of the provisions related to provided loans. The second part of the formula (2) is the dynamic part. This dynamic part of the formula causes banks to create a lower amount of provisions during economic expansion and the share of specific provisions is lower than the long-term average. During this period the dynamic part affects generic and total provisions. Conversely, banks draw dynamic provisions to reduce the growth of the total provisions during economic recession.

The Uruguay model has been applied since September 2001. Wezel (2010) explained that the Uruguay model is based on the relation between statistically estimated expected losses and actually incurred losses. The amount of dynamic provisions is the difference between these two parts:

$$\Delta DP_t = \sum_{i=1}^{5} \frac{1}{12} \times \beta_i C_{it} - LL_t, \quad (3)$$

where ΔDP are changes of the dynamic provisions, β_i is expected loss within the group of credits i, C_{it} represents credit amount within the credit group i and time t, LL_t represents changes in specific provisions in time t. The formula $\sum_{i=1}^{5} \frac{1}{12} \times \beta_i C_{it}$ is estimated loss calculated as the sum of losses within the different credit categories (the banking system in Uruguay differs between 5 groups of credit), which represents different expected levels of losses. Parameter β differs for each credit group in the range of 0.1–1.8%. Changes in specific provisions LL_t are calculated as a net credit loss in the period t (changes of specific provisions adjusted for their dissolution by shifting to a higher category of credit and reduced the yield of the loans already written off in the profit and loss statement). The total buffer of dynamic provisions is limited by the regulator in the range of 0–3% of total loans.

3. METHODOLOGICAL BACKGROUND

In this paper we follow the Spanish model of dynamic provisioning due to the similarity with banking systems in CEE countries (selected banking systems focus on standard commercial banking with a similar structure of credit portfolios and a significant share of the retail banking). To estimate parameter α (formula 1) we run the following regression using data from the whole sample period and one complete economic cycle:

$$NPL_{it} = c_0 + \alpha C_{it} + \mu_i + \varepsilon_{it}, \tag{4}$$

where *NPL* represents non-performing loans and *C* represents total loans of bank *i* and time *t*. We include fixed effects μ_i and estimate robust standard errors ε_{it}. Parameter β in formula (1) and (2) is the historical long-run average of the ratio of specific provision to the total amount of loans, c_0 represents constant in the model.

Our empirical analysis is divided into two steps. Firstly, we estimate parameter α and calculate parameter β from the whole sample period (period of the years 1998–2012). This means that we cover the full variability of the credit cycle. Thus, at this step we suggest that all shocks are known or there is no unknown variability or unexpected downturns. Thus, both parameters α and β are unchanged over the sample period.

At the second step we employ the HP filter and the Bry-Boschan algorithm (Bry – Boschan 1971) to identify turning points of the economic cycle (Poměnková – Maršálek 2012). Subsequently, both parameters α and β are estimated from two completed economic cycles represented by the period from the first to the third peak or trough. This means that we simulate the real decisions of the regulatory authorities and changes of the provisions during the sample period.

To obtain both parameters α and β we use microeconomic yearly data from the Bankscope database in the Czech Republic, Hungary, Poland and Slovakia during the years 1998–2012. Our dataset cover 179 financial institutions and 453 observations. We employ unbalanced cluster-robust panel data estimation with fixed effects (Wooldridge 2010).

We focus on V4 countries which differ in the structure of their credit portfolios (e.g. large share of foreign loans in Hungary). Thus, we assume that the analysis of this group shows changes in dynamic provisions in countries with different credit portfolios.

Our simulations and identification of turning points is based on the time series datasets in the period 2002M01–2013M09. The monthly dataset of credit cycle (total loans provided to non-financial institutions) is obtained from Monetary and Financial Statistics provided by the ECB. To identify the economic cycle we use the industrial production index provided by Eurostat Short-term Business Statistics, which measures monthly changes in the price-adjusted output of industry.

Finally, we employ a random number generator to simulate parameters α and β with discrete uniform distribution within a specified interval. Thus, we identify impact of parameter changes on the total provisions and its distribution in relation to the parameter size. Results are presented in histograms which show direct impact of different methodological approach of parametrization in dynamic provisioning models. Number of trials is 10,000 in our analyses.

4. RESULTS

Firstly, we identify economic cycle turning points to estimate parameters α and β specified in formula (1). The growth economic cycles and turnings points are presented in *Figure 1.* Obviously, there are a lot of economic cycles identified by the Bry-Boschan algorithm, which is caused by monthly frequency of the filtered time series. According to these results we split the time series into sub-periods *(Table 1).* In our simulations, the end of each sub-period presents the moment when the monetary or regulatory authority decides to change both parameters α and β. Consequently, these parameters are valid from the beginning of the next calendar year. Despite some differences in magnitudes of the financial crisis impact there is a significant peak in the year 2007 and trough in the year 2009 in all the analysed countries. Excluding this shock caused by the financial crisis we can identify different volatility development of economic cycles after the crisis.

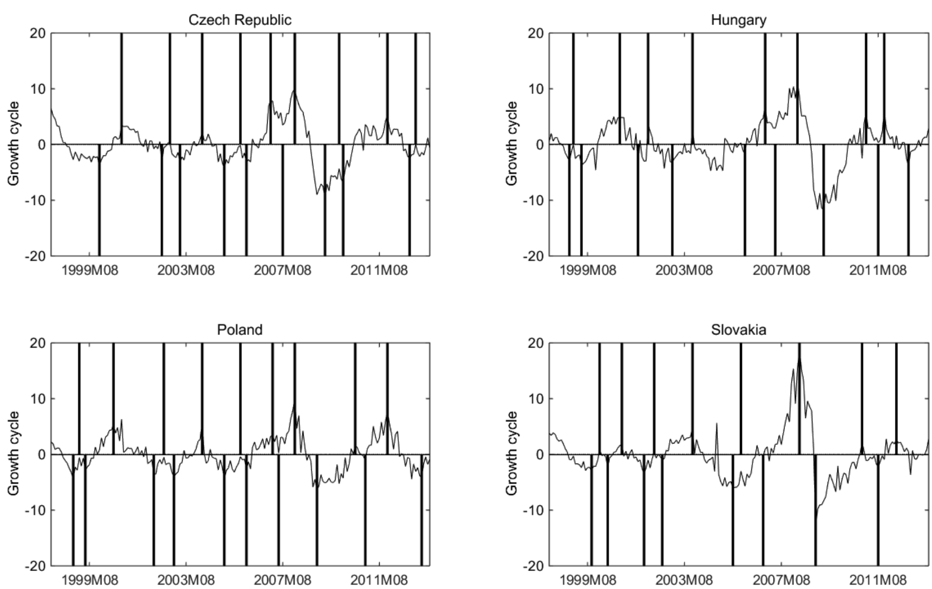

Figure 1. Economic cycle dating – identification of turning points

Source: authors

Table 1. Parameters α and β

Czech Republic						Poland					
period	No of obs.	α coef	α std.err.	α t-stat	β	period	No of obs.	α coef	α std.err.	α t-stat	β
1998–2002	14	−0.0324	0.0883	−0.37	0.1137	2004–2005	19	−0.0186	0.0133	−1.40	0.0770
2000–2003	17	−0.1556	0.1175	−1.32	0.0840	2004–2006	32	−0.0448	0.0112	−4.01	0.0678
2001–2004	22	−0.0486	0.0839	−0.58	0.0627	2005–2007	39	0.0209	0.0085	2.46	0.0486
2003–2005	21	0.0039	0.0061	0.64	0.0339	2006–2009	63	0.0557	0.0117	4.74	0.0376
2005–2007	26	0.0332	0.0032	10.29	0.0221	2007–2010	71	0.1415	0.0144	9.86	0.0357
2006–2009	40	0.0847	0.0154	5.49	0.0284	2008–2011	79	0.1594	0.0156	10.21	0.0389
2008–2011	47	0.1527	0.0310	4.93	0.0406						
Hungary						Slovakia					
period	No of obs.	α coef	α std.err.	α t-stat	β	period	No of obs.	α coef	α std.err.	α t-stat	β
2001–2003	12	0.0227	0.0062	3.65	0.0362	2002–2006	28	−0.0265	0.0283	−0.94	0.0678
2002–2006	28	0.0700	0.0076	9.18	0.0405	2003–2008	42	0.0200	0.0083	2.43	0.0496
2003–2007	31	0.0535	0.0077	6.98	0.0391	2005–2010	50	0.0663	0.0120	5.54	0.0408
2006–2009	30	0.0927	0.0394	2.35	0.0377	2006–2011	23	0.0965	0.0140	6.89	0.0426
2008–2011	36	−0.3903	0.1547	−2.52	0.0683						

Source: authors

While there is stagnation of industrial production in the Czech Republic, Hungary and Slovakia after the crisis, the economic cycle in Poland achieved significant recovery in the year 2012.

The estimated parameters α and β are presented in *Table 1.* Our estimates provide relatively high parameters meaning that the generic part of the provision is strongly determined by the credit cycle.

The simulations of the course of the provisions in V4 countries are shown in *Figures 2* to *5* (negative parameters are replaced by zero). Each figure has two parts. The first part of *Figures 2* to *5* represents the simulation of the course of provisions, more precisely total provisions and all their parts in the dynamic model with unchanged parameters α and β for the entire period. That is, we present the trend of provisions and trend of the credit cycle with long-term set parameters α and β provided that the introduction of dynamic parts of provisions does not affect the credit behaviour of banks. The second part of *Figures 2* to *5* presents the simulation of the trend of provisions with the change of parameters α and β (according to *Table 1*) and prove that the introduction of dynamic parts and changes to parameters does not affect the credit behaviour of banks.

Looking at the Czech Republic (*Figure 2,* top panel) we see that the reserve of Generic Provisions is created in the period from mid 2003 to 2008, while the

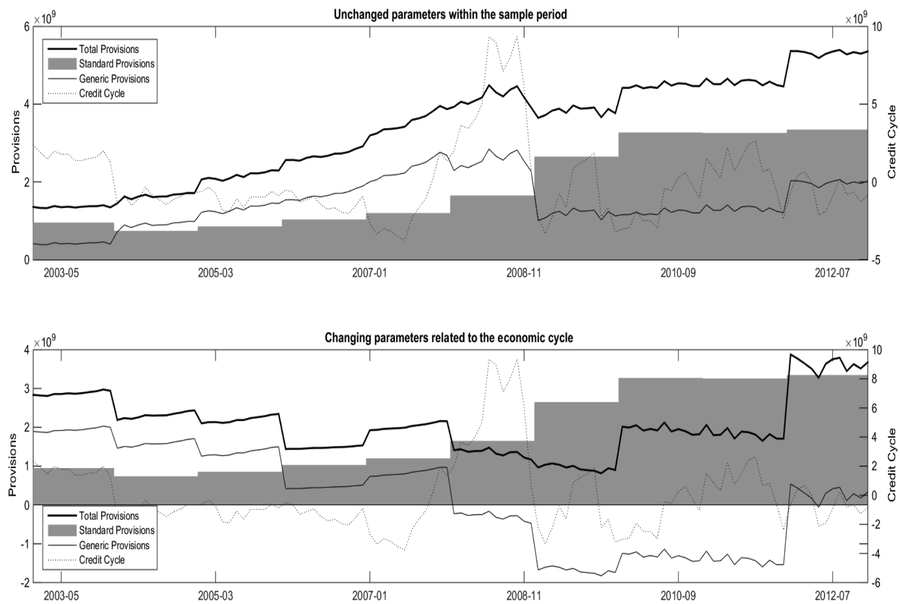

Figure 2. Provisions and credit cycle in the Czech Republic

Source: authors

credit expansion reaches its peak during 2007. During 2008 the credit issue falls and there is also a fall of total provisions (TP) due to the draw of the dynamic part of GP. Therefore the effect of the dynamic part is evident because with the fall of the credit issue and under a realistic proviso of the worsening quality of the credit portfolio there would firstly be a fall of total provisions in the Czech banking sector from 2008 to 2011 followed by their stagnation due to the effect of the draw of the reserve of Generic Provisions. It is evident from the figure that the problem in this case is the setting of the values of the parameters because they do not allow a draw in a greater volume of the reserve of GP, which is more than zero value throughout the financial crisis. On the contrary, a relatively frequent change in parameters is captured by the course of provisions with the same course of the credit cycle (*Figure 2,* bottom panel) probably reducing the effect of the creation of the dynamic part of the provisions. A reserve of Generic Provisions is created only in the period of 2003 to 2006 and the subsequent slight fall of credit issue in parts of the period of 2006 to 2007 already resulted in the draw of the dynamic part and a fall of the total provisions. It is evident that the reserve of Generic Provisions was drawn in this period and the effect of the dynamic part was not shown at all during the financial crisis (Generic Provisions reach negative values right up to 2011).

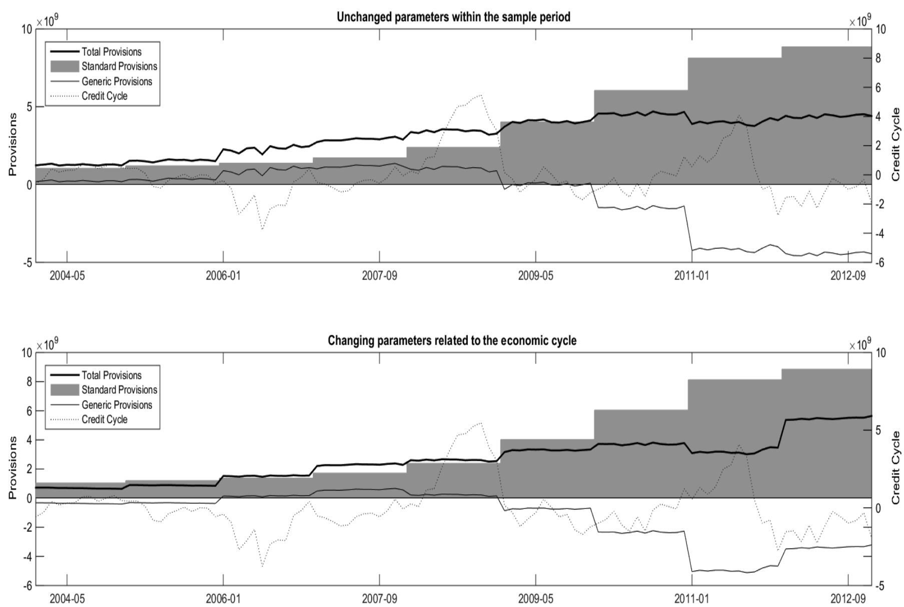

Figure 3. Provisions and credit cycle in Hungary

Source: authors

Different results are shown in the simulation of the dynamic provisions model in the case of Hungary *(Figure 3)*. Here we see that the different setting of parameters α and β would not have a fundamental effect on all parts of the provisions (*Figure 3* top and bottom panels). In the period of 2003 to 2008 the creation of a reserve of dynamic provisions is very low while worse results are shown in *Figure 3* below, i.e. the setting of parameters α and β for a short period. With the fall of the credit issue from mid-2008 it is evident that the effect of the dynamic part would not be shown during the financial crisis because its course shows zero to negative values of the Generic Provisions and a high increase of standard provisions (SP).

In the case of Poland the simulation of the dynamic provisions model shows different results when compared to the Czech Republic and Hungary. For long-term determined and set parameters α and β (*Figure 4,* top panel) no stock of Generic Provisions is created even with credit growth in the period of 2007 to 2008, which is probably caused by inadequately set parameters because the value of standard provisions has no significant fluctuations in this period, i.e. it does not indicate a worse or better trend in the quality of the credit portfolio.

With short-term set parameters α and β (*Figure 4,* bottom panel) there would be a short-term creation of a reserve of Generic Provisions at the start of credit

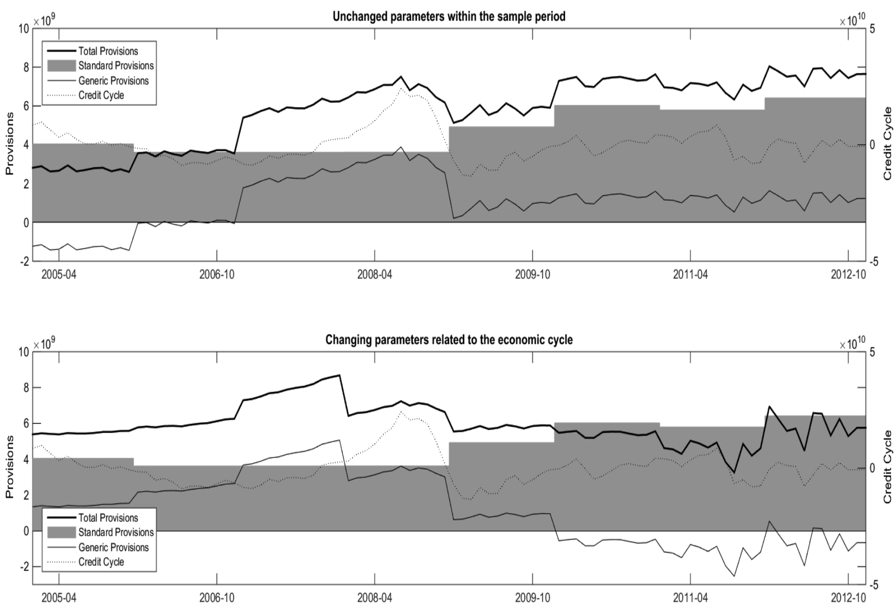

Figure 4. Provisions and credit cycle in Poland

Source: authors

expansion during 2007. In the next period, with the continuing credit expansion in 2008 the simulation paradoxically indicates a fall of the reserve of Generic Provisions with a virtually constant level of standard provisions. The reserve of Generic Provisions would be drawn at the end of 2009.

In the case of Slovakia the course of the simulation is very similar to the trend in the Czech Republic. In case of the unchanged parameters α and β (*Figure 5* top panel) the reserve of Generic Provision would be created in the period from 2007 to mid-2008 and then in the period of credit contraction to a draw of the dynamic part, which means a slight fall and subsequent stabilization of the level of total provisions up to the end of 2010. The simulation also shows a temporary slight growth of total provisions in the period as a consequence of the lower draw of the dynamic part during 2011 and after the increased draw of the dynamic part there is a fall again of the total provisions as of the start of 2012. For the short-term set parameters α and β (*Figure 5* bottom panel) the anti-cyclical effect with the credit fall is substantially lower – only during 2009 there would have been a minimum draw of the dynamic part. As of 2010 the dynamic part is drawn and there is an increase of standard provisions (SP) above the level of total provisions (TP), i.e. the effect of the dynamic part was drawn.

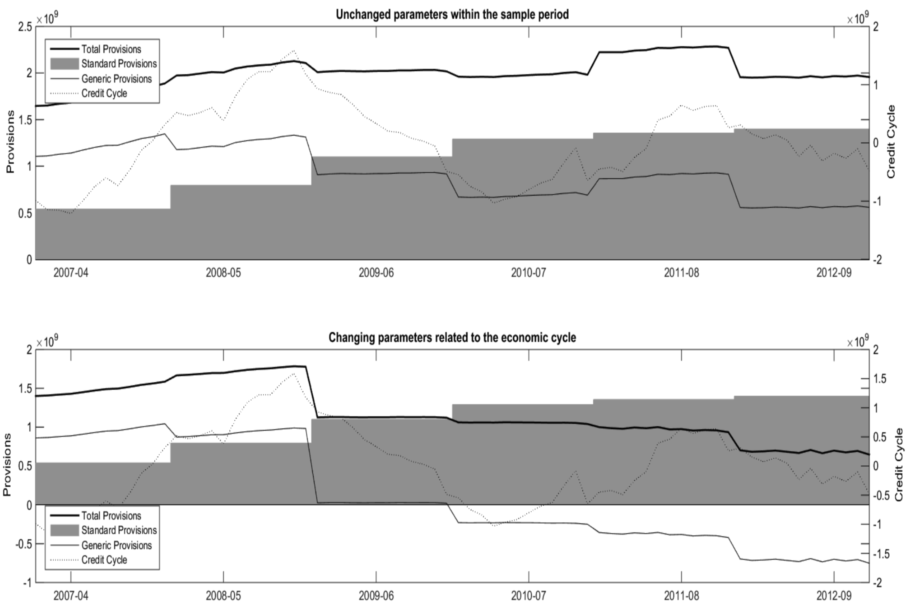

Figure 5. Provisions and credit cycle in Slovakia

Source: authors

Our simulations (except in the case of Hungary) confirm that the higher anti-cyclical effect of the dynamic model of provisions is reached with the setting of parameters α and β from the long period of several cycles and their subsequent application as unchanged parameters again for a relatively long period. The simulations therefore confirm the conclusions of Saurina (2009) or Fillat and Garriga (2010) on the need of the long-term time series for the setting of the values of parameters α and β. However, simultaneously, the study shows the incidence of the inadequate draw of the dynamic part of the provisions (Generic Provisions) in the cases of the Czech and Slovak Republic, which Wezel (2010) points out.

In the next part of the paper we deal with the changes of the total provisions related to the parameter changes in different ranges. The distribution of the total provisions is presented in *Figures 6–9.* Each figure is divided into four histograms. The first histogram presents the current amount and distribution of standard provisions. The second histogram provides distribution of total provisions in the Spanish model of dynamic provisioning with unchanged parameters during the whole sample period. The parameters are given by the recommendation of Banco de España.

Figures 6 to *9* shows that the use of limited parameters α and β according to the Banco de España model does not provide the desirable solution because the level of the total provisions (TP) in all monitored countries is lower with the application of the limited parameters. The adoption of the parameters and their

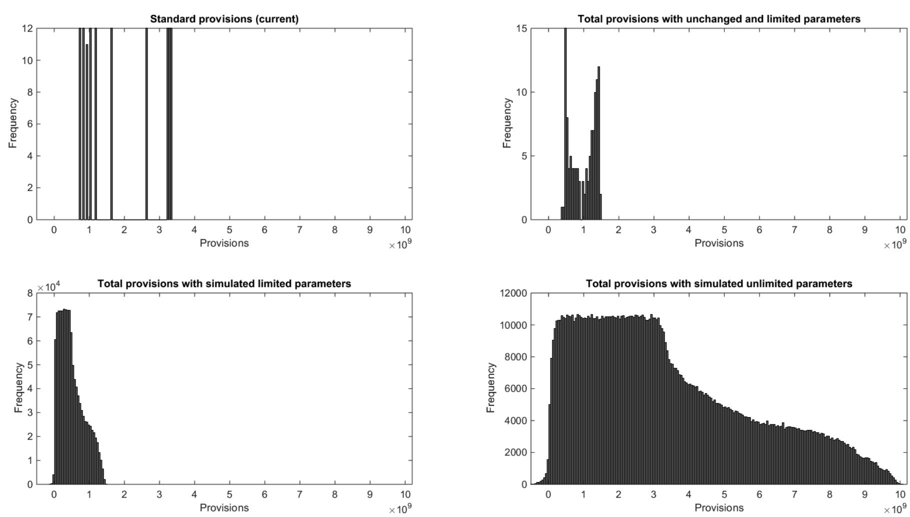

Figure 6. Impact of parameter changes on the provisions in the Czech Republic

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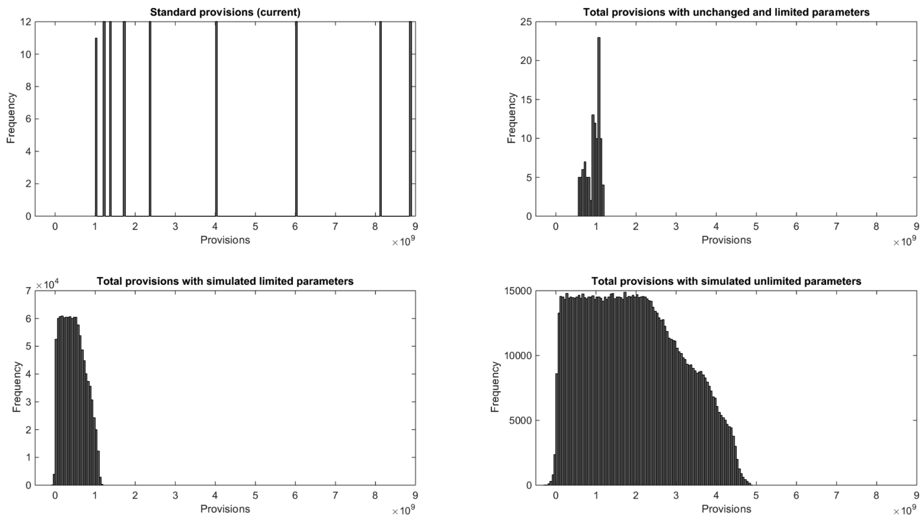

Figure 7. Impact of parameter changes on the provisions in Hungary

Source: authors

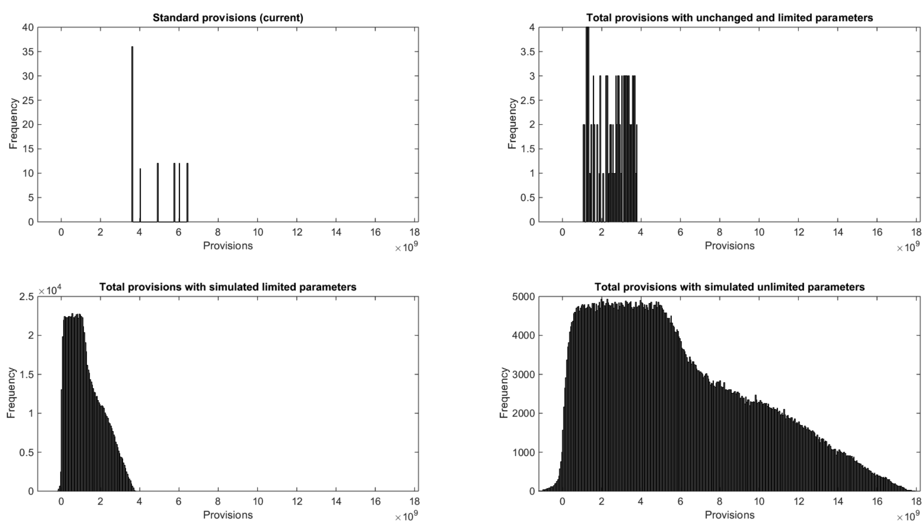

Figure 8. Impact of parameter changes on the provisions in Poland

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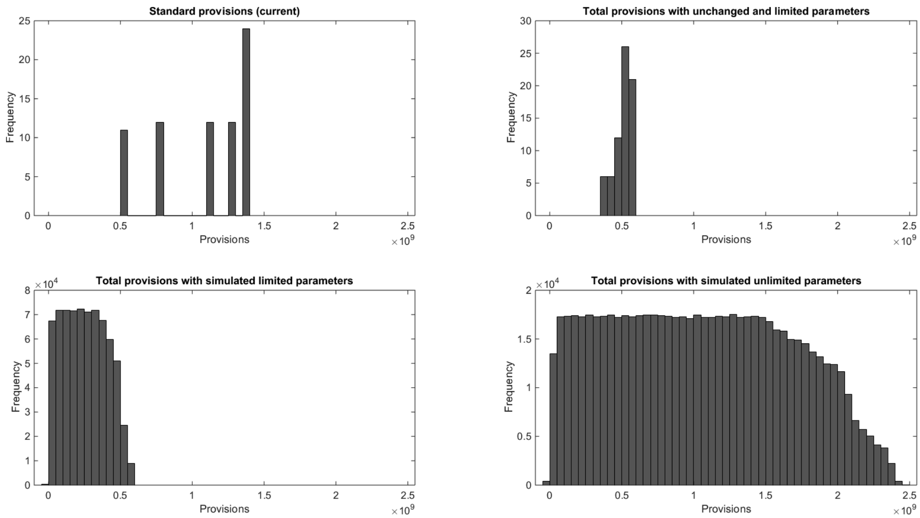

Figure 9. Impact of parameter changes on the provisions in Slovakia

Source: authors

application in different conditions would significantly distort the total provisions (TP) in all monitored countries in this period. In our opinion the standardization of parameters α and β (their harmonization) and their general application in the conditions of different banking and economic systems would not be the desirable solution for managing credit risk and regulating credit cycles.

5. DISCUSSION

In this paper we assume that total provisions affect banks' profit and lending activities, especially before the peak of the economic cycle and during economic downturns and credit falls. This argumentation is consistent with the findings provided by Saurina (2009), who shows that dynamic provisioning smoothed the cyclicality of the total provisions. He argues that non-performing loans increased significantly during the financial crisis, while the total amount of provisions increased much less than generic provisions. The main reason for this development is drawing of dynamic provisions in the crisis period. He concludes that dynamic provisioning has a significant macroprudential character and increases the stability of the banking sector. Similar results were obtained by Chan-Lau (2012). She points out that the Spanish model is able to increase banks' solvency but is not able to reduce cyclicality.

Wezel (2010) contributes the case where the dynamic provision buffer was not able to absorb losses arisen. In that case specific and total provisions increased after the financial buffer was drawn out. However, the banking system was relatively stable thanks to the buffer which was created by dynamic provisions. Finally, the author discusses estimation of the parameters from the historical time series. He argues that there is a reasonable risk of disproportionate buffer creation by dynamic provisions if economic downturns do not achieve the same intensity as in the past.

From that point of view, the key issue is not a question of dynamic provisioning model implementation but parameter estimation, the frequency of changes and their limits.

6. CONCLUSIONS

Dynamic provisioning follows the requirements for loan provisioning *ex ante* related to Basel III. Practical experience of this model could be found in Spain and several Latin American countries. This experience clearly demonstrates the ability of dynamic provisioning to dampen the credit cycle and reduce negative impacts of the economic cycle, in particular the model of dynamic provisioning reduced the decline and volatility of bank profits in economic downturns.

In this paper we combine a microeconomic panel data approach to estimate parameters of the Spanish model of dynamic provisioning with time series simulation. We show that the lower frequency of parameter changes without any upper limits increases the countercyclical effects of dynamic provisioning in V4 countries but generates a buffer which has not been exhausted. In that sense, a possible moral hazard occurs because banks are forced to increase their lending activities.

Finally, we suggest dynamic provisioning as a possible automatic stabilizer related to the paradox of financial instability. In particular, the system allows the re-estimation of loan loss provisions during economic expansion to reduce the underestimation of the current standard provisions which are based on historical loss rates and probability of loss of the bank's current loan portfolio.

REFERENCES

BCBS (2011): *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systeme.* Bank for International Settlements.

Bikker, J. A. – Metzemakers, P. A. J. (2005): Bank Provisioning Behaviour and Procyclicality. *Journal of International Financial Markets, Institutions and Money* 15(2): 141–157.

Borio, C. (2003): Towards a Macroprudential Framework for Financial Supervision and Regulation? *BIS Working Papers 128*, Bank for International Settlements.

Borio, C. – Drehmann, M. (2009): Towards an Operational Framework for Financial Stability: 'Fuzzy' Measurement and Its Consequences. In: Banco Central de Chile (ed.): *Financial Stability, Monetary Policy and Central Banking*.

Bry, G. – Boschan, C. (1971): *Cyclical Analysis of Time Series: Procedures and Computer Programs.* New York: NBER.

Chan-Lau, J. A. (2012): Do Dynamic Provisions Enhance Bank Solvency and Reduce Credit Procyclicality? A Study of the Chilean Banking System. *International Monetary Fund Working Paper*, WP/12/124.

Drehmann, M. – Borio, C. – Tsatsaronis, K. (2011): Anchoring Countercyclical Capital Buffers: The Role of Credit Aggregates. *International Journal of Central Banking* 7(4): 189–240.

Fernandez De Lis, S. – Garcia-Herrero, A. (2009): The Spanish Approach: Dynamic Provisioning and Other Tools. *BBVA Bank Working Paper* 0903.

Fernandez De Lis, S. – Garcia-Herrero, A. (2010): Dynamic Provisions: Some Lessons from Existing Experiences. *Asian Development Bank Institute Working Paper* 218.

Fidrmuc, J. – Schreiber, P. – Siddiqui, M. (2015): The Transmission of Bank Funding to Corporate Loans: Deleveraging in Germany. *Open Economies Review* 26(3): 581–597.

Fillat, J. L. – Garriga, J. M. (2010): Addressing the pro-Cyclicality of Capital Requirements with a Dynamic Loan Loss Provision System. *Working Paper no. QAU10-4*, Federal Reserve Bank of Boston.

Frait, J. – Komárková, Z. (2009): Nástroje na tlumení výkyvů v úvěrové dynamice v průběhu hospodářského cyklu. *Czech National Bank Financial Stability Report* 70: 72–81.

Kashyap, A. – Stein, J. (2004): Cyclical Implications of the Basel II Capital Standards. *Economic Perspectives* 28 (1): 18–31.

Mann, F. – Michael, I. (2002): Dynamic Provisioning: Issues and Application. *Financial Stability Review.* Bank of England, December 2002.

Osiński, J. – Seal, K. – Hoogduin, L. (2013): Macroprudential and Microprudential Policies: Toward Cohabitation. *IMF Staff Discussion Note*, June 2013, SDN 13/05.

Poměnková, J. – Maršálek, R. (2012): Time and Frequency Domain in the Business Cycle Structure. *Agricultural Economics (AGRICECON)* 58(7): 332–346.

Saurina, J. (2009): Loan Loss Provisions in Spain. A Working Macroprudential Tool. *Bank of Spain Financial Stability Review* 17: 11–26.

Saurina, J. (2011): Countercyclical Macroprudential Tools. *National Institute Economic Review* 216: R16.

Tarullo, D. K. (2012): *Developing Tools for Dynamic Capital Supervision.* Speech at the Federal Reserve Bank of Chicago Annual Risk Conference, Chicago, April 10.

Wezel, T. (2010): Dynamic Loan Loss Provisions in Uruguay: Properties, Shock Absorption Capacity and Simulations Using Alternative Formulas. *International Monetary Fund Working paper* 10/125.

Wooldridge, J. M. (2010): *Solutions Manual and Supplementary Materials for Econometric Analysis of Cross Section and Panel Data*. MIT Press Books.