

CREDIT CREATION THEORY AND FINANCIAL INTERMEDIATION THEORY: DIFFERENT INSIGHTS ON BANKS' OPERATIONS

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Abstract. *Purpose* – already for more than one hundred years there is an ongoing discussion about the role and function of banks, which subsequently has affected banking regulation. Three theories of banking were dominant in different periods of the 20th century: Credit creation theory (the oldest), Fractional reserve theory, Financial intermediation theory. Authors are contributing to the theoretical discussion with research showing that Credit creation theory and Financial intermediation theory reflect different insights on banks' operations.

Research methodology – literature review (regarding theories), financial ratio calculations (Loans-to-Deposits ratio);

Findings – using Loans-to-Deposits ratio calculations for several banks researchers have found that banks' lending process can be explained by Credit creation theory however banks' Strategic Asset-Liability Management can be explained by Financial intermediation theory.

Research limitations – (a) only domestic banks were selected as in this research it is important to get the needed relationship between deposits and lending. Subsidiaries of foreign banks could have not balanced balance sheet from Loans-to-Deposits ratio perspective as their funding could come from abroad if the business model in Baltics is primarily lending oriented, (b) Baltic market was taken because of know-how of researchers about banks operations here and history of their transformation, (c) audited financial reports were used as they gave a sufficient picture of banks Loans-to-Deposits ratio.

Practical implications – theoretical discussion in this paper enlightens the role and function of the banks thereby improving understanding of better banking regulation. Authors propose to adjust the current banking regulatory framework which is focused on capital requirements.

Originality/Value – current research provides some link between existing banking theories (Credit creation theory and Financial intermediation theory) shaping a new hybrid concept and proposing an adjusted regulatory framework based on this hybrid concept.

Keywords: Baltic banks, Credit creation theory, Financial intermediation theory, Loans-to-Deposits ratio, Regulatory framework.

JEL Classification: E44, E51.

Conference topic: Contemporary Financial Management.

Introduction

Already for more than one hundred years, there is an ongoing discussion about the role and function of banks, which subsequently has affected banking regulation. Most of current authors and researchers refer to Financial intermediation theory in order to explain the bank's role in the economy. Another theory – Credit creation theory – mostly supported by researchers of the beginning of the 20th century has now appeared in the articles of Werner (2014, 2016), Schumpeter (2016), Biondi (2018) etc. Other researchers support the Fractional reserve theory. Werner (2014, 2016) moved forward in scientific discussion with an empirical experiment using accounting records reflected in the balance sheet of Raiffeisenbank Wildenberg' annual financial reports of 2013. This experiment showed that only Credit creation theory supports empirical results.

Taking into account that results were observed in one particular bank and these results did not provide support for the dominating theory today – Financial intermediation theory –, authors investigated whether there are some financial ratios which can be observed based on publicly disclosed information and which can provide some insights in

abovementioned theories. After some brainstorming authors chose Loans-to-Deposits ratio (hereinafter – LDR) as an observable financial ratio and thereby this paper is dedicated to insights LDR gives on banking theories. Taking into account that authors are familiar with Baltic banking, authors decided to put a research limitation and look for several Baltic banks in order to evaluate statements of Credit creation theory and Financial intermediation theory based on data from bank's balance sheet.

This paper is organized in the following sections:

- (a) main findings from previous research are provided, including findings from empirical studies;
- (b) research motivation with the research hypothesis is stated;
- (c) data and data analysis methodology is explained;
- (d) findings are explained;
- (e) conclusions are made and possible practical implications are explained. Further research directions are shaped in this section as well.

Findings show the mixed result of both theories, i.e. hypothesis can not be rejected that Credit creation theory explains technical aspects of the loan issue process and Financial intermediation theory – strategic decisions of bank's management, and thereby authors propose the idea of a combination of theories and accordingly adjusting regulatory framework based on LDR ratio:

- a) if LDR is lower than $(1 - \alpha)$ times, then regulatory framework could be based on capital requirements;
- b) if LDR is $(1 - \alpha)$ times or higher, the regulatory framework could be based on (a) capital requirements and (b) credit policy restrictions or guidance.

1. Previous research

1.1. Financial intermediation theory

Servigny and Renault (2004, 2, pp. 12–19) refer to Financial intermediation theory in order to explain bank's role in the economy through three major intermediation functions: liquidity intermediation, risk intermediation and information intermediation. The need for those functions is arising due to the absence of Walrasian financial markets, providing full efficiency and completeness. Liquidity intermediation is explained as reallocation of money in excess provided by depositors to money need (due to investment projects) in the form of loans. Risk intermediation is explained as risk reengineering bank is doing when collecting risks from the economy (credit risk, interest rate risk, currency exchange risk etc.) and transforming/ repackaging them into new securities with varying degrees of risk. Information intermediation is explained as a function of balancing interests of well-informed entrepreneurs and less-informed savers in the conditions of information asymmetry when entrepreneurs' designed investment project is presented to the bank (savers).

This theory was already reflected in influential Keynes' (1936) work "The General Theory of Employment, Interest and Money" where Keynes stated that savings are needed for investments to take place. Subsequently, this theory is reflected in Keynesian models developed by researchers after Keynes. Today one of the bestselling textbooks about financial markets and institutions (Mishkin & Eakins, 2016) when describing financial institutions refer to Financial intermediation theory. And this theory is incorporated in research and policy of central banks (e.g. Bindseil & Jablecki, 2011; Federal Reserve Bank of New York, 2012) and current researchers (e.g. Mehra, Piguillem, & Prescott, 2011; Distinguin, Roulet, & Tarazi, 2013; Goel, Song, & Thakor, 2014; Beck, Kotz, & Zabelina, 2016; Gordon, 2017).

On the other hand, when Osborne, Fuerte, and Milne (2017) investigated the relationship between bank capital ratios and lending rates using data from 1998 to 2012 for 13 large banks accounting for 75% of total UK lending, their discovered instability was difficult to reconcile with Financial intermediation theory.

1.2. Credit creation theory

According to supporters of Credit creation theory bank do not need necessary to collect deposits at first in order to issue the loan. MacLeod (1906) said that "the business of banking is not to lend money, but to create Credit: and by means of the Clearing House these Credits are now transferred from one bank to another, just as easily as a Credit is transferred from one account to another in the same bank by means of a cheque." Many supporters of this theory wrote their articles in the first 20 years of the 20th century.

Recently Werner (2014) did the comparison of three banking theories: Financial intermediation theory, Fractional reserve theory and Credit creation theory. After an empirical experiment with data from Raiffeisenbank Wildenberg Werner (2014, 2016) concluded that Credit creation theory is the only explaining results in the experiment. On Werner's findings (first ideas regarding this topic were published already in 1992) refer Turner (2012) when researching socially optimal allocation of credit to different economic sectors or activities and Ponomarenko (2017) when researching the money creation mechanisms in emerging markets with special focus on external transactions and outlines the implications for monetary policy and financial stability issues. Other supporters recently published their views are Jakab and Kumkof (2014), Schumpeter (2016), Xiong, Fu, and Wang (2017) and Biondi (2018). Jakab and Kumkof (2014) point out that "(...) because the process does not involve physical resources, but rather the creation of money

through the simultaneous expansion of both sides of banks' balance sheets. While money is essential to facilitating purchases and sales of real resources outside the banking system, it is not itself a physical resource, and can be created at near zero cost." Schumpeter (2016) claims that "it is much more realistic to say that the banks "create credit," that is, that they create deposits in their act of lending than to say that they lend the deposits that have been entrusted to them. And the reason for insisting on this is that depositors should not be invested with the insignia of a role which they do not play." Xiong et al. (2017) present a multi-agent model describing the main mechanisms of money creation and money circulation in a credit economy. Biondi (2018) in support of Credit creation theory emphasizes the interaction between banks: "all the banks become interdependent on the flow of payments that are performed across them, generating the 'banking system'. Since each bank is structurally unbalanced due to money generation, inter-bank coordination is required to maintain the banking system in operation over time and circumstances. Both inter-bank clearing and credit arrangements provide this coordination at the inter-bank level, which is effectuated through central bank intervention, clearing houses and the money market."

Although in general Mishkin and Eakins (2012) supports Financial intermediation theory some of their arguments regarding involvement of bank's financial management practices in the 20th century provides some support to Credit creation theory. According to Mishkin and Eakins (2012, pp. 409–410) expansion of overnight loan markets and the development of new financial instruments starting in the 1960s gave additional flexibility for banks in their liability management thereby banks could set aggressive target goals for their asset growth and acquire funds as they were needed. This statement, in authors opinion, talks in favour of Credit creation theory emphasizing that liabilities are adjusted according to the asset needed, in other words, loans are issued and then funding searched.

1.3. Findings from empirical studies

Recently Werner (2014, 2016) did an empirical experiment with a balance sheet of Raiffeisenbank Wildenberg' annual financial reports of 2013. It showed that loan issue transaction boosted the bank's balance sheet by the amount of issued loan. On the assets' side, the loan amount appeared in the line "Claims on customers" and on the liabilities' side – in the line "Claims by customers". This finding supported the idea that loan issuance process creates asset and liabilities at the same time thereby Werner claimed that there is no empirical support for Financial intermediation theory as loan issue was not connected with deposit attraction. Authors propose to imagine the case when there is:

- (a) a person who wants to buy a house and needs a mortgage for this purchase and
- (b) a seller having a bank account with the same bank as purchaser's mortgage provider.

Thereby, in the authors' opinion, it is possible to design the money creation process in several steps:

1. bank grants the loan for the buyer, creating an accounting record of a loan (bank's asset) and liabilities towards buyer;
2. buyer transfer funds to seller thereby liabilities side of bank's balance sheet changes: liabilities towards buyer are changed to liabilities towards seller;
3. bank follow-ups of its liquidity: if seller transfer funds further to other clients of this bank, no liquidity issues arise;
4. if fund transfer is still needed, the bank can attract other deposits from private individuals, non-financial corporates, other banks or other entities. If liquidity needs become urgent, it can affect pricing.

When buyer and seller have the same bank and no fund transfer takes place outside of the bank, Credit creation theory fits well with empirical results. McLeay, Radia, and Thomas (2014) has visualized previously described the money creation process if the buyer and seller have different banks (see Figure 1). From the visualization, it is obvious that the amount of reserves for the buyer's bank is the break-even point when funds need to be transferred to the seller's bank.

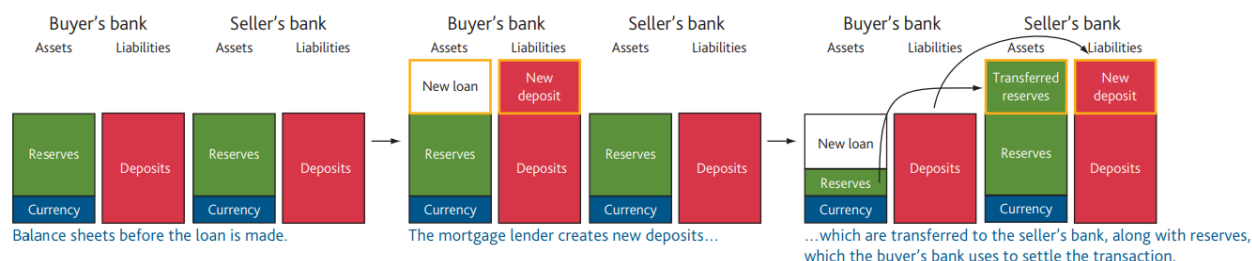


Figure 1. Changes to the balance sheets of the house buyer and seller's banks (source: McLeay et al., 2014)

When it comes to liquidity management, an example in Figure 1 shows that statements from Financial intermediation theory need to be taken into account in order to explain the bank's desire to manage its liabilities. If no cash or reserves are attracted on a sufficient level, money creation through loans can expose the bank to excessive liquidity risk.

2. Current research

2.1. Research motivation

Current literature provides some evidence that both – Credit creation theory and Financial intermediation theory – give insights to bank's operations and strategic balance sheet management decisions. Thereby authors decided to look for some quantitative measure and other empirical evidence supporting both theories.

In Credit creation theory it is expected that lending at some points of time will exceed deposits. This fact led authors to the idea to quantify this with LDR. When lending will exceed deposits base it is expected to have LDR above 1.0 threshold. In authors opinion, this ratio can perform as a quantitative measure for testing the basic assumption of Credit creation theory: credit creation out of nothing, i.e., lending out before deposits have been received. In balance sheets were LDR will exceed 1.0 threshold, it is expected that borrowings from other credit institutions or related persons will take place in order to compensate insufficient deposit base.

At the same time, LDR development over some period of time could indicate whether the bank tries to balance its loans and deposits. If so such Strategic Asset-Liability Management approach can be well explained by Financial intermediation theory: bank wants to loan out the amount it has received from its depositors. Thereby authors have the hypothesis that Credit creation theory explains technical aspects of loan issue process and Financial intermediation theory – strategic decisions of bank's management.

2.2. Data & Methodology

In the abovementioned hypothesis there are two parts:

- (a) Credit creation theory explains technical aspects of loan issue process;
- (b) Financial intermediation theory explains strategic decisions of bank's management.

The first part of hypothesis regarding Credit creation theory authors has decided to prove based on LDR calculation at some certain points of time. If LDR will exceed the value of $(1+\alpha)$ times for at least two succeeding reporting dates chosen by authors for at least two banks, the hypothesis will be proven. Variable α represents a "buffer" for excluding data noise in the reports, i.e. excluding the effect from transactions in process (in particular loans and deposits) at the reporting date, which could affect LDR calculation for the bank operating close to LDR 1.0. Authors in this research took a conservative approach and chose the significant buffer of 10% (0.1) which is justified by the authors' professional feeling. Authors recognize that in further research "buffer" α should be evaluated from available data.

Choice of two banks is based on conservatism principle: from economic logic, there should be enough even with one bank precedent however authors decided to strengthen results seeking for additional supporting precedent.

The second part of hypothesis regarding Financial intermediation theory authors has decided to prove based on LDR calculation over some period of time. If LDR on any date, e.g. year end, will be lower than in previous year for at least two succeeding years, i.e., there should be at least three points in time for at least two banks, the hypothesis will be proven. The limitation here is that only those cases will be taken into account where the bank will have initial LDR at least 1.0 times.

In order to get data for LDR calculations, authors decided to look for audited financial reports of main domestic-oriented Baltic banks – Swedbank, SEB, Luminor, Citadele –, and some local major banks (LHV in Estonia, Šiaulių bankas in Lithuania):

- a) domestic orientation (sometimes banks call them as home markets) in this research is important to get the needed relationship between deposits and lending. Subsidiaries of foreign banks could have not balanced balance sheet from LDR perspective as their funding could come from abroad if the business model in Baltics is primarily lending oriented;
- b) audited financial reports give a snapshot on December 31 in the respective year. This was considered as a good starting point. If in all cases lending would be lower or equal to the deposits base or other issues arise, quarterly reports would be considered for further research;
- c) The Baltic market was taken because of the know-how of researchers about banks operations here and the history of their transformation.

In annual financial reports in the balance sheet authors looked for those positions:

- a) on the assets side: loans to clients/ public (loans or other claims to counterparties not included);
- b) on the liabilities side: deposits from clients/ public (liabilities to counterparties not included).

Transactions with counterparties, including deposits from other banks, were excluded as they represent the balancing activity if loans are not financed by deposits from the public.

Authors looked for publicly available financial reports in banks' homepages covering different time periods, e.g.:

- a) Swedbank
period: 1996–2017
- b) SEB
period: 1994–2017

- c) Luminor
period: 2017
- d) Citadele
period: 2010–2017
- e) LHV
period: 2005–2017
- f) Šiaulių bankas
period: 2001–2017

Data from those reports were selected based on the needs of the hypothesis described above.

2.3. Findings

Hypothesis: Credit creation theory explains technical aspects of loan issue process

Annual financial reports of Baltic banks (Citadele (n.d.); LHV Bank (n.d.); Luminor Estonia (n.d.); Luminor Latvia (n.d.); Luminor Lithuania (n.d.); SEB Estonia (n.d.); SEB Group (n.d.); SEB Latvia (n.d.); Swedbank Estonia (n.d.); Swedbank Latvia (n.d.); Swedbank Lithuania (n.d.); Šiaulių bankas AB (n.d.)) showed that there are several cases where LDR is exceeding 1.0 threshold (Table 1). One of the examples is Luminor Bank which is created on the base of Nordea Bank's subsidiaries in Baltics and DNB Bank daughter companies in Baltics. Currently, insufficient deposit base is compensated by loans from Nordea and DNB (in total 1.15 bn EUR as of December 31, 2017). Another example is Swedbank in 2007 (their LDR was even on the extraordinarily high level of 2.45) whose funding gap was compensated by loans from Swedish Swedbank.

Thereby in order to prove the first part of hypothesis regarding Credit creation theory these banks were chosen:

- (a) Luminor Bank. As it started to operate in October 2017, currently it has annual audited financial reports only for the year 2017. Thereby exclusion was made and financial reports on September 30, 2018, were used as an alternative for second date point. **The result (see Table 1) shows that LDR exceeds the value of 1.1 times for at least two succeeding reporting dates.**
- (b) Swedbank. As for Swedbank shortly before economic crisis material non-balance of loans and deposits was discovered, year ends of 2006 and 2007 were chosen. **The result (see Table 1) shows that LDR exceeds the value of 1.1 times for at least two succeeding reporting dates.**

Table 1. LDR calculations for proof of first part of hypothesis regarding Credit creation theory (source: author's calculations based on annual audited financial reports of banks: Luminor Estonia (n.d.), Swedbank Latvia, (n.d.))

No	Bank	Country/Region	Date	Loans, mEUR	Deposits, mEUR	LDR, times
1.	Luminor Group AB	Baltics	Dec 31, 2017	11 647	8 430	1.38
	Luminor Group AB	Baltics	Sep 30, 2018	11 824	8 506	1.39
2.	Swedbank AS	LV	Dec 31, 2006	4 401	2 199	2.00
	Swedbank AS	LV	Dec 31, 2007	5 477	2 442	2.24

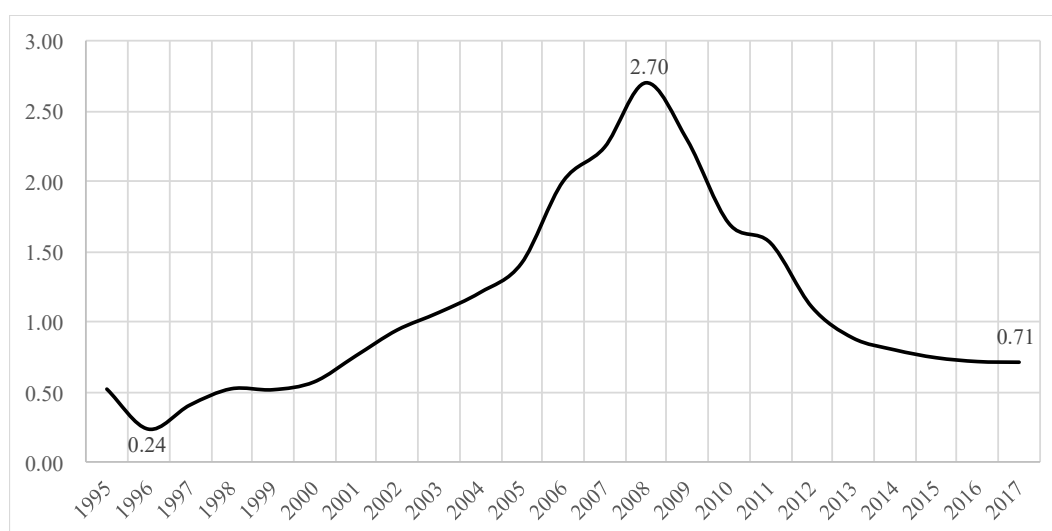


Figure 2. Historical LDR of Swedbank AS in Latvia (source: authors' calculations based on Swedbank Latvia (n.d.))

Based on abovementioned authors have concluded **that hypothesis “Credit creation theory explains technical aspects of loan issue process” is proven according to defined methodology.**

Analysis of data included in annual financial reports surprised authors as they not only clearly showed that loans are issued based on other factors not deposits volume, but leverage of LDR was quite heavy. As Table 1 shows Swedbank loans exceeded deposits by more than 2.2 times in 2007. Historical development of LDR for Swedbank AS in Latvia (see Figure 2) shows that most probably fast economic development in Latvia before the economic crisis in 2008 contributed a lot to LDR growth.

Hypothesis: Financial intermediation theory explains strategic decisions of bank's management

Results in Table 1 show opposite signs from the tendency authors are seeking for. It could be the case that banks' management was quite aggressive on profitability targets thereby balancing targets of the bank's balance sheet was not reached.

Thereby in order to prove the second part of hypothesis regarding Financial intermediation theory the same banks previously had proven Credit creation theory was chosen, excluding Luminor as there currently is data availability issue:

- (a) Swedbank. As economic crisis significantly changed the behaviour of many banks (more focus was paid on balancing risks and profitability), the year ends of 2010–2012 were chosen. It is more probable that during these years bank's management could set the target of balancing the bank's funding and lending. **The result (see Table 2) shows that LDR in observing year is lower than in the previous year for at least two succeeding years.**
- (b) SEB. The same logic applied as for Swedbank, however as results were contradictory in 2010 & 2011 the additionally year 2013 was added. **The adjusted result (see Table 2) shows that LDR in observing year is lower than in the previous year for at least two succeeding years.**

Table 2. LDR calculations for proof of second part of hypothesis regarding Financial intermediation theory (source: author's calculations based on annual audited financial reports of banks: Swedbank Latvia (n.d.); SEB Latvia (n.d.))

No	Bank	Country/Region	Date	Loans, mEUR	Deposits, mEUR	LDR, times
1.	Swedbank AS	LV	Dec 31, 2010	3 986	2 343	1.70
	Swedbank AS	LV	Dec 31, 2011	3 463	2 215	1.56
	Swedbank AS	LV	Dec 31, 2012	3 447	3 114	1.11
2.	SEB AS	LV	Dec 31, 2010	2 579	1 522	1.70
	SEB AS	LV	Dec 31, 2011	2 522	1 429	1.76
	SEB AS	LV	Dec 31, 2012	2 564	1 805	1.42
	SEB AS	LV	Dec 31, 2013	2 667	2 135	1.25

Conclusions and practical implication

Conclusions. Findings in this research show that hypothesis can not be rejected that Credit creation theory explains technical aspects of loan issue process and Financial intermediation theory – strategic decisions of bank's management. The first part of hypothesis got more clear results than the second part. In authors opinion, it is related to the fact that the bank's management set targets sometimes are not implemented in full during a challenging environment or other mostly external factors.

Further research direction. Currently, authors are working with data from financial reports to find out whether there is some economic relationship possible to capture by econometric model. In this paper findings from this research, part are not reflected as still improvements are needed there.

In this paper authors have focused on the stated hypothesis however there is the possibility to research other cases when LDR exceed the threshold. And buffer in threshold level calculation should be researched further as well.

Practical implementation. Werner (2016) points out that current banking regulation through capital adequacy has based on the theoretical backbone of Financial intermediation theory: “Bank regulation is based on the prevailing understanding of the role of banks. During the past forty years when the Financial intermediation theory of banking has been dominant, bank regulation has focused on capital adequacy. (..) As financial intermediaries, banks cannot, individually or in aggregate, increase the money supply available as potential bank capital. Hence imposing capital requirements on banks appears to be a viable way to keep their actions within limits.”

As Werner (2016) found supportive empirical results for Credit creation theory, he proposed to introduce banking regulation based on quantity and allocation of bank credit: “Using such guidance, bank credit for non-GDP (i.e. asset)

transactions could be suppressed, so that asset bubbles and subsequent banking crises were avoided. When instead bank credit was guided towards productive use, high, stable and non-inflationary economic growth could be achieved.”

In the authors' opinion regulators could utilize a combination of both approaches based on LDR:

c) if LDR is lower than 0.9 times, then regulatory framework could be based on capital requirements;

d) if LDR is 0.9 times or higher, regulatory framework could be based on (a) capital requirements and (b) credit policy restrictions or guidance.

If a bank has been funded mainly through deposits thereby reflecting the logic of Financial intermediation theory, the existing framework of capital requirements approach could be kept. LDR level of $(1 - \alpha)$, in this case, 0.9 (the logic of chosen α described above), is chosen to provide some buffer for the transitional condition to the case when the bank is funded from a mix of deposits and alternative sources (related parties loans, bonds etc.). When LDR is sufficiently high (over 0.9 times), the regulatory framework could be adjusted adding one more layer – credit policy restrictions or guidance.

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