The influence of the European Central Bank's monetary policy on banks' behavior

By

Gergely Ürmössy

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Advisor: Professor Attila Rátfai

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Abstract

I carry out empirical analysis to identify bank-specific factors and macroeconomic determinants that influence Euro Area banks' profitability. After the identification of such variables, I aim to reveal whether the European Central Bank has any monetary policy tool to influence banks' profitability either directly or indirectly through any of the uncovered determinants. From a policy point of view, it is very important to see clearly whether ultra-lax monetary policy erodes banks' profitability and whether eroded profitability harms the monetary transmission mechanism. Additionally to existing literature, I include external financial equilibrium and expectations formulated by financial markets to my model and use a longer and broader dataset for the Euro Area as a whole.

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1. Introduction

The Great Financial Crisis of 2008 highlighted the crucial need to understand the relationship between monetary policy and banks in depth – especially because in some countries nominal interest rates became negative. To evaluate whether the net effect of the depressed interest rate environment for such a long period of time is beneficial or harmful to the banking sector, the effect of low market interest rates on banks' financial performance and profitability can be, and should be, studied. In addition, it should be understood in-depth how central bank policies affect the real economy through the financial services industry, since academic literature has uncovered conflicting or mixed results regarding the link between monetary policy and bank profitability (see e.g. Samuelson, 1945; Flannery, 1981; Hancock, 1985; English 2002). The assessment of the health and resilience of the banking sector is key for monetary policymakers. In the assessment of the banking sector, the sustainability of profits going forward should be scrutinized closely, since profitability is indicative of the stability, resilience and soundness of the banking industry.

The European Central Bank (ECB) was the first monetary authority in a large advanced economy that reduced the marginal policy interest rate below zero percent. What makes the phenomenon even more special is the fact that not only the ECB's overnight deposit facility or short-dated interbank deposits yielded negative returns, but medium- and long-dated rates and yields became negative as well, thanks to the ECB's "*forward guidance*" and asset purchase program.

Critics of negative interest rate policies (NIRPs) argued that negative interest rate policy punishes those who are dependent on interest income, e.g. savers, pensioners, banks, etc. Critics emphasize that banks' profitability will be damaged to such an extent that it might hinder monetary transmission mechanism – which would be the opposite of what central banks want to ultimately

achieve, and might also build up risks related to financial stability. Hannoun (2015) takes it even further by stipulating that non-linearities prevail at the zero lower bound of interest rates, and as a consequence, the relationship between the interest rates set by the monetary authority and banks' profitability might substantially weaken.

Existing literature focuses on the impact of negative policy and interbank interest rates on economies other than the Euro Area, mainly on Denmark, Sweden and Switzerland. According to various studies, bank profitability has not been hurt by the low interest rate environment in Denmark, Sweden or Switzerland, because not only interest income adjusted downward in the depressed interest rate environment, but interest expenses shrank as well (Scheiber et al., 2016; Madaschi and Nuevo, 2017).

My research builds on the debates surrounding NIRP, and as a consequence, my ultimate goal is to see, which side's arguments are justifiable based on the data from the Euro Area: the ECB's or the critics'. First, my intention is to identify factors that has determined banks' profitability in the Euro Area since 2008. I examine both bank-specific factors and macroeconomic variables to see, what determines financial performance of the Euro Area's banking sector. I add to existing literature by including external financial equilibrium and expectations formulated by financial markets in the model, and also by using a longer and broader dataset. After the identification of profitability determinants, I aim to reveal whether the ECB has any monetary policy tool to influence banks' profitability either directly or indirectly through any of the uncovered determinants.

The research questions I intend to answer within this thesis are the following:

1. What are the primary bank-specific and macroeconomic determinants of banks' profitability in the Euro Area since 2008?

2. Is the ECB, as a monetary authority, able to influence the identified drivers of profitability directly or indirectly?

From a policy point of view, it is very important to have answers to these questions and to see clearly whether ultra-lax monetary policy erodes banks' profitability, which could ultimately harm the monetary transmission mechanism. The fact that the ECB will have to signal to economic agents and financial markets very soon whether the Governing Council wishes to sustain the current financial conditions in the Euro Area highlights the relevance of the questions. Should the net effect of the depressed interest rate environment be beneficial, the exit could be delayed to ensure the sustained cyclical recovery of the Euro Area economies.

My hypotheses to the research questions are the following:

1. Bank-specific variables should reveal that scale of economies, financial leverage, operational efficiency and liquidity risk are among the most important contributors to profits. Explaining bank profitability with the help of macroeconomic variables, I expect that banks' financial performance behave in pro-cyclical manner, i.e. in times of economic booms banks make high(er) profits, while during economic busts, banks may less profit or realize losses.
2. The ECB, as a monetary authority, may not be able to influence all of the bank-specific determinants directly, except for liquidity risk by standing ready with liquidity providing facilities. The cyclical components of macroeconomic variables, inflation expectations and expectations for the future path of interest rates can be strongly influenced by the ECB's monetary policy measures and also by its communication. Structural deficiencies, however, cannot be addressed by monetary policy.

My results show that financial leverage (reciprocal of capital adequacy) is a crucially important and statistically significant bank-specific determinant of banks' profitability. Furthermore, a variety of macroeconomic variables proved to be important contributors within the analysis. Model results revealed that variables that capture the business cycle, structural imbalances and expectations were also statistically significant. The conclusions drawn are largely in harmony with existing academic literature, to which I add by including external financial equilibrium and expectations formulated by financial markets in my model. These findings are very important from policymaking point of view, because the ECB can directly and very strongly influence both inflation and interest rate expectations, and can also promote the cyclical recovery of the economy by its tools.

In my analysis, I do not separate the effects of the negative marginal policy rate, the asset purchase programme or the "*forward guidance*." According to the arguments presented by ECB President Draghi at the regularly scheduled press conferences, all three tools are very important components of the ECB's monetary policy toolkit, and in addition to that, the combined effect of the individual tools is what matters for the Eurozone's economic recovery, since the individual tools would not be efficient on their own.

The structure of the thesis is as follows: the next section discusses the context and environment in which the ECB embarked on unconventional monetary policy measures, and also explains the channels through the ECB's tools may impact the Eurozone's economy. Section 3 provides a background on the dataset, the chosen variables and describes the models. Section 4 reveals the results of the models. Section 5 discusses the results in the context of academic literature, and highlights the policy relevance of the findings. Finally, Section 6 concludes the thesis.

2. Background and context

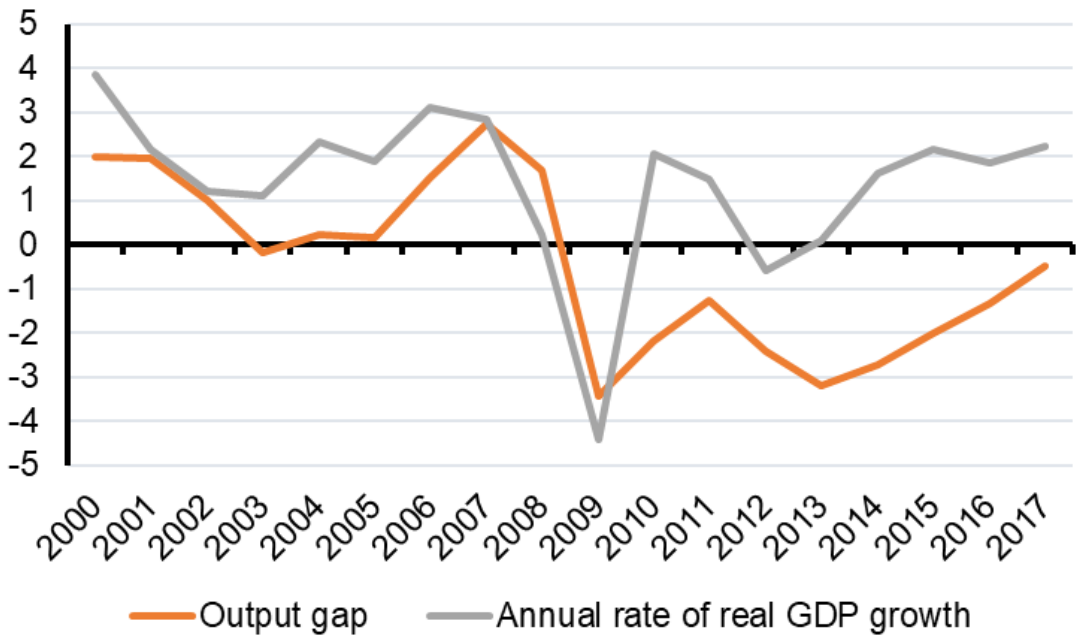
2.1 About the European Central Bank's motivation

The global economy went through a period of deep economic crisis, including a banking crisis in late 2000s. The banking crisis deepened the impending recession, and as a result, a significant amount of aggregate output was lost, while unemployment rate substantially increased. Central banks in advanced economies reacted to the bust by relaxing financial conditions to the extreme through slashing their (nominal) policy interest rates and by embarking on a wide variety of unconventional policy measures. The Federal Reserve in the US and the European Central Bank in the Eurozone have been among the most notably active and creative central banks in advanced economies.

Ultra-low interest rates, both in nominal and real terms, have been maintained for a decade now, which raises the following potential issue: whether the net impact of such a depressed interest rate environment for such a long period of time is beneficial for economies. As *Figure 1* shows, the Euro Area went through a double-dip recession since 2008 and the output gap (the difference between the potential and the actual GDP growth rates in proportion of the level of potential GDP in a given year) remained very wide between 2008 and 2013, when it gradually started to close.

There is broad agreement that unconventional monetary policy measures deployed by central banks greatly contributed to the recuperation of the ailing economies (Gambacorta et al., 2014). In the context of the Euro Area, the claim by Gambacorta et al. (2014) means that the ECB's loose monetary policy undoubtedly contributed to the Euro Area's cyclical recovery. However, there is a divide among experts, how long the stimulating effect of the ECB's accommodative policies will last, and whether it is enough in itself to sustain the ongoing economic recovery, without deep structural reforms initiated by the fiscal arms of the Euro Area member states.

Figure 1: Economic growth and growth potential in the Euro Area



Source: AMECO database

There is broad agreement that accommodative monetary policy was needed to support the cyclical recovery. Going forward, however, the efficient allocation of capital by financial markets and banks is crucial for sustained economic growth in the future. A banking sector with vulnerable aggregate balance sheet and lackluster outlook for profitability may be unable to contribute to economic growth in a meaningful manner, since some channels of the monetary policy transmission mechanism may become impaired, e.g. the traditional interest rate channel, the credit channel, etc. (Mishkin, 1996). On the one hand weak bank balance sheets can exacerbate economic crises vis-à-vis the collapse of credit supply by banks, while on the other hand, stimuli by central banks may not propagate into the ailing real economies unless the banking sector is healthy and properly functioning.

Lax monetary policy, in general, may lead to so loose financial conditions that certainly influence bank profitability via various channels. The dilemma is the following: the net effect of low market interest rates and ample liquidity might be unclear, since there are various channels that transmit the effect of easy monetary policy. The argument against the sustenance of loose financial conditions is that lower (nominal) interest rates can reduce banks' net interest income, which should be the primary source of income for financial intermediaries, and might compress net interest margins, which ultimately might lead to excessive risk-taking that overtime may endanger financial stability. The argument for such monetary policy is that the spurring effect of very low interest rates on the real economy can serve as a tailwind to banks through the improvement of their borrower's creditworthiness, moderating funding costs and capital gains on assets.

2.2 How overcoming the ZLB propagated through money and bond markets

The ECB had no choice, but to take bold policy steps, since it faced an extremely fragile macroeconomic environment and the danger of liquidity trap significantly intensified at the same time, as the zero lower bound of interest rates (ZLB) posed a pronounced constraint in the conduct of monetary policy. In other words, the ECB had to tackle a low-growth and low-inflation environment, in which low interest rates were not transmitted into the real economy to a sufficient extent, and in addition to that, economic recovery was also hampered by restrictive fiscal policies.

It is important to point out that in a subdued inflationary environment, in which economic agents believe that nominal interest rates are floored at zero percent, forward-looking real interest rates vis-à-vis inflation expectations can pose constraints to economic growth. The Fisher equation stipulates that real interest rate can be decomposed into nominal interest rate and inflation rate

(Fisher, 1930). Since monetary policy primarily wants to influence expectations of economic agents, the Fisher equation should be augmented with the expected rate of inflation, as below:

$$(1 + r) = \frac{(1 + i)}{(1 + \pi^e)},$$

$$r \approx i - \pi^e$$

where i denotes the nominal interest rate, r represents the real interest rate and π^e stands for expected rate of inflation. The decomposition above shows that if i is unable to cross the zero percent floor and inflation expectations (π^e) is well-below the ECB's inflation target, or worse, envision a deflationary environment, real interest rate can be stuck in the positive range that may hinder economic growth, which is especially painful in times of economic downturns, when negative real rates should bolster the cyclical recovery.

The ECB's Governor, Mario Draghi has undoubtedly expressed the Governing Council's intention in 2012 to do "*[…] whatever it takes to preserve the euro.*" Later, in its effort to kick-start growth and inflation in the Euro Area, the Governing Council introduced negative marginal deposit rate in June 2014, initiated the extended and large-scale asset purchase programme in March 2015 and substantially bolstered "*forward guidance*" about the forward-looking trajectory of interest rates. By doing so, the ECB strengthened its commitment to its primary objective of the restoration and sustenance of price stability within the Euro Area, which corresponds to "*a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%.*"

The European Central Bank was the first monetary authority in a large advanced economy to break through the zero lower bound by bringing its marginal policy rate (i.e. the interest rate at which commercial banks may place their excess liquidity overnight within the Eurosystem) into negative

territory, to -0.1% in June 2014. Later, the ECB delivered three further interest rate cuts, which in turn reduced the marginal policy rate to -0.4% in March 2016. Since then, the marginal policy rate has not changed (as shown in *Figure 2*). At the same time, the interest rate on the main refinancing operation (i.e. the interest rate at which banks can borrow from the ECB) was slashed to 0%.

By effectively pushing the short-end of the yield curve into negative territory, what went against the traditional economic view of the ZLB being an unavoidable constraint, inflation expectations could adjust upward, which in turn restored the ECB's signaling capacity and its credibility. Furthermore, such a step by the ECB flattened the yield curve, i.e. long-dated interest rates and yields decreased to a greater extent than short-dated ones (Wu and Xia, 2018). As a consequence, the combined effect of negative short-dated interbank interest rates and elevated inflation expectations led to a reduction of real interest rates that – in principle – promotes portfolio rebalancing and greater risk-taking behavior by banks.

After the marginal policy rate was pushed below the psychologically important threshold of zero percent, the pass-through to money markets was swift and efficient, as short-dated interbank interest rates adjusted accordingly in an orderly fashion. Negative interest rate policy reduced short-term money market interest rates, and the combined effect of the negative marginal policy rate, the asset purchase program and the "*forward guidance*" flattened the yield curve in Euro Area member states.

The steepness (or flatness) of a sovereign government bond yield curve can be decomposed with a simplified approach into two components: the term premium and the sovereign risk premium. The term premium can be approximated by subtracting the 2-year German government bond yield from the 10-year one. The assumption, which stipulates that the term premium extracted from the

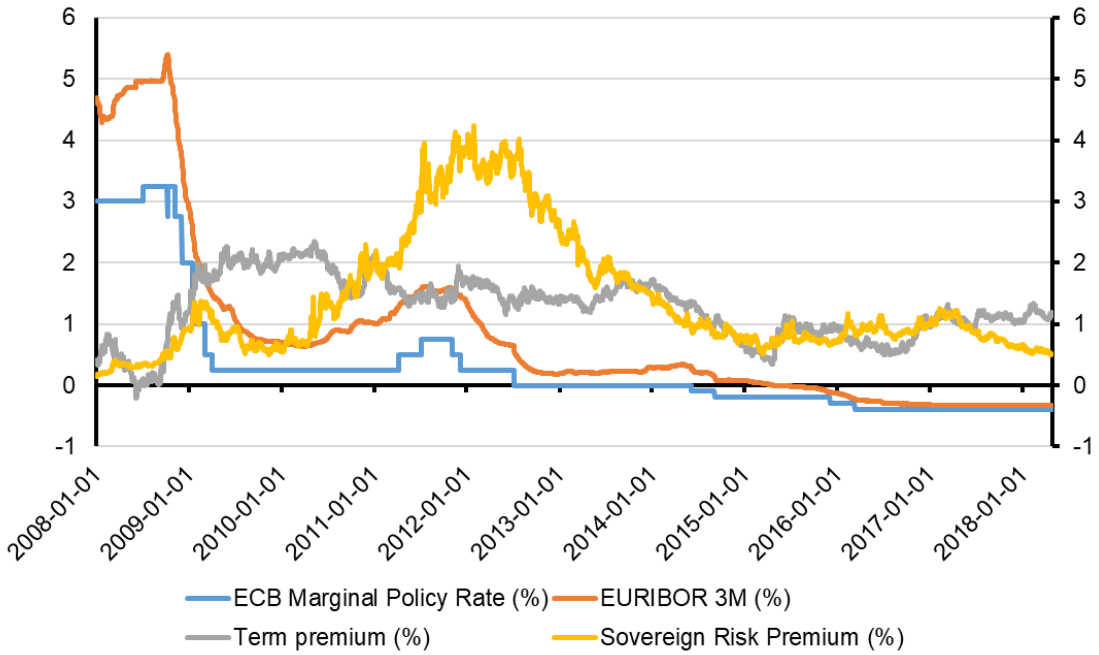
German yield curve contains no sovereign risk premium, should hold, because Germany has the largest economy and the most liquid bond market within the Euro Area and the smallest risk of default thanks to its broadly balanced fiscal position.

I acknowledge that academic researchers (e.g. Estrella and Mishkin, 1996) usually approximate the steepness of the yield curve by subtracting the yield on the Treasury Bill with the shortest maturity offered in the primary market from the yield born by the longest-dated Treasury Bonds in the primary market. However, since the ECB Governing Council very strongly focuses on the difference presented in the former approach, I stick to the difference between the 10-year and 2-year German government bond yields.

Following the previous line of thought, which stipulates that Germany bears (almost) no risk of default, bonds issued by other Euro Area member states bear sovereign risk premium compared to German debt assets, although the perception of default risk of each and every country can be different. According to the ECB, the sovereign risk premium can be extracted for each and every country by computing the difference between the yield on the respective Euro Area member state's sovereign debt instrument that matures in 10 years' time and the German sovereign bond with corresponding maturity.

Figure 2 captures the evolution of short-dated interest rates on the ECB's marginal (deposit) facility, the 3-month interbank interest rate (EURIBOR), the term and sovereign risk premia that were defined above. The movements in both risk premia sizes reflect the efficiency and the effectiveness of the monetary policy measures, as both compressed substantially over time – especially when all three key monetary policy components got deployed. (Please note that the time series in *Figure 2* end on 30 April 2018. Market developments since then are not included.)

Figure 2: The evolution of interest rates and risk premia



Source: Bloomberg, own calculations

Note (1): time series ends on 30 April 2018

Note (2): term premium is the difference between the 10-year and the 2-year German government bond yields, since the ECB refers to this difference as "*term premium*" in general

Note (3): sovereign risk premium is the GDP-weighted average of the respective differences between the 10-year German government bond yield and the Austrian, Belgian, Dutch, French, Italian, Irish, Portuguese and Spanish ones (other member states could not be included, as they do not have sufficiently long history of 10-year long government bond yields)

2.3 About the channels that transmit the ECB's measures into the banking sector

In the previous section, I described the mechanism through which the ECB's monetary policy measures tackled the ZLB and how they propagated through money and capital markets. In this section, I uncover the channels through which the ECB's measures and the increase of (debt) asset prices may impact the banking sector's balance sheet and income statement.

The following channels contribute to banks' profitability and can help counterbalance the impact of NIRP's potentially compressing impact on banks' net interest margins (illustrated by *Figure 3*):

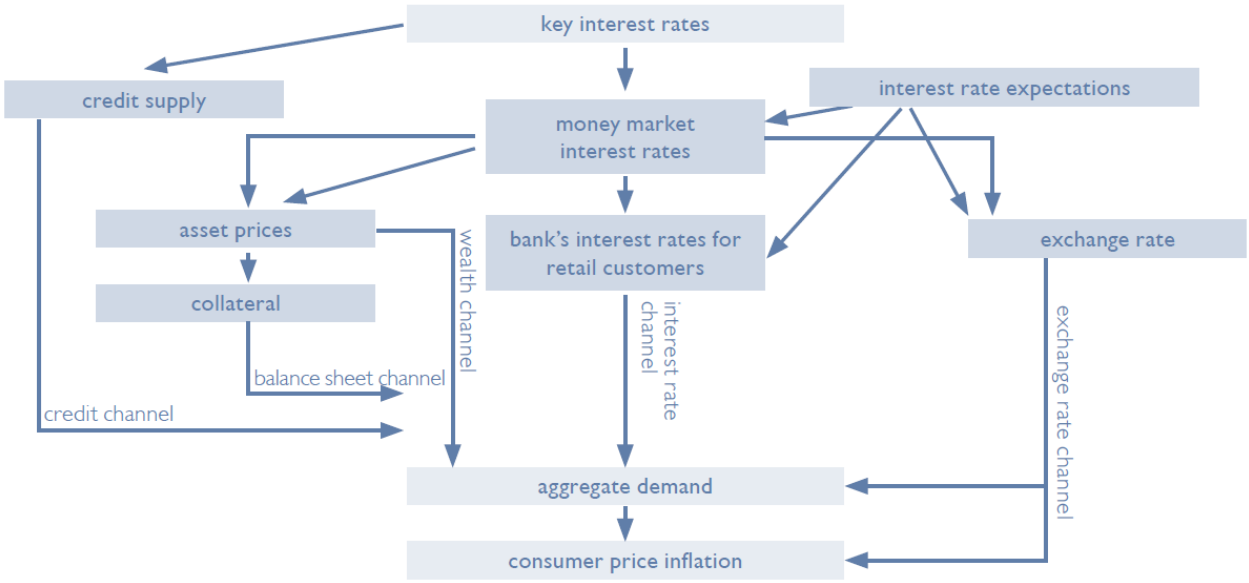
- The credit channel entails higher lending volume to the real economy, should the demand for credit be of sufficient amount and of good quality. As a result, higher loan stock may counterbalance the compression of net interest margins to some extent.
- To compensate for the loss in net interest margins, banks might find other sources of income that make up for the loss. Such sources could be increased fee and commission revenues.
- Portfolio rebalancing channel (or balance sheet channel) implies lower risk aversion that could lead to capital gains and also increase in the value of the collateral – through lower term and credit premia. As a result, banks might choose to purchase debt securities with longer maturities or with worse credit quality, which in turn supports credit creation.
- The previous bullet point implies that asset prices have strong impact on savers through the wealth channel. Thanks to increase of asset prices (or decrease of yields on debt assets), households' wealth may rise, which can spur them to consume or invest more than before.
- Portfolio rebalancing also entails a change in banks' provisioning behavior. Banks may be inclined to reverse previously created provisions thanks to the improvement in the quality

of the underlying asset, or create less provision in expectation of lower potential losses, or become more willing to extend loans thanks to the increase in collateral value.

- In economies, where a large proportion of loans are linked to variable interest rate (e.g. to the EURIBOR), the interest rate channel may be stronger. In these countries, lower instalments may restore the ability of the indebted to re-start the scheduled payments.

In short, loose monetary policy can contribute to banks' financial performance both directly (e.g. through the credit and the balance sheet channels) and indirectly (e.g. through the wealth and interest rate channels).

Figure 3: Monetary policy transmission channels



Source: Scheiber et al. (2016), page 11

There are, however, potential costs and downside risks stemming from NIRPs. The impact of the effective lower bound of nominal interest rate on financial intermediation and bank behavior establishes where the effective lower bound of nominal interest rate could be. First, there is direct pressure on banks' net interest income, since banks may place excess liquidity only in the ECB's deposit facility, which yields negative return – at least temporarily until they meet credit demand. Second, due to the stickiness of interest rates on deposits, banks' might not be able to reduce their interest expenses through the downward adjustment of interest rates on deposits. Consequently, banks may face compressed net interest margins, as interest rates on new lending may decrease to a greater extent than interest rates on deposits. As a result, net interest margins of banks may shrink, which could weigh on overall profitability of the banking sector. The mechanism, ultimately, might harm the pass-through channel between the policy interest rate and the lending rates to households and non-financial companies.

In addition to the mechanism described in the paragraph above, concerns might arise from a very long period of negative interest rates as well. The policy of negative interest rates may help non-viable firms to survive thanks to the lower debt service and the easier access to capital, which may constrain the access of healthy and viable firms to additional capital. This way, viable firms may not receive enough capital to create additional productive capacities that could contribute to economic growth. In other words, the efficient allocation of labor and physical capital may be hindered due to the misallocation of financial capital (Kwon et al., 2015).

3. Data and model

In this section I describe the dataset that is used in the analysis. Data related to banks' aggregate balance sheet and income statement are drawn from the European Central Bank's Statistical Data Warehouse Consolidated Banking Dataset 2. The dataset spans between 2007 Q4 and 2017 Q3. The last available full-year data point is from the end of 2016. The frequency of the data is yearly between 2007 Q4 and 2009 Q4, biannual between 2010 Q2 and 2014 Q4, and quarterly between 2015 Q1 and 2017 Q3.

All 19 Euro Area member states and the aggregate figures for the Euro Area are represented in the dataset, however, there are some geographical limitations, which are the following: there are no data available for 10 member states in 2007 Q4, including Germany and Spain – the largest and fourth largest economies. Further limitation is that there are no data for Ireland in 2017 Q3, for Slovakia in 2016 Q1. The dataset for Lithuania has a limited time frame, as the final point of data is in 2015 Q4. These missing data points for Ireland, Slovakia and Lithuania should pose no meaningful constraint for the analysis.

Macroeconomic variables are downloaded from the International Monetary Fund's World Economic Outlook Database (April 2018) and from annual macro-economic database of the European Commission (AMECO). In both databases, data reporting ends with the year-end 2017 data point.

3.1 Determinants of bank profitability and variable selection

3.1.1 Outcome variable

The goal of the thesis is to uncover what influences banks' profitability in the Euro Area. In order to identify these factors, first, the outcome variable should be defined that represents the profitability of the banking sector. Bank profitability is generally measured by the return on average total assets (ROA), which is the ratio of the company's annual net profits after tax in proportion of average total assets.

ROA is affected by both internal and external factors. Internal factor refers to the management's ability to generate profits from the assets of the bank, or in other words the return on assets ratio reflect how effectively the management utilizes the available financial resources. External factors include macroeconomic variables over which the management has no control at all. According to Golin (2001), ROA may be the most commonly used indicator in empirical academic literature to analyze and evaluate banks' profitability. The disadvantage of ROA is that it may be biased due to banks' off-balance sheet activities, i.e. revenue generated from off-balance sheet items (e.g. derivatives) are included in the numerator of ROA, but not in the denominator.

Alternatively, Return on Equity (ROE; net profit over average total equity) or Net Interest Margin (NIM; difference between interest revenue and interest expense over average total assets) could be used as the outcome variable. However, they may not be as good indicators for bank profitability as ROA. ROE may not be an ideal indicator, as it ignores the elevated risks stemming from high leverage (average total assets over average total equity), and in addition to that, ROE may misleadingly amplify banks' profitability when banks have low capital. Furthermore, ROE also disregards that leverage is usually regulated. In contrast with ROA that gauges the net profit earned

from all activities relative to all assets, NIM does not focus on all activities that generate revenues and expenses, as it focuses exclusively on interest-bearing assets and liabilities.

3.1.2 Explanatory variables

I use two separate categories of independent variables in the analysis of bank profitability. One of the categories consist of a group of bank-specific determinants, which capture internal factors, i.e. factors that are mainly influenced by the decisions of the management. The second category includes general macroeconomic and financial market variables. *Table 1* summarizes all of the variables.

Bank-specific (internal) determinants capture the following four aspects: economies of scale, financial leverage, operational efficiency and liquidity risk. These four factors are among the most important contributors to profits. The four aspects and the related variables are described in the following paragraphs.

Banks' economies of scale are proxied by the size of banks, which is captured by the sum of total assets (logarithmic). High number of studies find that financial performance of banks is related to their size, i.e. the larger the bank, the smaller the fixed costs in proportion of total assets, which ultimately improves banks' profitability indicators (Beccalli et al., 2015; Wheelock and Wilson, 2017). In addition, it is safe to assume that larger banks have more diversified loan portfolios. As a consequence, they are considered less risky by the market compared to their smaller peers, and thanks to their enhanced perception, large ones may be able to secure cheaper funding (Dietrich and Wanzenried, 2010). I note that there is a very strong implied assumption behind the

abovementioned findings: in order to exploit the benefits from the large size and economies of scale, banks' management must be competent and have a coherent business strategy.

Financial leverage (average total assets in proportion of average total equity; in percent) refers to the extent to which a bank finances its assets with borrowed funds or with their own capital. Financial leverage can be thought of as the reciprocal of the capital adequacy ratio. (I acknowledge that the previous sentence is not fully true, but the extent of the simplification is so small that it should cause no distortion in the analysis.) The interpretation of financial leverage is the following: a leverage ratio of 1 means that 50% of banks' assets are funded by borrowings (e.g. deposits) and the other 50% of assets are funded by the banks' own capital. The higher the leverage ratio, the lower banks' capital is, which means that they rely more on external funding. Beyond a certain point, too much leverage can create fragilities and endanger banks, since they may not be able to fill the gap caused by the substantial drop in liabilities in times of market stress. I assume that the lower the leverage ratio (i.e. higher the capital adequacy ratio) of banks, the more profitable they are. The argument supporting the assumption is that well-capitalized banks have the firepower to serve credit demand. Furthermore, should they need additional capital for lending purposes, they might have access to further stable and cheap funding in capital markets thanks to their high creditworthiness. Literature finds that there is a negative relationship between financial leverage and profitability (Demirguc-Kunt and Huizinga, 1999).

Operational efficiency is captured by the cost-to-income ratio (in percent), which is defined as operating expenses (e.g. interest expense, administrative costs, etc., but write-down of bad debt is not included) in proportion of operating income (e.g. interest income, fees and commissions, etc.). Banks' cost-to-income ratio should reflect how efficiently banks' are run by their management. The interpretation of the indicator is the following: a cost-to-income ratio of 50% means that banks'

business operations generate two units of income and one unit of cost at the same time. An operationally inefficient bank usually has a high cost-to-income ratio. Should the ratio breach 100% for a long period of time, banks either have to cut costs or increase revenues as soon as possible to reduce the ratio below 100%, or in the worst case scenario, banks have to close down the business. My expectations for the relationship between operational efficiency vis-à-vis the cost-to-income ratio is that it is negative: the more efficient banks are (i.e. the lower the ratio), the higher their profitability should be. I note that there are conflicting views with my assumption, as Kosmidou (2008) finds that "*[…] higher amounts of expenses may be associated with higher volume of banking activities and therefore higher revenues.*"

Banks must always be able to meet their financial obligations, or in other words, a decrease of the liabilities (e.g. customer deposits) should cause no hiccup in the operations of banks. Therefore, safeguarding liquidity and prudent liquidity management should be just as important for banks as generating profits. After Molyneux and Thornton (1992), I estimate liquidity risk with the ratio of total loans to total assets (in percent). The relationship between liquidity risk and profitability might be ambiguous. On the one hand, too high amount of liquid assets (i.e. low liquidity risk ratio) could erode banks' profitability, as safe and liquid assets usually offer low returns. On the other hand, should the lending activity of banks be so intensive that banks run out of liquidity, and in turn, they need additional funding, they might encounter increasing funding costs that can also worsen their profitability.

Macroeconomic (external) factors incorporate three crucial aspects of an economy: the business cycle, external financial equilibrium and expectations for future inflation and monetary policy formulated by financial markets. The three aspects and the related variables are described in the following paragraphs.

The cyclicality of economies is captured by two variables: annual real GDP growth rate and unemployment rate. Real GDP growth rate is associated with expanding lending volumes. During times of economic boom, not only credit demand increases, but banks might find themselves in situation, when they can charge higher net interest margins, fees and commissions (Demirguc-Kunt and Huizinga, 1999). When the economy is in recession and GDP in real prices plummet, credit demand contracts and quality of banks' loan portfolio deteriorate. I acknowledge that both real GDP growth rate and unemployment rate correspond to the business cycle in a very similar manner. Unemployment rate, however, could reflect structural imbalances in economies that may be consistent with the prevalence of bad loans and with banks' provisioning behavior (Bikker and Metzemakers, 2004). I expect real GDP growth rate to exhibit a positive relationship with bank profitability, while the relationship between unemployment rate and profitability should be inverse.

External financial equilibrium – captured by the current account balance that registers all cross-border income flows – is usually consistent with domestic monetary stability. An economy with healthy external financial position and orderly domestic monetary stability should be consistent with continuous lending dynamics, and in addition to that, may also be consistent with credible and predictable monetary policy. The relationship between external financial equilibrium and banks' profitability may be ambiguous, since an exorbitant current account surplus may be indicative of moderate domestic lending dynamics, while an enormous deficit may be a sign of excessive lending in economy that could lead to imbalances, and ultimately, to an economic crash.

Finally, it is important to include inflation expectations and expectations for the future path of interest rates. I approximate expectations by the steepness of the sovereign bond yield curve. The steepness is computed by subtracting the 3-month Treasury bill yield from the 10-year Treasury bond yield, as suggested by Estrella and Mishkin (1996). The steepness of the yield curve is not

only indicative of inflation expectations and interest rate expectations of financial markets, but also include term and sovereign risk premia. The relationship between the yield curve's steepness and bank profitability may not be straightforward: there may be a positive relationship when the yield curve is steep due to higher expected interest rates induced by strong economic growth, while the relationship may be negative, when the steepening of the curve is induced by higher inflation paired with sluggish GDP growth rate.

Table 1: Variables, definitions, notation and expected effect on profitability of banks

Variable	Description	Notation	Expected sign of coefficient
Outcome variable			
Profitability	Return on assets: annual net profits (after tax) over total average assets	ROA	
Bank-specific independent variables			
Economies of scale	Total assets (log): captures the size of the bank	LN_SIZE	(+)
Financial leverage	Ratio of total average assets over equity (reciprocal of capital adequacy): the extent to which banks financed their assets with their own equity	FINLEV	(-)
Operational efficiency	Operating costs in proportion of operating income: how effectively operating expenses are managed	CIR	(-)
Liquidity risk	Total loans to total assets: the ability to respond to decreases in liabilities (e.g. deposits)	LIQR	(+/-)
Independent variables related to the macroeconomic environment			
Cyclical variable	Annual real GDP growth rate	GDP	(+)
Cyclical variable that also captures structural imbalances	Unemployment rate	UR	(-)
External financial equilibrium	Current account balance	CA	(+/-)
Expectations	Steepness of the government bond yield curve, as the difference between the 10-year sovereign bond yield and the 3-month sovereign bill yield	STPN	(+/-)

3.2 Model description

I aim to measure the impact of bank-specific factors and macroeconomic determinants on banks' profitability on an unbalanced panel of 19 Euro Area member states in the period between 2007 and 2017. Since the fixed effects model is often used to reduce selection bias in the estimation of causal effects by removing great amounts of variation, I use fixed effects regression in my analysis. The method should be of help in order to control for potential effects of country-specific, time-varying unobserved variables, i.e. fixed effect coefficients may pick up the combined effects of all time-invariant predictors that differ across countries. The fixed effects method may mitigate endogeneity issues and may also address the "*omitted variable bias.*"

In order to estimate the impact of both bank-specific factors and macroeconomic determinants on the profitability of banks, I consider the following linear models:

$$(1)\ ROA_{c,t} = FE + \sum_{t=2007}^{2016} \sum_{c=1}^{19} \beta_{BS} \cdot X_{c,t}^{BS} + \varepsilon$$

$$(2)\ ROA_{c,t} = FE + \sum_{t=2007}^{2016} \sum_{c=1}^{19} \beta_{M} \cdot X_{c,t}^{M} + \theta$$

where $ROA_{c,t}$ is the outcome variable and denotes the return on assets of banks in country *c* at time *t*. In model (1), $X_{c,t}^{BS}$ denotes the bank-specific variables, while in model (2), $X_{c,t}^{M}$ represents macroeconomic variables. The error terms within the models are marked by ε and θ, respectively.

4. Results

The goal of the analysis is to identify statistically significant bank-specific factors and macroeconomic variables that have an impact on bank profitability. Among bank-specific factors, I controlled for economies of scale, financial leverage, operational efficiency and liquidity risk, in line with existing academic literature. I also build a model to see which macroeconomic variables have a statistically significant impact on bank profitability. The variables included in the model capture the cyclicality of the economy, structural imbalances, external financial equilibrium and expectations. The approach I use for the purpose of the analysis is essentially in harmony with existing literature. My analysis is different from existing literature, as it includes a longer time frame and takes into account all 19 Euro Area member states, instead of a small homogenous group of countries. In addition, I control for external financial equilibrium and expectations in model (2) that has not been included in broader academic literature, yet. Overall, the results produced by the models are largely consistent with that of other authors, but also points out where further research could be done in the assessment of the relationship between the ECB's monetary policy and the Euro Area banking sector's profitability.

4.1 Model with bank-specific independent variables

In the assessment of banks profitability in the context of bank-specific determinants, I incorporated four crucial aspects of the banking industry: scale of economies, financial leverage, operational efficiency and liquidity risk. Out of the four aspects, and therefore, four variables, only one variable, financial leverage proved to be statistically significant, while the other three, bank size, operational efficiency and liquidity risk was not found statistically significant on any level of significance (*Table 2, below*).

Table 2: Results of model (1) with bank-specific variables

Dependent variable: Return on Assets (ROA)

Independent variables	Coefficient	Standard Error	t-ratio	p-value	
constant	-6.4663	7.6031	-0.8505	0.3964	
LN_SIZE	0.5202	0.4059	1.2814	0.2019	
CIR	0.0042	0.0036	1.1839	0.2383	
FINLEV	-0.1670	0.0331	-5.0431	0.0000	***
LIQR	-0.0211	0.0167	-1.2655	0.2076	

* p < 0.10; ** p < 0.05; *** p < 0.01

Table 3: Results of model (1) with financial leverage, as the only statistically significant bank-specific variable

Dependent variable: Return on Assets (ROA)

Independent variables	Coefficient	Standard Error	t-ratio	p-value	
constant	2.1857	0.4711	4.6395	0.0000	***
FINLEV	-0.1509	0.0311	-4.8452	0.0000	***

* p < 0.10; ** p < 0.05; *** p < 0.01

Results in *Table 4* reveal that a country's banking sector has lower return on assets by 15.1% than its long-term average, if financial leverage of banks (FINLEV) in a certain country is 10% higher than its long-term average. The magnitude of the coefficient on financial leverage is very similar in *Tables 2 and 3*.

The interpretation of the results in *Table 2* is as follows: the profitability of a country's banking sector is greater by 52% than the long-term average, if banks' size (total assets in logarithm;

LN_SIZE) is 10% higher than the long-term average. Therefore, the larger the bank, the greater the economies of scale that should lead to improved profitability. The variable is not statistically significant.

According to the results, operational efficiency (i.e. cost-to-income ratio; CIR) is positively related to profitability, since return on assets of a country's banking sector could be 0.4% higher than the long-term average, if cost-to-income ratio is higher by 10% than its long-term average. The conclusion drawn from the model with regards to operational efficiency contradicts general economic intuition. The variable is not statistically significant.

Finally, the coefficient that belongs to liquidity risk (loans to total assets ratio; LIQR) has a negative sign, which leads to the conclusion that the relationship between return on assets and liquidity risk is inverse. In other words, when the liquidity risk ratio is high(er), banks' profitability becomes low(er): a country's banking sector realizes 2.1% lower return on assets than the long-term average, if the liquidity risk ratio is higher than its long-term average by 10%. The variable is not statistically significant.

4.2 Model with independent variables related to the macroeconomic environment

The assessment of banks profitability in the context of the general macroeconomic environment revealed that capturing the business cycle, structural imbalances and expectations is important, as these factors have important role in explaining profitability. External financial equilibrium, however, never contributed to the model in a statistically significant manner. One explanation for

that may be that current account balance itself may not be the perfect variable to control for external financial equilibrium.

The results of the fixed effects regression including independent variables related to the macroeconomic environment are showed in Table 2 below. As results show, both the steepness of the yield curve and real GDP growth rate are statistically significant at the 10% significance level and may contribute to the explanation of return on assets. In contrast with GDP growth and yield curve steepness, one-year lag of unemployment rate is statistically significant at the 1% level.

Table 4: Results of model (2) with variables that capture the macroeconomic environment

Dependent variable: Return on Assets (ROA)

Independent variables	Coefficient	Standard Error	t-ratio	p-value	
constant	0.8350	0.1312	6.3661	0.0000	***
UR(-1)	-0.0472	0.0127	-3.7330	0.0003	***
STPN	-0.0692	0.0360	-1.9234	0.0575	*
GDP	0.0312	0.0159	1.9695	0.0519	*

* p < 0.10; ** p < 0.05; *** p < 0.01

Results reveal that a country's banking sector has lower return on assets by 4.7% than its long-term average, if the unemployment rate in a certain country in the previous year (UR(-1)) was 10% higher than its long-term average. The variable is statistically significant at the 1% level.

The coefficient on real GDP growth shows that a country's banking sector's profitability improves when GDP growth is positive: a country's banking sector has greater return on assets by 3.1% than

its long-term average, if real GDP growth rate in a certain country that year is faster than its long-term average, by 10%. The variable is statistically significant at the 10% level.

Finally, steepness of the yield curve (STPN) exhibits a coefficient with negative sign, which implies that a flatter (steeper) yield curve leads to more (less) profitable banking sector – based on the measure of return on assets. As a result, a country's banking sector has lower return on assets by 6.9%, when the steepness of the sovereign bond yield curve is steeper by 10%. It is not defined in the model, what macroeconomic development or shock influenced the yield curve's steepness, i.e. whether the short-end or the long-end of the curve moved, or both. The variable is statistically significant at the 10% level.

Table 5: Summary of regression results

Variable	Description	Notation	Expected sign of coefficient	Result	Statistically significant
Outcome variable					
Profitability	Return on assets: annual net profits (after tax) over total average assets	ROA			
Bank-specific independent variables					
Economies of scale	Total assets (log): captures the size of the bank	LN_SIZE	(+)	(+)	No
Financial leverage	Ratio of total average assets over equity (reciprocal of capital adequacy): the extent to which banks financed their assets with their own equity	FINLEV	(-)	(-)	At 1%
Operational efficiency	Operating costs in proportion of operating income: how effectively operating expenses are managed	CIR	(-)	(+)	No
Liquidity risk	Total loans to total assets: the ability to respond to decreases in liabilities (e.g. deposits)	LIQR	(+/-)	(-)	No
Independent variables related to the macroeconomic environment					
Cyclical variable	Annual real GDP growth rate	GDP	(+)	(+)	At 10%
Cyclical variable that also captures structural imbalances	Unemployment rate	UR	(-)	(-)	At 1%
External financial equilibrium	Current account balance	CA	(+/-)	(-)	No
Expectations	Steepness of the government bond yield curve, as the difference between the 10-year sovereign bond yield and the 3-month sovereign bill yield	STPN	(+/-)	(-)	At 10%

5. Discussion and policy relevance

Following the previous section, in which I revealed the results of the models, I put the findings into a broader context, and in addition to that, I compare them to evidence presented by experts and scholars in the field. After the discussion of the results, I draw policy-relevant conclusions from the findings. Finally, I point out the most important aspects what the European Central Bank has to take into account when it decides on the next monetary policy measure(s).

5.1 Interpretation and discussion of results in a broader context

Within this sub-section, the most important findings presented by researchers in the academia regarding the bank profitability are summarized. The conclusions drawn by experts should serve as basis for the evaluation of my model results. The starting point is the seminal papers from the 1980s and 1990s that primarily focus on the direct relationship between net interest margins (NIM) and the main facility of central banks for the conduct of monetary policy. At the time, researchers captured banks' profitability by using NIM.

The empirical analysis delivered by Hanson and Rocha (1986) was among the very first ones that carried out in-depth analysis on banks' overall profitability. Hanson and Rocha's (1986) seminal paper assessed the potential determinants of net interest margins between 1975 and 1983 on a sample of 29 countries. They find that due to macroeconomic imbalances and domestic macroeconomic weaknesses, banks had to offer very high (real) interest rates on deposits in order to be able to sustain a minimum level of deposits. In addition to the sources of economic vulnerabilities, Hanson and Rocha (1986) identify that the way monetary policy is conducted explain the rather wide spread over the deposit rate, i.e. high net interest margins. In this context,

monetary policy was among the primary drivers that led to the elevated NIM, which ultimately contributed to banks' profitability to a great extent.

Demirguc-Kunt and Huizinga (1999) build on the findings presented by Hanson and Rocha (1986) by conducting research on a larger sample of 80 countries in the period between 1988 and 1995. The findings by Demirguc-Kunt and Huizinga (1999) are similar to the evidence presented by Hanson and Rocha (1986), as both pairs of authors uncovered the same negative relationship between reserve requirements and bank profitability, and identified positive relationship between profitability and capitalization of banks.

My findings are in harmony with the insights revealed by Hanson and Rocha (1986) and Demirguc-Kunt and Huizinga (1999), since my results revealed the importance of the level of banks' financial leverage. In addition to that, I identified the same negative relationship between financial leverage and profitability. Furthermore, in agreement with them, I also uncovered the significance of the conduct of monetary policy.

In the analysis of the relationship between bank profitability and market interest rates, English (2002) analyzed how the term structure of interest rates and changes in the term structure may influence net interest margins, and focused on the aspect of cash flows of balance sheet items that are functions of the yield curve. English (2002) gathers evidence on the effect of market interest rates on banks' net interest margins in 10 OECD countries (Australia, Canada, Germany, Italy, Japan, Norway, Sweden, United Kingdom, United States) and builds on the principle of maturity transformation. Consequently, he takes the "*conventional view*" under scrutiny, which stipulates that banks' liabilities are rather linked to short-dated interest rates, while assets are linked to long(er)-term interest rates. These assumptions imply that liabilities react rather quickly to changes

in interest rates and are repriced fast, while in contrast with them, assets adjust considerably slower to interest rate fluctuations. In short, the "*conventional view*" implies that banks may benefit from the steepness of the yield curve.

According to the results by English (2002), the "*conventional view*" holds in the United States. The results imply that the yield curve's steepness and the fluctuations of short-term and long-dated market interest rates have a statistically significant positive impact on bank profitability vis-à-vis net interest margins. In other words, when long-term interest rates increase (decrease) to a greater (smaller) extent than short-term ones, net interest margins are likely to rise. The results presented by English (2002) are in harmony with the model outcomes presented by Hanson and Rocha (1986) and Demirguc-Kunt and Huizinga (1999)

My model allows to draw opposing conclusion with regards to the difference between long-dated and short-term interest rates: a steep(er) yield curve reduces banks' return on assets. This area may call for further research, since from a policy point of view it is important to understand how banks' profitability, and ultimately, their lending behavior and risk-tolerance changes when the shape of the yield curve evolves. The opposing conclusions can be due to the fact that not only the time frame, but the geographical coverage is different. As a consequence, banks in the respective samples could have faced different regulatory environments and also different macroeconomic landscapes. In addition, hedging behavior of banks (e.g. interest rate, foreign exchange, etc.) and their off-balance sheet exposures could also be taken into account when further analysis is conducted.

While Hanson and Rocha (1986) and English (2002) do not control for macroeconomic variables within their models, Demirguc-Kunt and Huizinga (1999) are among the first ones to uncover the

importance of macroeconomic variables in the assessment of banks' bottom line. They point out in their evaluation of the general interest rate environment's impact on banks' financial performance that broad macroeconomic conditions should also be taken into account. This is a very important revelation in academic literature, since macroeconomic developments and imbalances greatly influence the conduct of monetary policy.

In agreement with the need for the inclusion of macroeconomic variables in the assessment of bank profitability, Genay and Podjasek (2014) emphasize that general macroeconomic conditions significantly influence the bottom line of the banking sector. Genay and Podjasek (2014) conclude that the net effect of low interest rate policies of central banks is beneficial. Carlo et al. (2017) agree with Genay and Podjasek (2014) that macroeconomic environment should be accounted for, and similarly to Albertazzi and Gambacorta (2008), the key message of theirs is that bank profitability is strongly linked to macroeconomic and financial conditions in a pro-cyclical manner.

The results related to the relationship between banks' profitability and the business cycle derived from my model are in harmony with Albertazzi and Gambacorta (2008), Genay and Podjasek (2014) and Carlo et al. (2017). Positive real GDP growth rate and low(er) unemployment rate undoubtedly lift the banking sector's profitability. Albertazzi and Gambacorta (2008) point out the importance of the balance sheet channel and the credit channel (channels discussed in *Section 2.3*). Real GDP growth is positively correlated with the increase in net interest income, since banks can serve greater credit demand of good quality (credit channel) instead of parking their excess liquidity in short-term liquid assets with low expected return. In addition, conjunctural upswing may improve the quality of banks' loan portfolio, as in times of economic boom bad debt can turn good again, which ultimately may lead to the release of loan loss provisions (balance sheet channel).

5.2 Policy relevance of the assessment of banks' profitability

In this subsection, I give a detailed overview of the relevant aspects of bank profitability from the European Central Bank's point of view. The relationship between profitability and bank-specific factors or macroeconomic determinants can have large weights in the policymakers' reaction function. In the following subsection, I prepare a one-page summary of the most important policy conclusions that targets busy policymakers and conveys and applies the key message of the thesis.

A large number of researchers conclude that the depressed interest rate environment can, but not necessarily leads to reduced net interest income and compressed net interest margins. Even if net interest margin decreases, banks can benefit from the improvement of the general macroeconomic environment that may help more than make up for the loss in net interest income. However, it may take a considerable amount of time before banks can benefit from the upswing in the business cycle.

Carlo et al. (2017) assess the relationship between macroeconomic conditions and financial performance of banks, and state unambiguously that the relationship between bank profitability and the shifts in the yield curve is not causal at all. They point out the issue of endogeneity: "*changes in the level and the slope of the term structure are not associated with lower bank profits once we control for the endogeneity of the policy measures to (current and expected) macroeconomic and financial conditions.*" The claim of the authors can be interpreted as banks' profitability does not deteriorate, because of the low interest rates, but because of the factors that triggered low interest rates to prevail, i.e. fragile and sluggish macroeconomic dynamics.

The conclusion drawn by Carlo et al. (2017) can be interpreted from the European Central Bank's point of view as follows: there is no rush for the Governing Council to reverse the negative interest rate policy (NIRP), the related "*forward guidance*" or to stop the large-scale asset purchase

program, because as long as macroeconomic variables continue to improve, banks may be able to keep up or even somewhat improve their profitability, which in turn may help to strengthen the monetary transmission mechanism.

Building on the line of thought in the previous paragraph, one may arrive at a counter-intuitive conclusion: should an economic downturn prevail in the Euro Area in spite of the sustenance of NIRP, banks would face not only compressed net interest margins, but also fee and commission revenues would decrease in addition to the increased need for creating loan loss provisions induced by the deteriorating quality of their loan portfolios. Bolt et al. (2012) point out that the nature of banks' profitability is not only procyclical, but also asymmetric. The asymmetry is primarily due to the fact that banks tend to underestimate the need for creating provisions during economic booms, and as a consequence bad loan coverage during recessions prove to be insufficiently low. Low level of bad loan provisions may generate additional costs in banks' income statements that substantially erode net profit in times of recessions.

In this case, the ECB could consider lifting interest rates into the positive range to ease the burden on the banking sector – purely from the aspect of NIM. Widening NIM could restore some of the profitability of banks through increased income, should nothing else change. However, rising interest rates and yields would delay the exit from recession, and could accelerate the deterioration of asset quality. Therefore, the final outcome in this case is not straightforward and requires further research. In such an adverse scenario, the ECB would be unable to tackle the recession without the help of fiscal policy. The ECB, however, has no tool to order governments to provide stimulus to the ailing economies or to roll out structural reforms.

Brunnermeier and Koby (2018) take the relationship between loose monetary policy conditions and bank profitability under scrutiny to gauge the time horizon over which extraordinarily accommodative monetary policy's stimulating effect lasts. The authors hypothesize that loose monetary policy can have contractionary effect on the economy, should certain circumstances prevail. They argue that a "*reversal interest rate*" always exists, which may or may not coincide with the zero lower bound of nominal interest rates, as the actual level of the "*reversal interest rate*" eventually depends on macroprudential policy, financial regulation, the general macroeconomic environment and various financial metrics of the domestic banking sector. The "*reversal interest rate*" decreases banks' net interest income and compresses net interest margins to the extent that cannot be counterbalanced by capital gains on debt securities, release of loan loss provisions or elevated fee and commission income.

Ultimately, this leads up to the point where banks face equity constraint. In other words, banks' ability to increase their lending activity any further may be hindered by their net worth. The mechanism may be the following: as banks' profits persistently drop and remain depressed, it might be too costly to issue new shares in order to raise capital. Therefore, in order to meet the capital requirements, set by the financial regulator, banks may decrease their lending activity, due to the lack of sufficiently profitable assets. As a result of net interest income reduction of great magnitude, the stimulating nature of accommodative monetary policy not only fades over time, but also reverses and ultimately becomes contractionary, as banks' ability and willingness to lend to the real economy (i.e. to households and corporates) significantly weakens.

The results derived from my model that includes bank-specific factors are in line with the theory demonstrated by Brunnermeier and Koby (2018). Both emphasize the importance of the level of financial leverage, or in other words, capital adequacy, as the two are reciprocals of each other. It

is important to point out that banks, which are able to generate profits in a sustainable manner, are not only able to accumulate capital through putting aside net profit as retained earnings, but are also able to attract external capital from various market players. Thus, a well-capitalized banking sector with good quality assets on their balance sheet and with the ability to tap capital markets for additional capital for lending when needed should have the capacity to provide sufficient credit to the real economy. However, a banking sector with weak capital structure may not be able to support real economic activity, due to the equity constraint.

In such a case, the European Central Bank, as a monetary authority, is unable to help, as its short-term liquidity providing facility is for the purpose of overcoming temporary liquidity shortages, while the bank is strong in capital and solvent. Even in its current unconventional monetary policy toolkit, the ECB is prohibited from purchasing company stocks or bonds issued by financial institutions. Consequently, the monetary policy arm of the ECB has no direct or indirect influence over the banking sector's capital adequacy or capital structure.

5.3 One-page summary of policy conclusions

The ECB's Governing Council brings its monetary policy decision by abiding its mandate, which sets price stability as the primary objective. The Euro Area has been going through a very long period of low-inflation and low-growth. The appropriate stance for such macroeconomic landscape is the sustenance of loose monetary conditions. Currently, the ECB is committed to the negative interest rate policy, the large-scale asset purchase program and also to the "*forward guidance,*" which is supposed to push out expectations for the exit from the ongoing asset purchase programs and policies to as far in the future as possible.

According to the official guidance released by the Governing Council, the open-ended asset purchase program will last until the September 2018, and no interest rate hike should be expected "*well past*" the exit from the program. President Draghi added that asset purchases should not end abruptly. No further clarification has been released to date. The next monetary policy decision will be taken and announced on 14 June, when the Governing Council has to decide on the appropriate policy interest rates, whether the current "*forward guidance*" is effective and efficient enough without any adjustment and also needs to discuss the future of the asset purchase program.

Recent inflation and GDP growth data reflected improvement, but both remain far away from the point that would call for tighter monetary policy. According to the results of the thesis, banks' profitability in the Euro Area is strongly dependent on the economic cycle, structural imbalances and expectations, while financial leverage prevailed as a significant determinant among bank-specific factors. Banks benefitted from the recent pick up in economic growth, and overcame many hurdles that were related to their profitability. Therefore, the monetary transmission mechanism has somewhat strengthened.

The ECB is unable to influence bank capitalization or structural deficiencies of the economy, but has the ability and willingness to strongly influence expectations, and has been promoting policies to aid the recovery of the Euro Area's economy. Consequently, the sustenance of the large-scale asset purchase program and the negative interest rate policy is appropriate, since the monetary transmission mechanism is unlikely to be damaged due to the evolution of banks' profitability.

6. Conclusion

I identified bank-specific and macroeconomic factors that have considerable impact on Euro Area banks' profitability. Results revealed that financial leverage is one of the most crucial bank-specific factor that influences bank profitability: the higher the leverage of banks, the lower their profitability, all else equal. Among macroeconomic variables, those prevailed as significant influences that capture the business cycle, structural imbalances and expectations.

The depressed interest rate environment can, but not necessarily leads to reduced net interest income and compressed net interest margins. Even if net interest margin decreases, banks can benefit from the improvement of the general macroeconomic environment that may help more than make up for the loss in net interest income. Based on the results derived from the developed models, as long as macroeconomic variables continue to improve in the Euro Area, banks may be able to keep up their profitability, which may help to maintain, or even improve the effectiveness of the monetary transmission mechanism. Consequently, the ECB may maintain its current accommodative monetary policy to support the recovery of the Euro Area's economy, as banks also profit from the cyclical upswing induced by loos monetary conditions.

There should be great emphasis on the importance of the level of banks' financial leverage, or in other words, capital adequacy, as the two are reciprocals of each other. It is important to point out that banks, which are able to generate profits in a sustainable manner, are not only able to accumulate capital through putting aside net profit as retained earnings, but are also able to attract external capital from various market players. Thus, a well-capitalized banking sector with good quality assets on their balance sheet and with the ability to tap capital markets for additional capital for lending when needed, should have the capacity to provide sufficient credit to the real economy. However, a banking sector with weak capital structure may not be able to support real economic

activity, due to the equity constraint. In such a case, the European Central Bank, as a monetary authority, is unable to help, as its short-term liquidity providing facility is for the purpose of overcoming temporary liquidity shortages, while the bank is solvent. The monetary policy arm of the ECB has no direct or indirect influence over the banking sector's capital adequacy or capital structure.

The research carried out within this thesis can be further advanced by assessing whether macroprudential tools complement monetary policy and contribute to the achievement of price stability. Furthermore, the regulatory environment could be included in the analysis as well, to see if capital requirements and risk-weights on assets pose any constraint to bank lending that could hinder the recovery of the Euro Area.

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