The Impacts of Capital Requirements on Banks' Credit-Creation

By FELIX SCHÄFER*

After the fall of the "reserve position doctrine" in the early 1990s and therefore the exaggerated role of the money-multiplier for the estimation of the maximum money-supply in an economy, there is again a shift to endogenous- and credit-theories of money creation by commercial banks. Since the implementation of the Basel Accords in 1988 it is discussed how the introduced capital requirements can affect banks' lending activities. Although a possible replacement of the money-multiplier has been discussed in literature so far, there are currently only a few models that include capital requirements. This paper presents a new approach to calculate the potential credit-creation (PCC) of banks. The integration of the Basel capital requirements provides simple equations of how the equity, the given solvency ratio and the individual risk-weights can constrain lending activities at bank level. In addition, the PCC illustrates that banks' credit-supply is constrained by capital requirements when certain combinations of those variables occur. The PCC only indicates the area in which the actual lending of the banks is located and therefore represents solely the technical lending possibilities. In contrast to the concept of the money-multiplier, it is not necessary to determine the maximum amount of credit. It is shown, that an inaccurate risk-calculation and a low equity base could reduce the possible credit-supply of an economy.

Keywords: Capital requirements, potential credit-creation, risk-weights, equity

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I. Introduction

Since the financial crisis in 2008, the capital requirements for banks have received a considerable amount of attention within economic research and banking supervision. The rescue and subsidization of some banks by governments led to controversial discussions about the effectiveness of capital requirements and also to a reform of capital regulation at the time. This is part of the general discussion on the effects of capital requirements on banks' credit-supply, which has been discussed since the introduction of the Basel Accords in 1988. Parallel to the implementation of the Basel Accords, there was again a shift in the economic theory debate towards endogenous- and credit-theories of the money creation of commercial banks. According to Bindseil (2004), between 1920 and the late 1980s the "reserve position doctrine" dominated central bank policy and economic theory. Within this doctrine, a reserve concept through the money multiplier would have effects on the monetary aggregates and thus control the maximum money-supply through changes in the monetary base.

The credit creation of commercial banks is independent of deposits and therefore not constrained through reserves. In accounting terms, the credit creation represents an extension of the bank's balance sheet, with a credit being created on the assets side and a deposit on the liabilities side (see e.g. McLeay et al., 2014; Deutsche Bundesbank, 2017). The credit creation of commercial banks may be constrained by internal and external regulations. Furthermore, from an economic point of view, the demand for credit from non-banks, the level of interest rates and the profit maximization of commercial banks can have a considerable impact on their lending behavior (Deutsche Bundesbank, 2017). On the basis of the endogenous credit theory, the bank is autonomous and unlimited in its credit expansion. In this respect, a loss from the lending business would be absorbed by the available equity. In the

1980s, however, banking supervisors around the world began to doubt that banks had sufficient capitalization, which was reinforced by an increased international risk of bank insolvency (Panagopoulos et al., 2017). This led to the Basel Accords, which implemented general capital requirements starting with Basel I in 1988. Since then, the impact of capital requirements on banks' credit-supply has been discussed. While empirical studies have not yet reached a consensus on the results[1], this paper theoretically analyses the direct connection between capital requirements and credit supply.

This paper presents a new approach to calculate the potential credit-creation (PCC) of banks. The integration of the Basel capital requirements provides simple equations of how the equity, the given solvency ratio and the individual risk-weights can constrain lending activities at bank level. In addition, the PCC illustrates that banks' credit-supply is constrained by capital requirements when certain combinations of those variables occur. This paper focuses only on the direct relationship between equity, regulatory requirements and the impact on banks' credit creation possibilities. Additional transmission channels, which determine the impact on credit supply in the most empirical studies, are not included.

II. Capital adequacy and risk weighting according to Basel

A bank's granting of credit always leads to an increase in risk depending on the creditworthiness of the debtor. The increase results from the risk of a partial or complete default of the debtor and the resulting possible loss due to write-downs or value adjustments (Basel Committee on Banking Supervision, 2000). In addition to

[1] See for example Eickmeier et al., 2018; Bahaj et al., 2018; Fraisse et al., 2017.

internal requirements (e.g. a risk interest premium), commercial banks are also obliged by external regulations to back the risks of the lending business with equity capital, which can restrict credit-creation opportunities. At the regulatory level, this refers to the capital adequacy agreements of the Basel Committee on Banking Supervision and the associated capital adequacy requirements for commercial banks in lending, which have been implemented by the EU in the Capital Requirements Regulation (CRR) (Official Journal of the European Union, 2013).[2]

Since 1988, the Basel Committee has published three agreements containing recommendations for the regulation of banks by the banking supervisory authorities, whereby the current agreement (Basel III) has been gradually implemented since 2014. Since the introduction of Basel I and its implementation in the CRR, commercial banks have had to hold at least 8 % of their risk positions (solvency ratio) as equity, which is also referred to as regulatory capital[3]. Accordingly, all risk-bearing assets on the balance sheet must be included in the provision for risks, which relates to all credits granted by a bank. The risk assessment of the individual risk positions, or assets A, is based on an individual weighting δ. The solvency ratio sr determines the proportion of the respective risk-weighted position to be backed by own funds. With Basel III, the minimum solvency ratio was gradually raised from 8 % to currently 10.5 % (Basel Committee on Banking Supervision, 2011). The regulatory required equity (or capital) backing E_{reg} for an individual risk position is calculated as follows:

$$E_{reg} = A \cdot \delta \cdot sr_{min} \quad ; \quad 0 < sr \leq 1 \tag{1}$$

[2] Unless otherwise indicated, the regulatory requirements stated in this chapter and the equations derived from them by the author are based on the following source: Official Journal of the European Union, 2013.

[3] To reduce complexity, this paper does not distinguish between different types of bank equity (i.e. tier-1 and tier-2 capital)

The amount of equity backing is therefore primarily determined by the individual risk weighting δ of an asset. Furthermore, the total sum of the risk-weighted positions $A\delta$ may not exceed the required regulatory capital, which can be calculated by multiplying the equity E and the reciprocal value of the solvency ratio sr_{min}:

(2) $$\sum A\delta \leq E \cdot \frac{1}{sr_{min}}$$

Whereby for each risk position i of all debtors D and the related amount of Equity E_i applies:

(3) $$\sum_{i=1}^{D} A_i \cdot \delta_i \leq E_i \cdot \frac{1}{sr_{min}}$$

These regulatory requirements have two fundamental consequences for bank lending. On the one hand, the credit-creation possibilities are limited by the respective available equity depending on the solvency ratio. On the other hand, the absolute volume of lending depends on the average risk weighting $\emptyset\delta$. For example, if a commercial bank only grants credits with low risk, then the lending volume for the equal equity is higher than for a high-risk credit portfolio. As the equity of commercial banks is variable, their credit-creation possibilities may also vary. For example, a commercial bank's equity shown in the balance sheet changes as a result of capital reserves, retained earnings or losses and the issue of equity shares. As a result, banks are dependent on the extent to which they can generate and maintain equity in the short or long term.

With regard to credit, the risk weighting is crucial as it leads to a higher equity backing. For the weighting of credit risks, two basic approaches are permissible, which were introduced with Basel I and II. The commercial banks have the option of independently assessing their credit risks by means of an Internal Rating Based Approach (IRBA) upon application to the respective banking supervisory authorities. Otherwise, an external rating can be used for credit risks, which is referred to as the Standardized Approach for Credit Risk (SACR).[4] It is also possible to use and combine internal and external approaches for targeted risk estimation. In both approaches, three different parameters are used to determine a borrower's risk. The probability of default (PD) estimates the potential default risk of a debtor within a specific time. In addition, the loss given default (LGD) is used to forecast the amount of the potential loss on an exposure. The third risk parameter is the credit amount at the time of default (exposure at default, EaD), which represents the debtor's outstanding exposure. (see van Greuning et al., 133-138, 2009)

Depending on the methods used to measure the credit risk, the parameters mentioned are determined internally by the bank in accordance with IRBA or externally by rating companies or the banking supervisory authority in accordance with SACR. Under SACR, all risk positions of a bank are evaluated by external ratings. This is based on valuation tables issued by the Basel Committee on Banking Supervision, which indicate a percentage classification of credit risks (Basel Committee on Banking Supervision, 2006). The risk-weights differ depending on the type of debtor, which includes companies, sovereigns and financial institutions, for example. An assessment by an external rating agency or the banking supervisory

[4] If no external rating is available, standard bank supervisory rates are used. For example, the exposure classes are 100 % for credits to non-banks without a rating, 75 % for retail credits or 35 % for real estate credits secured by residential real estate.

authority is a prerequisite for an assessment according to SACR. Depending on the assessment and classification of a borrower's risk, the respective risk positions are weighted. The equity backing is then calculated by multiplying the risk position by the risk weighting and the solvency ratio, as shown in Equation (1). Table 1 below shows the risk weightings of the respective rating classes for credits to sovereigns and corporates:

TABLE 1— CREDIT RISK-WEIGHTS BY RATING CLASS (SACR)

Credit Assessment	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Sovereigns	0 %	20 %	50 %	100 %	150 %	100 %
			(BBB+ to BB-)		**(Below BB-)**	
Corporates	20 %	50 %	100 %		150 %	100 %

Notes: For further risk-weights and comprehensive details of the Standardized Approach see Basel Committee on Banking Supervision (2006).

Source: Basel Committee on Banking Supervision (2006).

The rating classes *AAA* to *AA*- therefore have the lowest risk weighting, with no risk weighting required for sovereigns in this class. This also indicates that commercial banks do not have to provide equity backing for credits to sovereigns in these rating classes and that therefore unlimited credits could be granted. Under SACR, however, credits without or with a partial rating only receive a risk weighting of 100 %. This lower weighting is intended to enable national supervisory authorities to measure individual default risks on exposures and, where appropriate, to apply a higher risk-weight of up to 150%. Nevertheless, it can also be assumed that some exposures without a rating are measured with a lower risk-weight despite a lower quality and are therefore backed by less equity than would be necessary (Koulafetis, p. 47, 2017). In the internal rating method (IRBA), the previous risk-weights are calculated using the bank's own models. These must be reviewed and approved by the respective banking supervisory authorities and enable the banks to individually adjust the risk-weights with regard to their credit

exposures. Furthermore, the distribution of individual positions across different rating classes can lead to higher granularity and thus an appropriate risk weighting of the entire portfolio (Basel Committee on Banking Supervision, 2017). The two approaches to risk weighting should guarantee a higher risk sensitivity of the capital requirements, which adequately reflect the actual credit risks of commercial banks. However, this requirement presupposes that the models applied can also reflect the risks assumed. The regulatory equity backing required for the credit portfolio of a commercial bank is therefore determined to a large extent by the risk weighting. The lower the calculated risk-weight of a granted credit, the lower the equity backing.

III. The potential credit-creation of commercial banks

As already mentioned, in the classical monetary approach the maximum credit-creation is derived from the "money multiplier" and is thus significantly dependent on the minimum reserve or the available reserves. Even though this model of multiple money creation is increasingly viewed critically[5], no alternative basis has yet been established for a "maximum" credit-creation of commercial banks. Within post-keynesian theory, reference was already made to the restrictive effect of capital adequacy rules in the years following the introduction of Basel I in 1988 (Dow, 1996). In this regard, it was also discussed to what extent regulatory requirements could replace the previous theory of the money multiplier (Lavoie, p. 199, 2014). On the basis of the Capital Requirements Regulation (CRR) already mentioned, restrictions can be derived with respect to credit-creation by commercial banks. However, due to the volatility of the factors described above

[5] See therefor McLeay et al. (2014) and Carpenter et al. (2010).

(risk weighting and equity backing), the term "maximum credit-creation" is misleading, as it suggests a constant finite value and therefore the term "potential credit-creation" (PCC) is used later in this paper. In the following, a possible approach to determining the PCC is presented, which from an economic point of view allows conclusions to be drawn about the development of commercial banks' lending possibilities. This integrates the capital adequacy requirements, but is not dependent on the minimum reserve due to the asset-side view of the balance sheet. The determined potential credit-creation indicates the range in which the actual lending of a commercial bank varies.

On the basis of the regulatory requirements in equations (1) to (3), the commercial banks' potential lending volume[6] can be derived from equity and risk-weights. Thus, the potential credit-creation C_y^{pcc} of a bank y results from the available equity E_y in relation to the average risk-weights $\emptyset\delta_y$ of the credit portfolio multiplied by the regulatory minimum solvency ratio sr_{min}:

$$C_y^{pcc} = \left(\frac{E_y}{\emptyset\delta_y \cdot sr_{min}}\right) \tag{4}$$

Whereby $\emptyset\delta_y$ represents the weighted average of the individual risk-weights δ_i of every credit c_i in the credit portfolio:

$$\emptyset\delta_y = \frac{\sum_{i=1} c_i \cdot \delta_i}{\sum_{i=1} c_i} \tag{5}$$

[6] Assuming constant average risk-weights for further lending. Additional credits with a lower or higher risk-weight would influence the average risk-weight of the portfolio and thus also the level of the potential credit-creation C_y^{pcc}.

The excess credit possibilities C_y^{ex} can be calculated by deducting the current credit volume of the banks' portfolio[7] C_y from the potential credit-creation C_y^{pcc}.:

$$C_y^{ex} = C_y^{pcc} - C_y \tag{6}$$

If C_y^{ex} is zero, then the bank's credit creation possibilities are exhausted and no further credits can be granted. If C_y^{ex} is negative, the capital requirements would be violated.

For a modeled commercial banking system within a closed economy, in which the equity of all commercial banks E^t, the solvency ratio sr_{min} (currently 10.5 % under Basel III) and their total average risk-weight $\emptyset\delta^t$ would be known, the potential credit-creation $C^{pcc;\,t}$ at a certain time t could be calculated from equation (4):

$$C^{pcc;\,t} = \frac{E^t}{\emptyset\delta^t \cdot sr_{min}} \quad ; \quad 0 < sr_{min} \leq 1 \tag{7}$$

With a given solvency ratio sr, the PCC depends on the total equity of the commercial banks of an economy. The average risk taken by banks is the decisive factor that determines the potential credit-creation in an economy with a leverage effect. Equation (7) can be used to compare the change in lending possibilities between at least two periods and thus approximate the potential credit growth. However, the PCC does not indicate future credit growth, but rather provides a possible indicator of how the risk-dependent lending opportunities of banks will change in line with regulatory requirements and changes in equity. The PCC can

[7] Applies only under the assumption that the bank holds only credits as assets. Accordingly, other assets are not considered in this paper. However, it would be possible to apply this to all risk-weighted assets of a bank.

also be graphically displayed. The lending possibilities are in the range below the PCC-curve, which can be determined for each risk-weight. Figure 1 illustrates the potential credit-creation curve for 1 MU[8] equity and a solvency ratio of 8 % in line with Basel II, depending on the regulatory risk-weights.

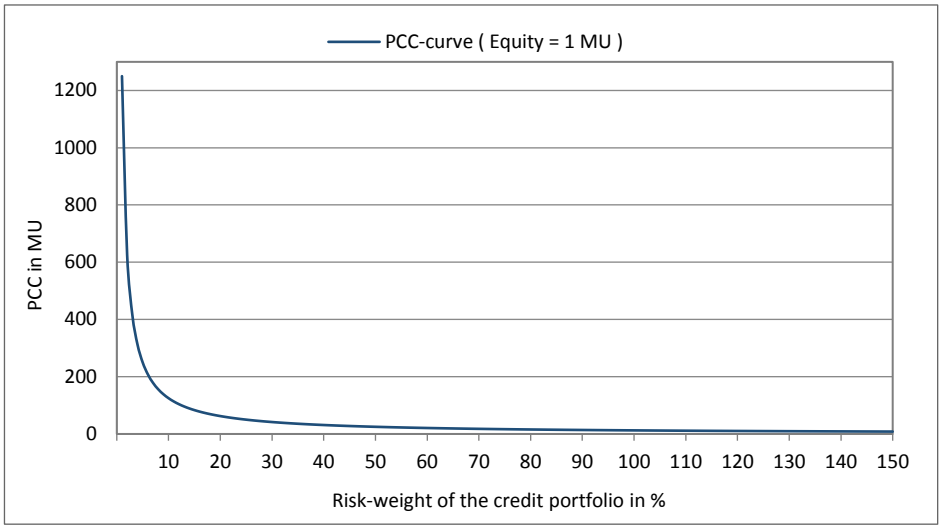

FIGURE 1. POTENTIAL CREDIT-CREATION CURVE

The PCC-curve in Figure 1 illustrates the effect of the risk-weights on the credit portfolio. As the risk-weight decreases, the potential lending opportunities of commercial banks increase accordingly. With equity of 1 MU, the potential credit creation for the highest risk-weight of 150 % is approximately 8 MU and for the lowest risk-weight of 1 % it is 1250 MU. As already mentioned, lending with a risk-weight of 0 % does not require equity backing and is therefore unlimited. This indicates that the PCC of a commercial bank may vary even if equity remains constant due to the weighted risks determined. This already applies to the two approaches (IRBA and SACR) for determining risk-weights. On average, the use

[8] MU = monetary unit

of internal models results in lower risk-weights than under the standardized approach. In 2015, the median credit risk-weights under IRBA of the banks supervised by the European Banking Authority were 34 %. The credit portfolios weighted according to SACR were rated at a median of 75 % and thus significantly higher (Turk-Ariss, 2017). Accordingly, banks using IRBA risk-weights have higher credit-creation opportunities, which can be proven by a modification of equation (1):

$$A = \frac{E}{\delta \cdot sr_{min}} \quad ; \quad 0 < sr \leq 1 \tag{8}$$

With a minimum solvency ratio sr_{min} of 8 % in 2015 and an average risk-weight δ of 34 %, banks under IRBA were able to lend approximately 36 MU with each monetary unit of available equity E as credits. By comparison, under SACR, with an average risk-weight of 75 %, only 16 MU per monetary unit of equity were available and thus significantly lower. According to Haldane (2013), since its introduction, the average risk-weights has tended to decrease. While these were still around 70 % in 1993, the average risk-weights in 2011 were only slightly above 40 %.[9] It may be possible that the risks incurred by commercial banks have decreased over time or that their risk management has improved significantly. However, in the light of the financial crisis, it can be assumed that in order to increase the return on equity and meet capital adequacy requirements, commercial banks wanted to keep the risk-weights of their assets as low as possible by allowing their risks to be assessed internally (Haldane, 2013). This risk reduction is also referred to as regulatory arbitrage, i.e. the minimization of regulatory effects on the banking business through the application of internal risk models, the innovative

[9] The underlying data relate to a sample of 17 major international banks, including Deutsche Bank, Barclays and Citigroup; cf. Haldane (2013), p. 11

collateralization of risks or the development of new financial products (e.g. the securitization of exposures) (Jones, 2000; Beltratti et al., 2016; Ferri et al., 2017). The potential credit creation of commercial banks, which mainly calculate their risks using internal models, is correspondingly higher and the provision for possible credit losses as well as the regulatory capital lower. The Basel proposals were originally intended to strengthen the stability of the financial sector and the solvency of commercial banks, but at the same time they offered commercial banks the opportunity to minimize these regulatory requirements through the risk weighting of assets.

In modern credit theory, the credit creation process is derived from a balance sheet extension, whereby demand deposits are only created through the granting of credit. Some economists refer to the regulatory capital requirements in the discussion about the limits of this autonomous credit creation (e.g. Borio et al., 2009; Lavoie, p. 514 2003; Godley et al., p. 401-402, 2007; Peek et al., 1995). The presented approach of the potential credit creation can reflect the constraints of the credit creation by commercial banks through the implementation of regulatory requirements. It was found that, in addition to the equity base of the commercial banks, the lending possibilities depend to a significant extent on the risk weighting and the solvency ratio. The autonomous credit creation by commercial banks is restricted by regulatory capital requirements. However, the optimal credit volume is by no means derived; rather, the approach serves to illustrate the technically possible lending of commercial banks or banking systems. A periodic comparison of the PCC could be an additional indicator for estimating potential credit growth.

IV. Credit-supply and the Paradox of Capital Requirements

The impact of capital requirements on the credit-supply of banks has been often discussed in the literature. The results of the empirical literature, however, do not provide any clear evidence on the extent to which positive or negative effects on the credit-supply arise (e.g. see Eickmeier et al., 2018; Bahaj et al., 2018; Fraisse et al., 2017). Though, some fundamental and theoretical inferences can be drawn from the conditions and equations mentioned in the previous chapters. Based on the derivation of the potential credit creation C_y^{pcc} (equation (4)), three factors are decisive for the lending possibilities: the equity, the solvency ratio and the average risk-weight.

The absolute value of equity can only be altered by the respective bank. An increase (reduction) in equity would ceteris paribus lead to an increase (reduction) in the potential credit creation. For example, a doubling of equity leads to a doubling of the potential credit creation. In this respect, a change in equity results in a new PCC-curve with a stretched (if the equity is increased) or compressed slope (if the equity is reduced), as shown in Figure 2. Similarly, a change in the solvency ratio, which is only specified by the regulator, leads to a new PCC-curve. Any variation in the average risk-weight would result in a new point on the PCC curve and consequently a new potential credit creation. The level of risk-weights depends on the regulatory framework, the use of internal rating models or the external risk assessment of rating companies and standardized approaches of the regulator.

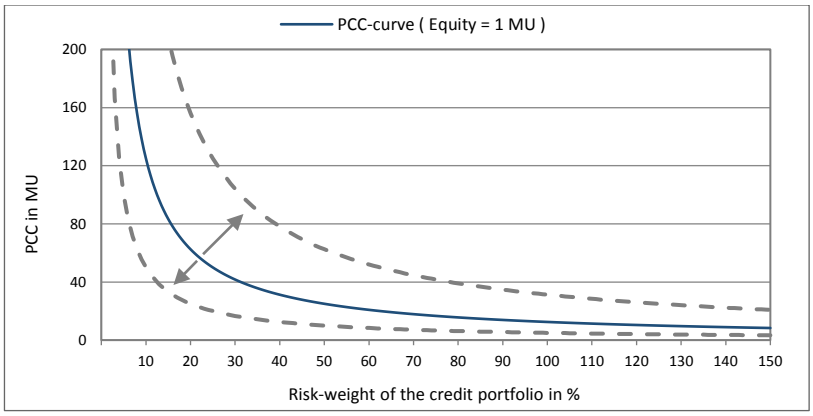

FIGURE 2. CHANGE OF ABSOLUTE EQUITY OR THE SOLVENCY RATIO

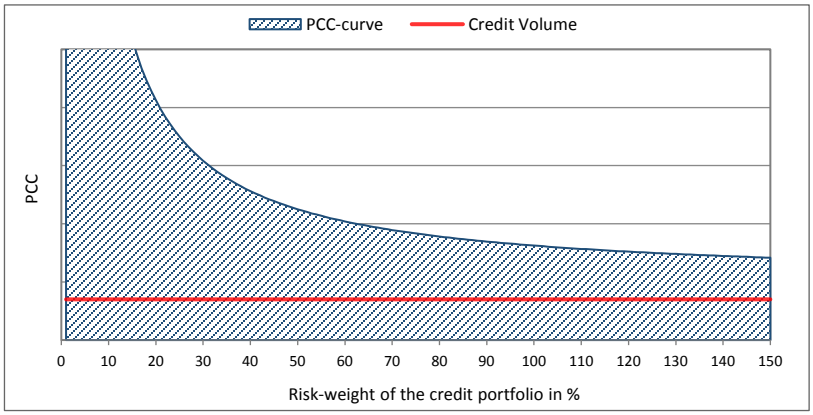

FIGURE 3. CAPITAL-UNCONSTRAINED BANK

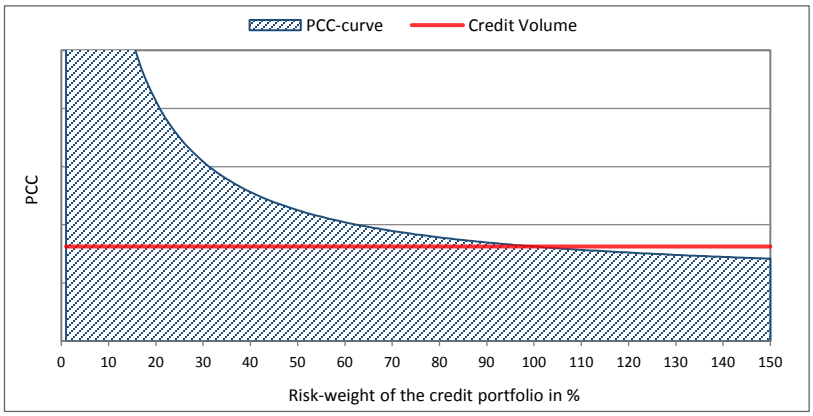

FIGURE 4. CAPITAL-CONSTRAINED BANK

In order to assess the impact of capital requirements on the credit-supply of banks, a distinction must be made between two cases: capital-constrained and capital-unconstrained banks. Figure 3 shows the PCC-curve and the current credit volume of a capital-unconstrained bank. It can be noted that the exemplary bank still has excess credit possibilities (C_y^{ex}) for every risk-weight, which is represented by the distance of the PCC-curve from the current credit volume. Accordingly, this representative bank is unconstraint in its potential credit-supply. Figure 4, in contrast, shows the case of a capital-constrained bank. It can be recognized that there are not sufficient excess credit possibilities (C_y^{ex}) available for every risk-weight. This bank could no longer grant any further credit with a risk-weight of more than 100 %, although the lending possibilities with lower risk-weights would also be limited. As a result, the credit-supply would be constraint in this situation. In order to leave such a capital-constrained situation, the banks have three fundamental options: (i) increase equity, (ii) reduce the credit portfolio or (iii) reduce the average risk-weight. However, the latter two options have more or less disadvantages in terms of effectiveness and practicability. The reduction of the average risk-weight can only be achieved by granting additional credits at low-risk, which can be considered rather inefficient. In conjunction with (ii), that is the reduction of the credit portfolio, a more effective option could be used. This is achieved by an active portfolio reduction, i.e. by selling or writing down credits. However, both variants result in a loss and accordingly could reduce the equity of a commercial bank beyond the extent of the respective loan loss provisions. On the one hand, the sale would release equity, which was previously bound by the regulatory requirements. On the other hand, credits are mostly sold below market value to investors. The resulting loss reduces equity and may exceed the released regulatory risk provision. A partial or complete write-off of a credit would thus

exceed the release of equity. However, this depends on the amount of collateral that could be utilized.

The most effective option is to increase absolute equity (i), as this would lead to a new PCC-curve and thus to higher excess credit possibilities. This is in line with the arguments of Admati and Hellwig (2013), which also point to an increase in lending opportunities through the increase in equity. In a banking system with a regulatory capital framework, higher equity cause a higher potential credit creation and therefore has no direct negative effect on the credit-supply of a bank. This is in significant contrast to the results of some empirical studies already mentioned, which have identified different effects of tighter regulatory requirements on credit-supply through bank-specific transmission channels. One might say, that the theoretical assumptions in this paper lead to a “Paradox of Capital Requirements”. In the case of a capital-unconstrained bank, an increase in absolute equity as well as an appropriate increase in the capital requirements has no direct impact on the credit-supply. Furthermore, the same applies to a capital-constrained bank, where an increase in absolute equity also increases the credit creation possibilities. However, in certain situations, such as in times of frequent exogenous changes in the average risk-weight from e.g. macroeconomic shocks, a tightening of capital requirements may occasionally result in a restriction on the credit-supply of a bank. This may be due to an insufficient equity base combined with an inadequate assessment of the risks incurred.

V. Conclusion

In this paper, the impact of capital adequacy requirements on banks' credit creation was theoretically analyzed. On the basis of the regulatory capital

requirements, an approach was developed which can determine the credit creation possibilities of commercial banks. The integration of the Basel capital requirements provided simple equations of how the equity, the given solvency ratio and the individual risk-weights can constrain lending activities at bank level. In addition, the PCC illustrates that banks' credit-supply is constrained by capital requirements when certain combinations of those variables occur. Nevertheless, the PCC only indicates the area in which the actual lending of the banks is located and therefore represents solely the technical lending possibilities. It has been proven that the capital requirements have no direct impact on the credit-supply of capital-unconstrained banks. Only in the case of capital-constrained banks a tightening of capital requirements may occasionally result in a restriction on the credit-supply of a bank.

REFERENCES

Admati, Anat; Hellwig, Martin (2013). “The Bankers´ New Clothes”, Princeton.

Bahaj, Saleem; Malherbe, Frederic (2018). “The Forced Safety Effect: How Higher Capital Requirements Can Increase Bank Lending”, Working Paper, London.

Basel Committee on Banking Supervision (2000). “Principles for the Management of Credit Risk”, Basel.

Basel Committee on Banking Supervision (2006). “International Convergence of Capital Measurement and Capital Standards”, Basel.

Basel Committee on Banking Supervision (2011). “Basel III: A global regulatory framework for more resilient banks and banking systems”, Basel.

Basel Committee on Banking Supervision (2017). “High-level summary of Basel III reforms”, Basel.

Beltratti, Andrea; Paladino, Giovanna (2016). “Basel II and regulatory arbitrage. Evidence from financial crises”, in: Journal of Empirical Finance, Vol. 39 (2016), pp. 180–196, Milan.

Bindseil, Ulrich (2004). "The operational target of monetary policy and the rise and fall of reserve position doctrine", European Central Bank, Working Paper Series, No. 372, Frankfurt am Main.

Borio, Claudio; Piti Disyatat (2009). “Unconventional monetary policies: an appraisal”, BIS Working Papers, No. 292, Basel.

Carpenter, Seth B.; Demiralp, Selva (2010). “Money, Reserves, and the Transmission of Monetary Policy: Does the Money Multiplier Exist?”, in: Finance and Economics Discussion Series, Vol. 41 (2010), Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington D.C..

Deutsche Bundesbank (2017). “The role of banks, non- banks and the central bank in the money creation process”, Monthly Report, April 2017, Frankfurt am Main.

Dow, Sheila C. (1996). “Horizontalism: a critique”, in: Cambridge Journal of Economics, Vol. 20, No. 4, pp. 497 – 508, Oxford.

Eickmeier, Sandra; Kolb, Benedikt; Esteban Prieto (2018). „Macroeconomic effects of bank capital regulation”, Bundesbank Discussion Paper, No 44/2018, Frankfurt am Main.

Ferri, Giovanni; Pesic, Valerio (2017). “Bank regulatory arbitrage via risk weighted assests dispersion”, in: Journal of Financial Stability, Vol. 33, pp. 331 – 345, New York.

Fraisse, Henri; Lé, Mathias; Thesmar, David (2017). “The real effects of bank capital requirements”, European Systemic Risk Board, Working Paper Series, No 47 / June 2017, Frankfurt am Main.

Godley, Wynne; Lavioe, Marc (2007). “Monetary Economics – An Integrated Approach to Credit, Money, Income, Production and Wealth”, New York.

Haldane, Andrew G. (2013). “Constraining discretion in bank regulation”, Speech given at the Federal Reserve Bank of Atlanta Conference on ‘Maintaining Financial Stability: Holding a Tiger by the Tail(s)’”, Federal Reserve Bank of Atlanta, Atlanta.

Jones, David (2000). “Emerging problems with the Basel Capital Accord: Regulatory capital arbitrage and related issues”, in: Journal of Banking & Finance, Vol. 24 (2000), pp. 35 – 58, Washington D.C..

Koulafetis, Panayiota (2017). “Modern Credit Risk Management – Theory and Practice”, London.

Lavoie, Marc (2003). “A Primer on Endogenous Credit-Money”, in: Modern Theories of Money – The Nature and Role of Money in Capitalist Economies, ed.: Rochon, Louis-Philippe; Rossi, Sergio, pp. 506 – 543, Cheltenham.

Lavoie, Marc (2014). “Post-Keynesian Economics – New Foundations”, Cheltenham.

McLeay, Michael; Radia, Amar; Thomas, Ryland (2014). “Money creation in the modern economy”, in: Bank of England – Quarterly Bulletin, 2014 Q1, Volume 54 No. 1, pp. 14 – 27, London.

Official Journal of the European Union (2013). “Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012”.

Panagopoulos, Yannis; Spiliotis, Aristotelis (2017). “New insights on the money-supply-endogeneity debate and the new `equity´ multiplier: some evidence from the euro area”, in: Rochon, Louis-Philippe; Rossi, Sergio (2017), Advances in endogenous money analysis, pp. 129-144, Cheltenham.

Peek, Joe; Rosengren, Eric S. (1995). „Bank Lending and the Transmission of Monetary Policy”, in: Is Bank Lending Important for the Transmission of Monetary Policy?, Federal Reserve Bank of Boston Conference Series, Vol. 39, pp. 47 – 68, Boston.

Turk-Ariss, Rima (2017). “Heterogeneity of Bank Risk Weights in the EU: Evidence by Asset Class and Country of Counterparty Exposure”, IMF Working Paper, WP/17/137, Washington D.C..

Van Greuning, Hennie; Brajovic Bratamovic, Sonja (2009). “Analyzing Banking Risk – A Framework for Assessing Corporate Governance and Risk Management”, 3rd Edition, The World Bank, Washington D.C..